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CITTA 5th ANNUAL CONFERENCE ON PLANNING RESEARCH

PLANNING AND AGEING
THINK, ACT AND SHARE AGE-FRIENDLY CITIES

EDITED BY SARA SANTOS CRUZ, FERNANDO BRANDÃO ALVES, PAULO PINHO

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PLANNING AND AGEING

Think, Act and Share Age-Friendly Cities

Edited by Sara Santos Cruz, Fernando Brandão Alves, Paulo Pinho

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Preface

Paulo Pinho
Director of CITTA

The 5th Annual Conference of our research centre, CITTA, with the general theme – *Planning for Ageing: Think, Act and Share Age-Friendly Cities* – took place in the European Year on Active Ageing and Intergenerational Solidarity, emphasizing the relevance of addressing population change and new demands to communicate and serve the entire citizenry. The conference intended to stimulate the debate on the importance of planning for ageing. It is imperative nowadays to bring ageing into planning by raising awareness of planners in developing inclusive communities and environments, but also to encourage policymakers and other stakeholders in creating better opportunities for older people to live in our contemporary societies.

The populations of the world are changing. In some countries, the number of senior citizens will strongly increase. The number of older persons (60+) will double from the current 600 million to 1.2 billion by 2025, and again, to 2 billion by 2050. Homes, communities and environments have not been designed with older people's needs and capacities in mind. Policy makers, planners and other urban actors should approach new agendas (like WHO Age Friendly Cities Guidelines) to ensure the quality of the tools and interventions they use. Experts need to guide policies and processes to achieve better results in the planning of services and infrastructures not only for the elderly but also for all ages; changing patterns of behaviour, life-style and expectations of new generations of older people should be taken into account.

We were pleased to have the valuable contributions of Prof Taner Oc, from the Barttlet School of Planning of the University College of London, and of Prof Mike Biddulph, from Cardiff University, as keynote speakers, who have enriched and stimulated the debate with new perspectives and recent advances. The participants included mainly researchers from the academic world, both national and international planning research centres, with a large contribution of members of CITTA. The theme of the conference, for its transdisciplinarity, had the capacity to join papers from different research interests and fields of knowledge, focusing on diverse topics like: urban policies, social patterns and behaviours, urban design, mobility and transports, urban infrastructures and services, and others.

This book follows the organization of the conference, being divided in four parts corresponding to the four parallel sessions. Part A includes five papers organized under the heading *Urban Policies and Ageing*, focusing on urban policies and (new) agendas regarding better results in the planning of services and infrastructures for all ages; Part B gathers eight papers under the heading *Inclusive Communities - Tools and Approaches*, highlighting new opportunities and solutions for building inclusive communities; Part C includes six papers under the heading *Designing Age-Friendly Environments*, addressing how age friendly design can support active living, healthy environments and social connectedness for all citizens and ages; and finally, Part C is organized with seven papers under the heading *New Paradigms for Ageing Cities*, discussing the need to shift the planning paradigm facing the new challenges of ageing cities. The editors of this book would like to thank all the authors and contributors involved in the

organization of the conference, and, in particular, the scientific commission for all the work in the selection of the papers.

Part A. Urban Policies and Ageing

Local planning for an ageing population in the UK

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The population of the United Kingdom is growing and ageing. High proportions of older people particularly challenge popular retirement destinations in coastal and more rural areas. The implications of these demographic shifts are crosscutting; they extend from service provision to the design of housing and neighbourhoods. The central government has attributed prominence to the topic and has for example issued strategic guidance for local areas. As one example, this guidance promotes the concept of the "Lifetime Neighbourhood", an inclusive living environment for all generations.

How do local actors plan for population ageing? Qualitative research has been carried out in three case study areas to answer this question (Meyer, 2011). The paper gives an insight into the wealth of activities, including successes and difficulties, in the case study areas. Key results of the paper focus on local governance arrangements. A lot of experimenting with governance structures, such as the formation and re-formation of multi-organisational partnerships, can be observed in local areas. The paper analyses inter alia what kind of learning processes are connected therewith. Furthermore it focuses on experiences concerning older people's participation.

Keywords: Ageing; local area; case study; governance; learning

1. Introduction

In 2007 the UK reached a demographic tipping point: the population above state pension age began to outnumber young people under age 16. Such striking facts help to raise awareness for demographic changes. Apart from the general population shifts, the lively debate about the ageing of the population in the UK is closely connected to the phenomenon of the "costa geriatrica" Champion (2005: 98). The British coastline has enormous proportions of older people, as it is a preferred destination for retirement migration.

The paper first describes main trends of population development in the UK before it gives an overview on strategic responses to population ageing on different spatial levels. After a summary of the research design and methods of the study this paper is based on, main activities in planning for an ageing population in the three case study areas are presented. On this basis, governance arrangements in planning for an ageing population are discussed. This comprises a typology of actors and an analysis of different forms of partnerships, which are connected to different collective learning processes. A special focus is put on older people's participation. The paper closes with a brief outlook to what other countries can learn from the investigation into British experiences in planning for an ageing population.

2. The UK's growing and ageing population

Population development in the UK is mainly characterized by growth and ageing. The population comprised 62.3 million citizens in 2010. From 1981 to 2010 it increased by 5.9 million. If past trends continue, the population will reach 73.2 million by 2035. (If no other source given all data from the Office for National Statistics 2012).

Figure 1 depicts the population pyramids for 2010 and 2035. Both, net immigration and a fertility rate, which is higher than in most other countries in the European Union, have been contributing to population increase.

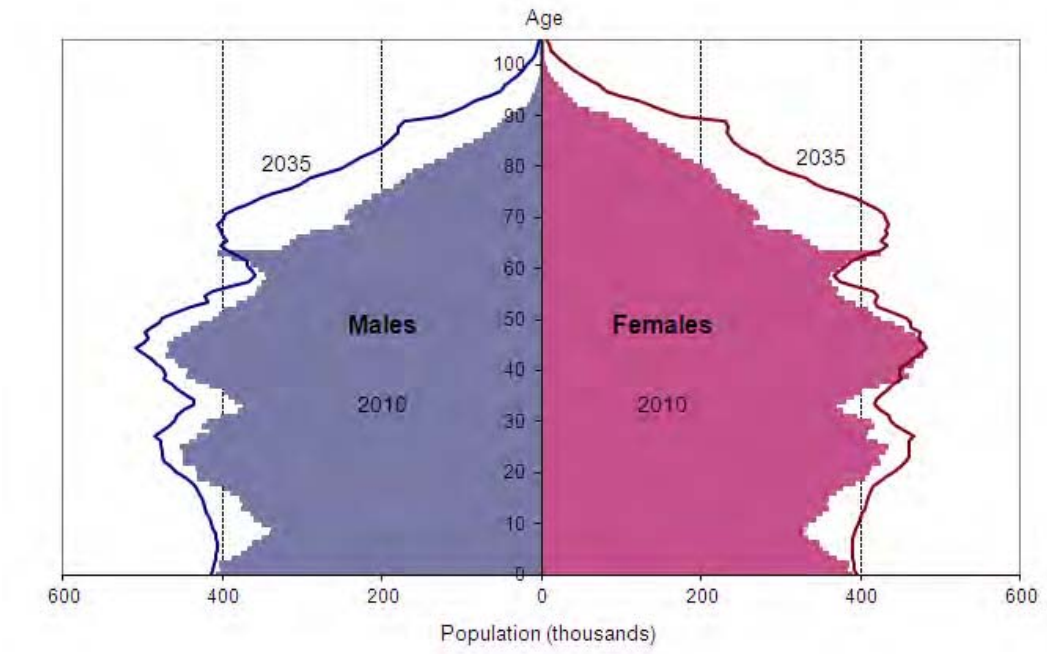

Figure 1. Actual and projected population by sex and age, 2010 and 2035 (Source: Office for National Statistics 2012)

Immigration and natural growth have not prevented the UK from ageing, however. In the last twenty-five years (1985 to 2010), for example, the population over 65 grew by 1.7 million. Currently, 17 per cent of the population are aged 65 and over. According to projections, this age group will account for 23 per cent of the total population by 2035. The population over 85, the 'oldest old', is growing fastest. Compared to other countries in the European Union, the UK population is ageing more slowly.

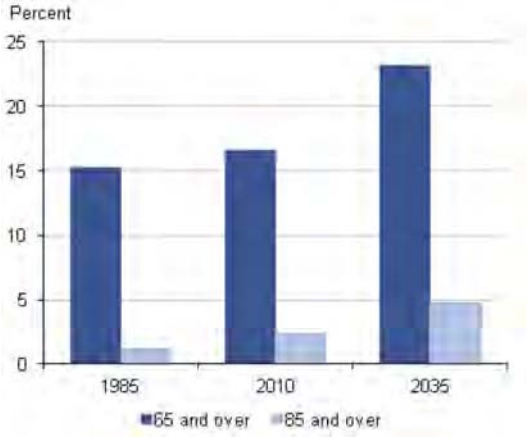

Figure 2. Percentage of older people in the UK 1985, 2010 and 2035 (Source: Office for National Statistics 2012)

High proportions of older people are especially to be found in more rural and coastal locations, which are popular retirement destinations (Office of the Deputy Prime Minister 2006). In England, the 50-plus-generation moves preferably to areas like the Isle of Wight, Dorset or Cornwall (Uren & Goldring, 2007).

Strategic responses to population ageing

The ageing of the population constitutes a challenge for local development. The design of housing and neighbourhoods as well as service provision is usually tailored for a younger population. Many questions concerning financing and strategic goals must be tackled on the national level – such as those pertaining to the pension system. However, the consequences of the demographic shifts are most tangible on the local level, the ageing population's place of residence (see Hollbach-Grömig 2002).

Population ageing in the UK has resulted in a remarkable policy response (European Policies Research Centre, University of Strathclyde 2006; Gilroy, Brooks, Shaw 2007). The British government has issued several strategies on how to deal with the ageing population. In this paper, they can only be presented exemplary.

"Opportunity Age – Meeting the challenges of ageing in the 21st century" (Department for Work and Pensions 2005) and its successor "Building a society for all ages" (HM Government 2009) aim inter alia to improve older people's wellbeing by promoting active lifestyles and encouraging people to work for longer, as well as supporting older people's independence. Furthermore, they seek to improve attitudes towards ageing and older people. They constitute the framework for more specific strategies.

Of particular relevance for the local level is the "Lifetime Homes, Lifetime Neighbourhoods" strategy (Department for Communities and Local Government, Department of Health & Department for Work and Pensions 2008). It seeks to assist regional and local level authorities to consider needs of older people concerning housing and living environment. "Lifetime Homes" can easily be adapted for different needs arising in the course of a lifetime as they follow a catalogue of design criteria. The "Lifetime Neighbourhood" concept transfers this idea of an accessible and adaptable home to the surrounding area.

In 2010 the Department for Work and Pensions launched the "Ageing Well" programme. It focused on "what makes a good place to grow old and action councils can take to create one" (http://www.local.gov.uk/topic-ageing-well). The programme provided information and good practice, workshops, mentoring programmes, etc.

On the regional level, too, some notable approaches to tackle the ageing of the population have been developed. The "Age Proofing Toolkit Regional Strategies and Demographic Ageing" (Ferry, Baker 2006), has been much discussed. It aims to ensure that population ageing is considered in all regional strategies.

The majority of local areas are also beginning to develop strategic approaches. According to the Audit Commission (2008), almost one third has "well developed, comprehensive strategies" in place (21). Governmental and nongovernmental organisations have compiled good practice examples of local approaches. A research gap can be identified, however, concerning detailed

knowledge of local approaches. Investigations into “normal practice” in contrast to best practice is lacking as well as investigations covering a longer time span.

3. Research design and methods

How do local actors plan for population ageing? Qualitative research has been carried out in three case study areas to answer this question. Hereby a time frame was observed which goes back to the first local strategic reactions to ageing in the respective area.

The research followed a multiple-case design. The case study authorities are all characterized by above average proportions of older people but contrast regarding general conditions like location or administrative structure. North Tyneside is located in the Newcastle city region in the less prosperous North East of England. Poole is a tourist resort on the coast in South West England. Wealden, finally, is a rural district belonging to East Sussex County in South East England.

The research data is drawn from qualitative interviews with experts in local authority administration, charities, etc. based on an interview guideline. Moreover, an analysis of documents such as older people strategies and minutes of meetings has been carried out.

An analytical perspective on local governance and collective learning are the main theoretical concepts the research builds on. The research design is oriented to grounded theory and aims at identifying themes and patterns in the research data by closely connecting data collection, data analysis and theoretical abstraction.

4. Planning for an ageing population in North Tyneside, Poole and Wealden

In North Tyneside, Poole and Wealden, the “normal practice” of planning for an ageing population was analysed. North Tyneside, bordering onto Newcastle, is a former coal-mining area. The population, comprising 199,000 inhabitants is growing in North Tyneside. While the English average is a proportion of 16.5 per cent population aged 65 and over of the total population, it is slightly more, 17.5 per cent, in North Tyneside. (Office for National Statistics 2011, Projecting Older People Population Information System based on ONS data, 2011)

Compared to other local areas in the UK, North Tyneside started to tackle the ageing of its population early. In 2001, for example, an older people’s forum was initiated to give a voice to older and retired people. A first general older people strategy was published in 2004 and has been revised several times meanwhile. Specific strategies have been developed for health and social care services as well as housing. The housing-focused strategy eventually led to the complete remodelling of North Tyneside’s sheltered housing, the “Quality Homes for Older People” project. The social care department is the main driver of the mentioned activities, however, topics and responsibilities have widened more and more. This is reflected in the Local Strategic Partnership taking the lead for the review of the older people strategy. Local Strategic Partnerships consist of representatives from different organizations of the public, private and voluntary sector. They are responsible for developing the Sustainable Community Strategy, a long-term vision for the local area. This way one aims at to achieve a broader impact of strategic activities concerning older people.

Poole is a prosperous tourist resort on the coast in South West England. Its population of 141,900 citizens has an enormous proportion of older people: 21.3 per cent are 65 and over, 3.5 per cent are 85 and over, compared to 16.5 per cent and 2.3 per cent respectively for England. In 2030 In Poole 27.6 per cent of the total population are projected to be 65 years and over. (Office for National Statistics 2011, Projecting Older People Population Information System based on ONS data, 2011)

The topic older people and ageing has become prominent on the local agenda with the preparation of Poole's Sustainable Community Strategy in 2006. This occurred later than in the other case study areas, despite Poole having a large proportion of older people. The topic was considered to be crucial for local development so that a theme partnership of the Local Strategic Partnership took ownership of it – the Older People Services Steering Group was formed. In contrast to the other two case study areas and many other areas nationally, there is no adult social care focus as concerns council departments, but a broad membership covering transportation, leisure services, financial services, etc. Two years later, the group presented an Older People's Strategy. The strategy is both, a vision for future service provision as well as a guide for older people themselves, providing for example useful contact details. Spatial planning documents in Poole consider population ageing and promote for example the Lifetime Homes concept.

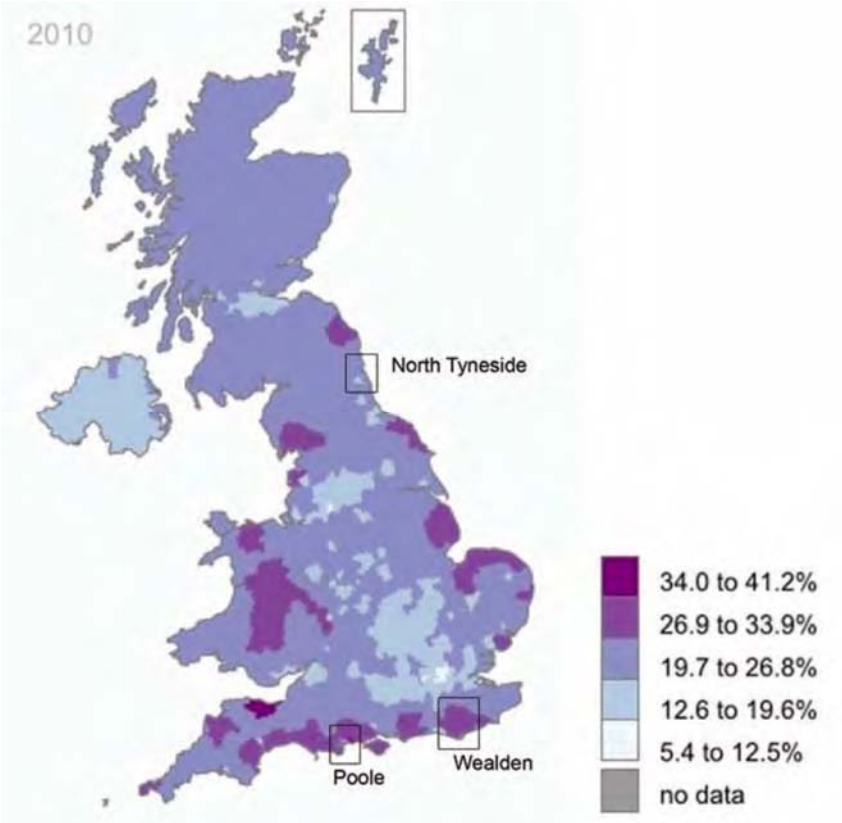

Figure 3. Population aged state pension age and over as a percentage of the population and the case study areas (Source: Meyer 2011, map and data based on Office for National Statistics)

Furthermore, Poole has been taking part in several nationwide initiatives concerning older people. It was one of the areas for example, which participated in the Department of Health's Partnerships for Older People's Projects programme. The Borough of Poole Council and the local organisation of the National Health Service used the funding to establish an Intermediate Care Service reducing admissions to hospitals and residential care.

Wealden District is a rural area in East Sussex County in South East England. Because of the two-tier administration (see Chapter 2.2 on local government) both, district and county level have to be considered regarding local planning for an ageing population. More than half of the area is classified as "Area of Outstanding Natural Beauty". The standard of living is comparatively high. East Sussex has an enormous proportion of older people; 23.6 per cent of the 517,000 citizens are 65 years and over. A special characteristic of the county is its high proportion of oldest old people, it has the highest percentage of people aged 85 and over of all English counties, 3.9 per cent. The situation is similar in Wealden, where 23.7 per cent of the population are aged 65 and over, 3.5 per cent are aged 85 and over. The area attracts a lot of retirement migration, whereas many younger people move away because of limited education and job opportunities and the lack of affordable housing (Office for National Statistics 2011, Projecting Older People Population Information System based on ONS data, 2011).

Planning, for an ageing population in Wealden, must be considered within the East Sussex's policy and planning context. The Joint Commissioning Strategy for Older People, which was developed by East Sussex adult social services and local organizations of the National Health Service focuses on prevention and providing services closer to home. Moreover, the County Council initiated the development of strategies for housing and housing related support in all districts. Older people's forums have established across East Sussex. General community planning and spatial planning are also involved in the planning for an ageing population in Wealden/East Sussex.

Planning for an ageing population in Wealden/East Sussex is clearly led by the council's adult social care department. As in the other areas, an older people's partnership has been established. In East Sussex its task is to plan and commission health, housing, and social care services for older people. Accordingly, it is dominated by adult social care and health but also includes housing representatives. On the board, older people's representatives play an important role.

5. Governance arrangements in planning for an ageing population

Due to the crosscutting nature of ageing, no singular organisation is ultimately responsible. There is rather a search for responsibility in local areas. Figure 4 shows a characteristic constellation of the main local actors who deal with population ageing and the major interactions. The generalised illustration is based on the current situation in the three case study areas.

On the basis of the government arrangements in the case study areas, the council administration has been identified as leading local planning for an ageing population. More specifically, the council's adult social care department is usually the main actor for older people's issues. As it is perceived to be responsible for these issues by the public and other service

providers, it has widened its role beyond offering care services for people with specific needs to a more strategic one covering the quality of life of all older people. The council's adult social services department cooperates with other public sector organisations such as the National Health Service as well as the voluntary sector.

Local Strategic Partnerships have a membership of representatives from all three sectors. They are responsible for developing a Sustainable Community Strategy, which is a long-term vision for the local area as described above. Concerning planning and ageing, they are responsible for positioning the topic with respect to the superordinate local strategic development. Older people's partnerships, bringing the main stakeholders together, develop more concrete strategic approaches concerning ageing and older people.

Local areas are struggling to broaden the ageing agenda beyond social care and healthcare issues, which are linked to services required particularly by the elderly. While housing has become involved mainly due to national government efforts, other fields like spatial planning or transportation are only concerned to a limited extent. Local politics take a supporting role at most.

Figure 4: Characteristic local governance arrangement in planning for an ageing population (Source: Meyer 2011)

Types of actors

Almost thirty experts from different organizations have been interviewed in the case study areas. Concerning their goals and approaches striking similarities have been observed across localities and organizations. The actors are influenced by their job position, personal characteristics and experiences, such as caring for older parents.

Consequently, a typology of actors has been developed. Four types can be distinguished: "the modern efficient service provider", "the dedicated social service provider", "the strategic manager for older people's issues" and "the lobbyist for older people's issues". The typology

illustrates inter alia the conditions for collective decisions, e.g. in older people's partnerships, where different actors agree for example on a joint older people's strategy or the provision of services. The four types are not based on real persons, in the sense of prototypes, but they are ideal types constructed out of several individuals (Kelle, Kluge 1999, 94 f.).

Strikingly, only singular interviewees mentioned attempts to influence the demographic profile of their local area, for example attracting younger people to the area in order to slow down the ageing of the population. The majority of interviewees focus on the older population's needs and on how to come up to those needs.

The modern efficient service provider

"The modern efficient service provider" actively aims to improve services for older people as well as governance structures. It is important for him or her to deliver services efficiently, i.e. a good quality of services at low financial input. Those goals are followed by two main activities. First, planning is based on evidence so that services can be targeted to needs. The effects of the measures are monitored with the help of quantitative indicators. Second, expenses are reduced and one makes use of specific funding streams to complement basic funding by national government. The language of "modern efficient service providers" reflects their business-like attitude, It is characterised by statements like "we're starting to rationalise the service and consolidate".

The dedicated social service provider

"The dedicated social service provider" contrasts with "the modern efficient service provider" insofar that his or her goals are centred on older people and their needs and aspirations. Similar to "the modern efficient service provider", he or she tries to reach those goals through his or her own daily work. The emphatic attitude, which characterises this type, is reflected in statements like the following: " we need to make sure we keep doing about is this all right for my parents, my grandparents. If the answer's no, then we need to do something about it." Strikingly, all "dedicated social service providers" among the interviewees are female. Some of them refer to their experience with their parents' growing older or their role as a carer. Ways to achieve the goal of improving older people's quality of life are characterised by interaction with older people themselves – through consulting or engaging them.

The strategic manager for older people's issues

"Strategic managers for older people's issues" aim at finding governance arrangements to make sure that older people's issues are adequately considered – mainly through initiating and providing input into discussions concerning such structures. They are for example drivers in setting up multi-organisational partnerships to deal with ageing and older people.

The lobbyist for older people's issues

The fourth type, "the lobbyist for older people's issues", aims to raise awareness concerning ageing and older people and give the latter a voice. Their approach is adverting to the impact of

strategies and policies on older people, taking part in consultations on plans or setting up and joining groups which lobby for older people. Often, “lobbyists for older people’s issues” belong to the third sector.

In order to achieve a coordinated planning for an ageing population, representatives of different organisations but also different individuals have to find a common frame of reference.

From working in silos to partnerships

As the dominance of adult social care departments shows, traditional hierarchical and sectoral steering by public bodies is still important. In line with general trends in the UK, however, network-like governance arrangements become more and more important in planning for an ageing population. A dominant pattern concerning governance arrangements, which reappeared in interviews and documents, is a change “from working in silos to working in partnership”. Motivations for partnership work range from an attempt to use resources efficiently to the cross-cuttingness of the ageing agenda. Between social care and health efforts form harmonization are especially remarkable. Beyond that, older people themselves are more and more consulted about their needs and aspirations and most recently have even become integrated in strategic planning.

Formalised older people’s partnerships are crucial vehicles, which bring actors together who are involved in planning for an ageing population. Older people’s partnerships are a forum to align different views to develop a common strategic approach. It has to be kept in mind in how far action orientations in planning for an ageing population differ (see typology of actors). They span the public and voluntary and community sectors, but rarely the private sector. They are responsible for older people strategies, joint commissioning strategies, etc. Such partnerships have been created in most local areas in the last few years and will thus be discussed in greater detail.

Two models of older people’s partnerships can be distinguished: adult social care led partnerships and Local Strategic Partnership led models. While the first are strongly dominated by adult social care and health, the latter have wider membership including representatives from police and fire services, leisure services, etc. North Tyneside’s Older People’s Partnership Board (OPPB) and The East Sussex Older People’s Partnership Board have a health and care focus. Poole‘s Older People’s Services Steering Group is a broader partnership.

Learning processes in partnerships

The dominant form of learning in older people’s partnerships is an exchange of information. Depending on the design of groups, there is also learning that goes beyond insofar that a new shared perspective is created. Using a term from learning theory, the latter can be described as problem solving in the network. The two forms or intensities of learning by networking correspond to the two models of older people’s partnerships, the ASC- and LSP-led models.

Information exchange in the network

In all older people’s partnerships the dominant form of learning is information exchange. Members are inter alia updated on developments in the involved organisations. The groups also debate and develop ideas for improving older people’s quality of life. An example is the development of an

Older People's Charter in Poole, The charter, which local organisations sign up to, assembles principles how older people should be treated. Information exchange in the network leads to the systematic diffusion of specific knowledge concerning older people's issues, specifically with respect to older people strategies, the development of new ideas and a change of attitudes towards ageing and older people in the wider membership.

Problem solving in the network

The term problem solving refers to the way how knowledge is used or applied in the general learning literature, (Mietzel 2003, 247). With respect to collective learning, it emphasises striving for consensus and developing a shared perspective (Wilkesmann 1999, 78; Pommeranz 2001, 201). This form of learning is in the main restricted to the ASC-led partnerships in North Tyneside and East Sussex. Work on draft plans, for example the action plan for the East Sussex dementia strategy, can illustrate how the partnership develops a common perspective. Drafts are discussed, whereby especially critical attitudes are voiced. The draft is then amended to come up to the different perspectives of the network members.

Why does it come to creating a shared perspective in the older people's partnerships in East Sussex and in North Tyneside but not in Poole? The design of the partnerships is crucial for the learning forms within. It is decisive for problem solving learning whether partnerships have responsibilities that go beyond exchanging and developing ideas and include decision-making, for example concerning services. Furthermore, a smaller and more homogenous membership as in East Sussex and North Tyneside is conducive. The same holds for stronger ties between the members because the actors also work together in other contexts. Strong ties encourage trust between partnership members (Gulati et al. 2002, 291).

Wilkesmann (1999) contrasts problem solving in the network with simple collective learning. In this form of learning, a common perspective is created through majorities or hierarchies. Remarkably, simple collective learning can hardly be observed in planning for an ageing population in the case study areas' partnerships. Hierarchies play a marginal role in the networks. Majority votes are an exception. If they are used, they usually follow a discussion process with an exchange of perspectives.

Older people's participation

It has already been referred to the role older people themselves play in planning for an ageing population. In British local areas, there has been a two-stage shift from merely informing older people about strategic developments, service offers, etc. to consulting them about their needs and aspirations and, most recently, to engaging them in designing services, e.g. as members of older people's partnerships. Older people have for example co-designed care homes in North Tyneside

and Wealden. Particularly the "dedicated social service providers" support consulting and involving older people. This actor type is characterised by an emphatic attitude putting older people's needs and aspirations in the centre of attention.

There are various formats of consultation exercises. Frequently, feedback is invited to documents concerning older people, for example older people's strategies. Documents can for example be commented on the Internet. As in the general debate about participation, a disadvantage is that especially well educated and voiced persons engage. More interactive and more open formats are focus groups or discussion rounds at bigger events. In Poole, several so-called "Speak Out" Events were conducted. There, older people had the opportunity to discuss various topics of their interest with service providers and voluntary and community groups. The advantage of such events is the breadth and depth of information one can get in a short period of time.

In the context of consultation with older people, older people's forums are crucial. On the one hand, they constitute a consultation or information base for the local authority. They provide the authority with an uncomplicated access to older people's perspectives if asked about certain projects or plans. On the other hand, they raise issues on their own, complain about deficits in services for older people or the like. In North Tyneside, for example, they were one of the driving forces, which led to developing an older people strategy. Older people's forums also constitute a link between older people and service providers insofar that they inform older people about services available locally and enlighten service providers about older people's needs. In contrast to elected senior councils, access to these forums is low-threshold. However, their representativeness problem is repeatedly criticised. Thus, forums are urged to consult with a broad range of older people internally, i.e. to include frailer older people, ethnic minorities, people with learning disabilities, etc.

There has been an immense debate on older people's participation on the national level. The Better Government for Older People (BGOP) initiative has to be mentioned in this context. It tested opportunities to involve older people in the design of policies.

Exkursus: Dorset Partnership for Older People Programme (POPP)

Dorset Partnership for Older People Programme (POPP) was one of 29 national pilot initiatives funded by the Department of Health, which aimed at involving older people in improving local services. Dorset POPPs has won awards and has been much quoted as a successful example for older people's empowerment. Dorset POPP started in 2006. Meanwhile Dorset County Council and National Health Service (NHS) Dorset fund the programme. The key term of the project is empowerment - local communities should be strengthened thereby enabling people remaining in their own homes, as they grow old.

Dorset POPP is organised as a partnership between Dorset County Council, the local organisation of NHS, the different voluntary sector organisations as well as older people themselves. They hold a majority on the Strategic Board and they are strongly represented in the delivery of the specific projects.

The following components are central to Dorset POPP:

- Leadership Programme

Leaders are paid staff that is responsible to identify gaps and development opportunities in service delivery in local clusters. They attend for example town and parish council meetings and other forums where decisions are made about service provision.

- Wayfinder Programme
  Wayfinders are paid staff working in the local clusters are responsible for signposting and support concerning services that affect older people. These range from information on pensions to social activities. Wayfinders are for example to be found in GP practices, libraries or leisure groups.
- Evaluation Programme
  Volunteers, mainly older people evaluate the impact of the POPPs programme. They collect for example ‘outcome stories' documenting the impact of the initiative on individuals’ quality of life.
- The Community Initiatives Commissioning Fund
  Local initiatives can be supported by 'seed fund'. Funded projects comprise computer classes or memory cafés for older people suffering from dementia.

One of Dorset POPP’s key success factors is older people’s strong representation in both, steering and carrying out**.** (Creating Excellence**,** National Empowerment Partnership 2010, Dorset County Council 2012).

6. Lessons to be learnt

Other European countries in particular, all faced with ageing populations, can benefit from the multitude of activities in the UK to tackle ageing. On the one hand, these are linked to the prominence central government has attributed to the topic and its strong impact on local authorities. On the other hand, ageing is discussed in its own respect in the UK, scarcely in the context of a more abstract demographic change. In other countries where the population is declining overall, population ageing has been discussed less intensely than shrinkage, even though countries such as Germany or Italy have average proportions of pensioners overall which equal those in British retirement destinations. Population decline is frequently perceived as more threatening than ageing.

One must be careful in transferring approaches, however, and take specific conditions in the respective country into account, such as the strength of central government influence on local areas in the UK. The identified types of actors involved in planning for an ageing population, for example, are partially characterised by typically British approaches. The particular features of “the modern efficient service provider”, “the dedicated social service provider”, “the strategic manager for older people’s issues” and “the lobbyist for older people’s issues” might not apply in other contexts. However, similar basic differentiations are supposed to be found there and are worth bringing to mind.

Partnerships dealing with crosscutting issues have been strongly supported by central government for decades and are thus more common governance arrangements than in other countries. Older people’s partnerships have shown to be valuable in planning for an ageing population as they assemble those who share responsibility and interest in older people and

ageing and facilitate finding common solutions and a coordination of activities. As the experience in the case study areas has shown, their functions differ according to their design, ranging from a forum to discuss ideas to a decision-making body specialised on health and care.

The UK is extraordinarily experienced concerning older people's participation, which has been focused on and experimented with. Older people's forums are the preferred option for political participation in local areas. Even though local authorities often criticise the forums for not being representative enough, the dominant experience in the case study areas has shown that the forums manage to integrate a variety of older people and, above all, that they are willing to invest time and experience to improve the situation for older people locally. In contrast to elected senior councils, access to these forums is low-threshold. The average age in local councils is usually quite high anyway. Local service providers can use forums' engagement to target services better and to increase acceptance of decisions in the public. Furthermore, the forums organise mutual support among older people thereby disburdening public authorities.

There is no recipe for planning for an ageing population as local needs as well as potentials are crucial. The presentation of British experiences should thus be read as a stimulus for discussing own approaches.

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Smart ageing in smart cities

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A city designed for ageing people, and in general for weak users – as women, children, disabled people – is a better city for all. As WHO states, active ageing is a lifelong process, an age-friendly city is not just "elderly-friendly". An essential condition for quality of life and well being, as for a sustainable economic growth, is represented by health, considered as a primary right for every human being. European Union has then developed, starting from 2006, the Health in All Policies (HiAP) approach. In this framework, SiTI contribution was focused on identifying the relationship between basic human needs (as moving, living in a certain environment, working, etc.) and the consequences they may have on health and lifestyles, as well as how policies can influence this relationship.

Making cities and communities age-friendly is one of the most effective policy approaches for responding to demographic ageing, and an age-friendly city will be more friendly for each citizen. Within the Italian HiAP approach, one of the focus policies is urban planning and regeneration in relation to health, an interesting but scarcely investigated issue. The aim of this study, and the effect that it's trying to achieve, is to create an integrated approach based on joint actions, as a lot still has to be done in Europe: starting from the Healthy Cities network, with the knowledge of HiAP program, and the relevant programs about sustainable and smart cities, the aim will be to create a pleasant and more equal environment for all.

Keywords: Policies; Equity; Urban planning; Quality of life; Health inequalities.

The research here presented is based on the assumption that a city designed for ageing people, and in general for weak users – as women, children, disabled people – is a better city for all. As WHO states, "because active ageing is a lifelong process, an age-friendly city is not just "elderly-friendly". Barrier-free buildings and streets enhance the mobility and independence of people with disabilities, young as well as old. Secure neighbourhoods allow children, younger women and older people to venture outside in confidence to participate in physically active leisure and in social activities" (WHO 2007).

A prerequisite for quality of life and well being, as for a sustainable economic growth, is represented by health, considered as a primary right for every human being (WHO Constitution 1948[1]). According to the official WHO definition, health is a state of complete physical, mental and social well being and not merely the absence of disease or infirmity. Within the context of health promotion, health is seen as a resource for everyday life, not the object of living; it is a positive concept emphasizing social and personal resources as well as physical capacities (Nutbeam 1986).

It's from these perspectives that the present paper has been thought.

1. Background

As European Union shares and endorses these considerations, it has therefore developed a framework for deepening the knowledge and promoting actions in this field: starting from 2006, the Health in All Policies (HiAP) approach was proposed, and a relevant document was published by the

[1] Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19–22 June 1946; signed 22 July 1946 by the representatives of 61 states (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

Ministry of Social Affairs and Health, during the Finnish presidency of EU. It states (Ståhl 2006) that "health is a key foundation stone of the overall Lisbon strategy of growth, competitiveness and sustainable development. A healthy economy depends on a healthy population. Without this, employers lose worker productivity and citizens are deprived of potential length and quality of life. This is doubly important as the European population ages in the coming decades. The impact of this demographic ageing will crucially depend on our ability to keep our citizens healthy and active throughout their longer lives. We are adding years to life, but we must also add healthy life to years. A wide range of policies can help to influence this, ranging from employment and social protection strategies to the food we eat and how much we walk rather than drive. European policies and rules shape many of these areas and this underlines how vital it is to ensure the integration of health protection into all policies and actions."

Because of the solid evidence that health can be influenced by policies of other sectors, and that health has, in turn, important effects on the realization of the goals of other sectors, such as economic wealth, the Health in All Policies (HiAP) approach was proposed as a strategy to help strengthen this link between health and other policies. Health in All Policies addresses the effects on health across all policies such as agriculture, education, environment, fiscal policies, housing, and transport. Thus HiAP is not confined to the health sector and to the public health community, but is a complementary strategy with a high potential towards improving a population's health, with health determinants as the bridge between policies and health outcomes.

For Europe in particular, it is vital to further strengthen the link between health and other policies, without taking for granted that the positive developments of the past will last into the future. Through the looming obesity crisis (European Commission, 2005b), the expected rise in chronic diseases and the cognitive decline associated with ageing, European societies provide examples of the challenges lying before us.

Italy decided to give its contribution to the research on this issues by promoting several projects: in particular the HiAP approach was taken in by CCM (National Centre for Disease Prevention and Control) in 2008 with a specific project, named "Gaining health: encouraging healthy choices", which was then turned properly into "Health in All Policies".

In this framework, SiTI – Higher Institute on Territorial Systems for Innovation, a non-profit organization set-up in 2002 by the Politecnico of Torino and the Compagnia di San Paolo (Foundation of banking origin), worked in collaboration with the public Epidemiological Service and with the University of Torino, in order to identify the relationship between basic human needs (as moving, living in a certain environment, working, etc.) and the consequences they may have on health and lifestyles, as well as how policies can influence this relationship.

2. Global setting

Considering the global setting of an increasing ageing population, which is progressively leaving urban areas for cities, it's important to bring to the attention the focus on elderly people as they will be the main city users of tomorrow.

In 2000, the global population of people aged 60 and over was 600 million; by 2025 there will be 1.2 billion and, by 2050, almost 2 billion. The proportion of the global population aged 60 will

double from 11% in 2006 to 22% by 2050. In 2008, for the first time in history, the majority of the world's population lived in cities and by 2030; approximately 3 out of every 5 people will live in an urban area[2].

The countries of the European Union (EU) have achieved historically unprecedented levels of health and wealth: in recent decades life expectancy has grown substantially. People nowadays live longer and are in better health than 20 years ago. Simultaneously the wealth of the EU countries has grown steadily since 1980. However, wealth and health inequalities between and within countries have been kept unchanged or have even grown.

Europe's population is ageing and simultaneously shrinking. The ageing is a result of the historical decline in the fertility rate below the replacement level and the growth in life expectancy (Figure 1).

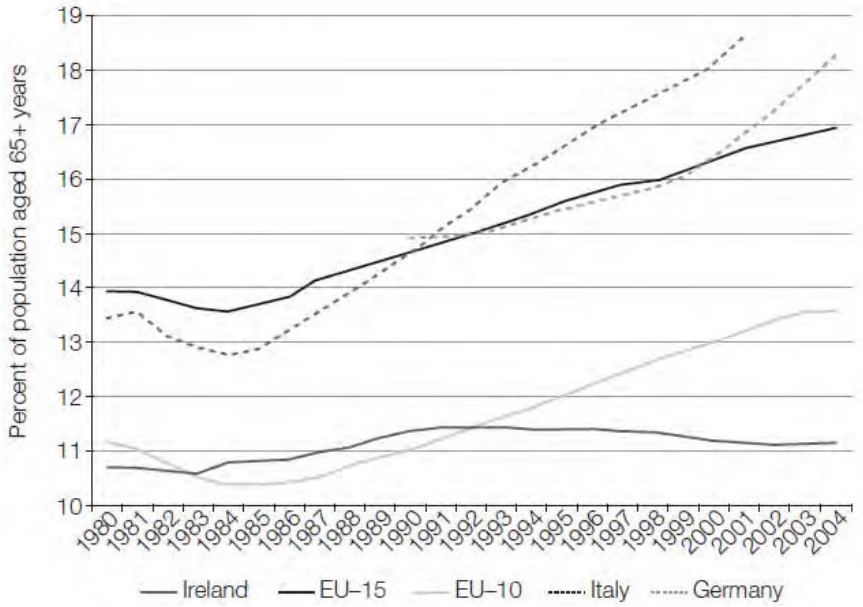

Figure 1. Europe's ageing population. Copenhagen, World Health Organization Regional Office for Europe, 2006[3].

2.1 Ageing people needs and potentials

Older people play a significant role in communities - in paid or volunteering work, transmitting experience and knowledge, or helping their families. These contributions can only be ensured if older persons enjoy good health and if societies address their needs. Making cities and communities age-friendly is one of the most effective policy approaches for responding to demographic ageing, and an age-friendly city will be friendlier for each citizen.

It's important to remember that we are an ever-ageing society, and that this process is running nowadays and it will give its results in the next decades. Today, we have to prepare to this changing and to start thinking about a different society: in fact, if demographic trends will continue in the future

[2] Data from WHO website, last accessed on April 22, 2012.

[3] EU-15: EU Member States prior to May 2004; EU-10: new Member States joining the EU in May 2004.

and no effective countermeasures are taken the situation will become critical (e.g. labour market participation will dwindle). This can be illustrated by the projected growth of the dependency ratio.

The dependency ratio (expressed as a percentage) calculates the part of the population aged 0 to 14 years and over 65 as compared to the population aged between 15 and 64. It therefore expresses the part of the population that is typically not in employment. Projections for the EU state that the demographic dependency ratio will rise from 49% in 2005 to 66% in 2030 (European Commission 2005a). Undoubtedly, this will result in a decline in labour market participation. As the population of Europe is unlikely to grow, this will, for most countries, result in a decline in absolute numbers of people in the labour market.

It must be pointed out, however, that the existence of a healthy “grey population” can also have positive impacts on national economies, both through increased consumption of services and through other non-fiscal resources through which the elderly can contribute to society. In this light, the dependency ratio predictions can only give a limited vision of the future and their significance should not be overemphasized.

3. Health in All Policies: methodology

HiAP is a strategy with a solid background in science, which aims at influencing health determinants in order to improve, maintain and protect health.

HiAP approach has its analytical and scientific roots in public health sciences, hygiene and epidemiology. It is especially rooted in the broader policy-level interventions on health problems and the focus on population health.

The ultimate aim of HiAP is to improve evidence-based policy-making. As health inequalities are prevailing or even increasing both within and between countries, and as health determinants are unevenly distributed within societies, increasing inequalities in health pose a special challenge for HiAP.

For example, if we consider major diseases – both “old” and emerging – a systematic response is considerably facilitated by the fact that the risk factors are mainly the same, and that they are nowadays known. Instead of seeing major diseases as a challenge to the health sector only, HiAP highlights the fact that the risk factors of major diseases, or the determinants of health, are modified by measures that are often managed by other government sectors as well as by other actors in society. Broader societal health determinants – above all, education, employment and the environment – influence the distribution of risk factors among population groups, thereby resulting in health inequalities. Focusing on HiAP may shift the emphasis slightly from individual lifestyles and single diseases to societal factors and actions that shape our everyday living environments. It does not, however, imply that any other public health approaches, for example health education or disease prevention are undermined or treated as less important.

Once achieved, scientific knowledge and key results are meant to be transferred to three levels: citizens active in local urban planning, the technical decision makers and the relevant policy makers at executive and legislative levels, in order to increase awareness of all policies decision makers towards health and health equity, keeping in mind that a non-sanitary policy could have serious and recognizable effects on citizens’ health.

First results and progresses have been made in the environmental field, which is today one of the most advanced in this sense, thanks to an important transition in the quest for strategies for health-friendly decision making regarding the relationship between environment and health. Starting from a situation where scientific information was produced by science and research and passed on to decision makers with a marked separation of roles, the transition, affecting the science–policy interface, produced a situation characterised by a more collaborative approach, with more direct participation and interaction between the relevant interested parties: from one where risk assessment and risk management are clearly separated to one where there is a continuum.

More specifically, at the starting point a model was used where information on health effects of given risk factors contributes to rectifying environmental policies, in a reactive fashion, in order to remediate or mitigate detrimental health consequences. This model has been evolving into a more proactive one, where health is on the broad political agenda of the environment and other sectors at earlier stages of the policy process, in an effort to better prevent adverse health effects but also to promote good health and well being. Health in All Policies can be seen as the ultimate goal of this transition, which should, therefore, be further pursued.

3.1 The causal chain in the Italian approach

As general framework of our work, policies, determinants and the population's health are conceptualized as a chain of causation (Figure 2). Health in All Policies starts at the source of this chain and it may help to make policies more consistent overall and therefore contribute to better regulation. A policy with negative consequences for the health of the populations will put an extra burden on the economy and health care systems.

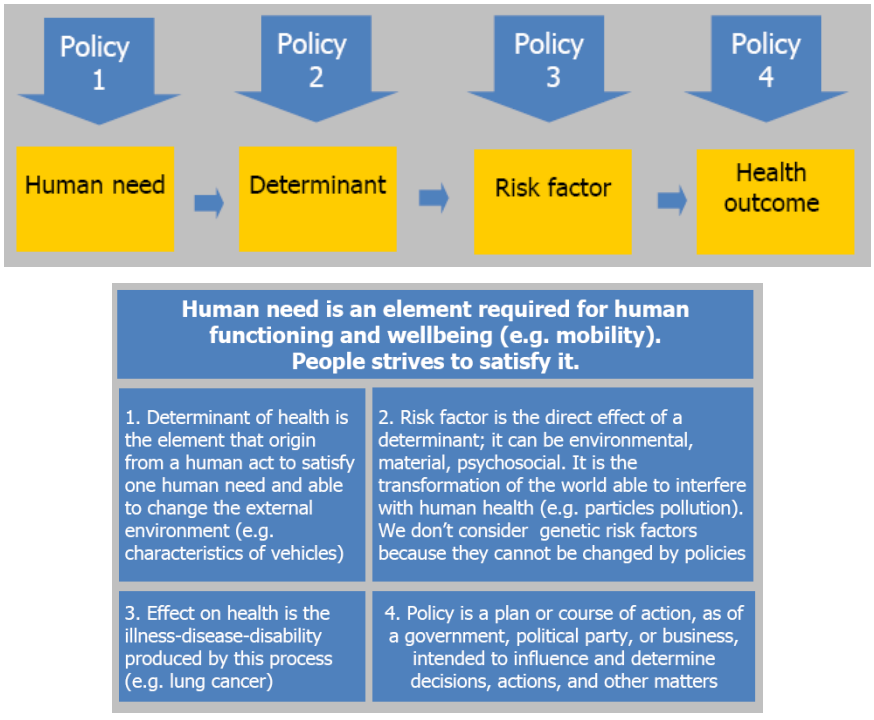

Figure 2. Causal chain from Health in All Policies.

Compensating the negative health effects of a policy by health care interventions may turn out to be difficult and costly. Starting from a human need, a causal chain has been set out and evidences on nexus have been collected.

The collection of evidence, in our case, was based on:

1) Strong multidisciplinary
2) Literature review
3) Experts opinion.

Determinants of health refer to factors found to have the most significant influence – for better or worse – on health. Determinants of health include the social and economic environment and the physical environment, as well as the individual's particular characteristics and behaviours, as stated by the World Health Organization. Social and economic conditions – such as poverty, social exclusion, unemployment and poor housing – are strongly correlated with health status. They contribute to inequalities in health, explaining why people living in poverty die sooner and become sick more often than those living in more privileged conditions (WHO 2006). Social determinants of health can be understood as the social conditions in which people live and work. These determinants point to specific features of the social context that affect health and to the pathways by which social conditions translate into health impacts (Commission on social determinants of health, 2005).

4. HiAP for Urban and the Built Environment: key findings

Within the Italian HiAP approach, one of the focus policies is represented by urban planning and regeneration in relation to health, an interesting but scarcely investigated issue. Scientific literature until now has shown fable evidences on health impacts of urban regeneration investment, due to difficulties in finding and isolating health effects' impact data proving those links.

In particular, considering the built environment, the following causal chains were identified, starting from the need of "liveability" (Figure 3).

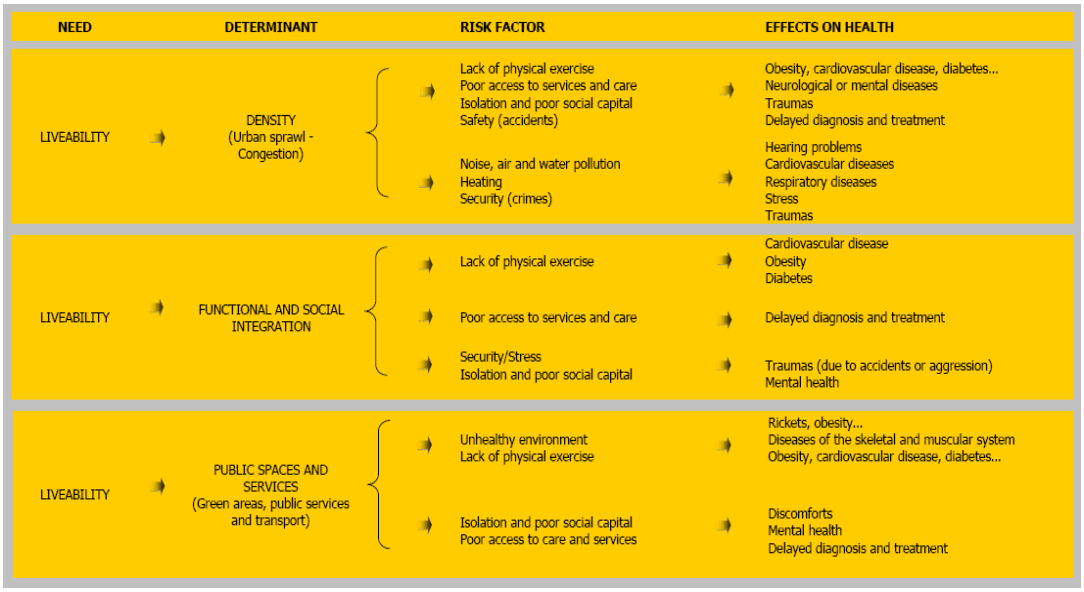

Figure 3. Causal chain for Urban and Built Environment.

The aim of this study, and the effects that it's trying to achieve, is to create an integrated approach based on joint actions, as a lot still has to be done in Europe: starting from the Healthy Cities network, with the knowledge of HIAP program, and the relevant programs about sustainable and smart cities, the aim will be to create a pleasant and more equal environment for all: acknowledging and respecting diversity should characterize social and service relationships no less than physical structures and materials.

In the report, scientific evidence over each nexus was collected, in order to start building a knowledge framework on which decision makers could be involved. Some policies were also evaluated, in order to find out how effective they are and how much they can, positively or negatively, impact on public health.

The three determinants pointed out by the research are:

- Density: urban density was considered in its two declination, as sprawl, with very low density rates settlements which lead to the difficulties to provide services, public transport etc., and the excessive congestion which shows problems of overcrowding and insufficient facilities for all the residents;
- Functional and social integration: a good mix of land uses will lead to an enriched built environment, with opportunities of varied activities and social contacts; where this is not present, the consequences can easily show up in isolation, depression and segregation;
- Public spaces and services: green spaces, good public transport, availability of basic facilities are important to ensure an active life for everybody, avoiding isolation of the weaker city users.

5. HIAP for active ageing: relevance for conference themes

Active ageing depends on a variety of influences (determinants) that surround individuals. They include material conditions as well as social factors that affect individual types of behaviour: HiAP has collected evidence on these determinants, considering that their effects on ageing people are more acute than on youngsters.

Central to prolonging the independence of older people is enabling them to live in their own homes and neighbourhood for as long as possible. Research on the design of home environments that maximize older people's independence has led to innovations such as 'Smart Homes', but very little research has addressed the outdoor environments. If older people are to remain at home, they need to be able to continue to use the wider environment and to go outdoors otherwise they will be effectively trapped inside.

Getting outdoors offers physical, sociological and psychological benefits for older people. Physical inactivity is a major underlying cause of disease and disability (WHO, 2003). Despite abundant scientific evidence, and multilevel strategies to promote an active lifestyle, the majority of older people are not sufficiently active to maintain good health: getting outdoors has been shown to be one of the best ways to keep active, and that's why it's of such importance to design supportive outdoors spaces (Sugiyama, 2006).

Considering also the urban environment at larger scale, some indications about urban form outcrop from the research: a liveable community could be defined as "one that has affordable and

appropriate housing, supportive community features and services, and adequate mobility options, which, together facilitate personal independence and the engagement of residents in civic and social life" (AARP[4], 2007).

Large, dense cities, especially in the developed world, offer more mass transit facilities than rural areas. Older residents in rural and suburban areas must rely on cars to reach almost any destination, and if unable to drive, their mobility is severely limited. At the same time, cities offer more social and civic opportunities, such as entertainment, neighbourhood and community organizations, and volunteer charities, which are all related to successful ageing. Research has also shown that dense urban areas with mixed uses and good pedestrian sidewalks are associated with increased walking among older residents, allowing them to engage their communities and maintain their physical health (Li 2005, Patterson 2004).

Over the last few years, a model of urban management has gradually imposed itself, which is essentially founded on the possibility of citizens' participation in the most important decisions concerning the development of their own city. From general policies (strategic plans, programming plans, urban development model) to more specific problems (such as waste management, pollution reduction, the rearrangement of quarters) HiAP aims to transfer the scientific and technical knowledge into these processes, in order to achieve a healthier and equity oriented community.

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The demographic decline in Lisbon city core

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This paper discusses the demographic trends and processes and assesses their impact on urban development and national and municipal policies, with particular focus on the city of Lisbon.

Presently, Europe is facing both population decline (shrinkage) and ageing. Eurostat estimates that population decline is experienced in one quarter of the European regions, and it is expectable that the ratio would continue to grow in the near future. In the same way, the life expectancy, due to better living conditions and medical care, is predicted to increase by five years in the next 40 years.

In Portugal, according to the Population Reference Bureau, in 2011 the share of population aged 65 years and over was almost 18%. Although the highest percentage of younger residents can be found in Lisbon Metropolitan Area (AML), the city of Lisbon is also one of the European capitals with higher percentage of population aged 65 years and over. Most of the elderly residents are low-income people living in the city core, in rented dwellings, with low expectations in what concerns residential mobility in the future. Both the physical deterioration of most of the buildings and urban amenities in the city core and the fact that they do not provide the requirements for actual housing standards led to an inner-city decline and depopulation. These trends are accompanied by a decrease in the household size (less persons per household) and changes in its classical structure, resulting in a minor density and in the under-usage of dwellings and consequently in a higher per head consumption of housing space.

Keywords: Ageing; Demographic change; city core; urban policies; Lisbon

1 Introduction

The main purpose of this paper is to explore one of the hypotheses of my doctoral dissertation: Despite the population-growing scenario, shrinkage occurs in specific urban areas of the Lisbon Metropolitan Area (AML[1]); provisionally entitled “Urban shrinkage in Lisbon Metropolitan Area” and supervised by Professor Sofia Morgado (FA-UTL).

This paper discusses the demographic trends and processes (fertility rate[2], mortality rate[3], household size and structure, working age population[4], migration and ageing) and assesses their impact on urban development (urban fabric, urban infrastructures and on the demand for services and amenities) and national or municipal policies, with particular focus on the city of Lisbon, and in two of its inner city municipal parishes, considered as case studies: S. Nicolau, located in the historic centre, and S. João de Brito, located in the second metropolitan crown.

The choice of these two municipal parishes was based on the analysis of Lisbon Metropolitan Area, defined from a set of demographic and housing variables. I have chosen to study the two municipal parishes because according to 2001 survey results these showed a population decline far above the Lisbon city average and a higher percentage of residents aged 65 and over. Moreover, I found interesting to study the fact that according to the 2011 census preliminary results the outcome was totally different in both municipal parishes.

[1] AML – Área Metropolitana de Lisboa.

[2] Fertility rate is the average number of children per women.

[3] Mortality rate is the annual number of deaths per one thousand people.

[4] The members of a population between the ages of 20 and 65 years old.

Presently, Europe is facing new challenges: population decline (shrinkage) and ageing populations. Eurostat[5] estimates that shrinkage is experienced in one quarter of the European regions, and it is expectable that the number would continue to grow in the near future (ESPON, 2009). In the same way, life expectancy, due to better living conditions and medical care, is predicted to increase by five years in the next 40 years (In men growing from 75.7 years to 80.5 years and in women from 80.4 to 85.6 years).

In Portugal, according to the Population Reference Bureau[6], in 2011 the share of population aged 65 years and over was almost 18%. Although the highest percentage of younger residents can be found in Lisbon Metropolitan Area (AML), the city of Lisbon is also one of the European capitals with higher percentage of population (24,2%) aged 65 years and over (INE, 2011[7]). Most of the elderly residents are low-income people living in the historic inner-city municipal parishes, in rented dwellings, with low expectations in what concerns residential mobility in the future. The younger residents, looking for high housing standards, with more generous areas and better urban amenities, choose the surrounding municipal parishes. Both the physical deterioration affecting most of the buildings and urban amenities in the city core and the fact that they do not provide the requirements for actual housing standards led to an inner-city decline and depopulation. These trends are accompanied by a decrease in the household size and changes in its classical structure, resulting in a minor density and in the under-usage of dwellings and consequently in a higher per head consumption of housing space.

In Lisbon Municipality, urban decision-makers are outlining new housing policies and programs, and more accurate strategies in urban planning, mostly through incentives to support the rehabilitation of degraded buildings. The main goal is to increase housing dynamics in the city core and to reassert market forces and reduce public intervention, due to an unfavourable economic environment.

Our goal is to compare censuses statistical data, from the Census 2001 to the Census in 2011 (INE, 2001[8]; INE, 2011), and to identify these municipal parishes in which the population is decreasing or has being decreasing for a long time, with a high percentage of elderly population (population aged 65 years and over) and high prevalence of one person and two person households (normally connoted as a less stabled family structure). Then, try to relate the verified demographic trends with the operative Municipal planning instruments and urban policies.

2 Demographic and housing trends within the Lisbon Metropolitan Area

When extending the analysis of population dynamics to the Lisbon region, we found that it is one of the two territorial units of the country that reveals a positive population growth, to nearly 3 million inhabitants.

[5] EUROSTAT – European Comission http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes (accessed April 22, 2012)
[6] Population Reference Bureau, http://www.prb.org/ (accessed April 18, 2012)
[7] Statistics Portugal – 2011 censitary data (preliminar results): http://www.ine.pt/ (accessed April 10, 2012)
[8] Statistics Portugal – 2001 censitary data: http://www.ine.pt/ (accessed April 10, 2012)

According to the 2011 Census preliminary results[9], between 2001 and 2011, the Lisbon Metropolitan Area (AML) population grew by 5.7% (159 849 residents), to 2 821 699 residents. The Lisbon Sub-region total population, increased by over 5%, in the same period, to 2 042 326 residents. The growth rates across the Lisbon Sub-region, ranged from a decrease of 3.4% in Lisbon municipality to an increase of 41.2% in Mafra municipality. The Setubal Peninsula Sub-region total population grew 8.9% in the same period, largely due to the increases in population growth rates in Alcochete (35%), Montijo (31%) and Sesimbra (31%) municipalities (see Figure 1).

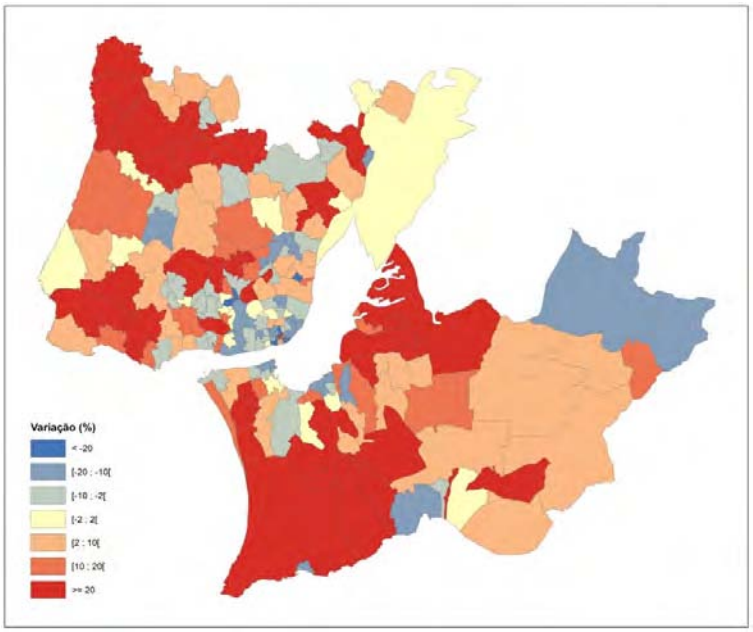

Figure 1. Population change (%) in Lisbon Metropolitan Area (AML). Author's calculation based on data from Censuses 2001 and 2011 (INE).

Despite the positive scenario in the AML, the Lisbon municipality lost 32.2% of its residents between 1981 (807 937 residents) and 2011 (547 631 residents), totalizing more than 260 thousand residents lost in three decades. In the last decade the loss was less severe than some reports had predicted, nevertheless, the city lost 17 026 inhabitants (-3.0%) and most of the municipal parishes in its historic centre, experienced massive population losses with associated urban decay (as can be seen in Figure 2): e.g. Castelo (- 37,5%), Encarnação (-32,9%), Santiago (-27,8%) and Santo Estêvão (-26,4%). However, overall, the Lisbon municipality has the second highest population density in the country and remains as the largest municipality in terms of population size.

The Lisbon Metropolitan Area follows the general demographic trends verified in European developed regions, showing an ageing process of the population, especially in the Lisbon municipality city core.

The demographic ageing ratio (IE[10]) has grown in the AML region, from 103.4 to 118.3 individuals aged 65 and over per each 100 individuals aged under 15, between 2001 and 2011. Although the 2011 results are slightly below the national value of 128.6 persons aged 65 and over

[9] Statistics Portugal (INE), http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_main (accessed April 20, 2012)
[10] IE – Índice de Envelhecimento (Source: INE)

per each 100 individuals aged under 15 years old. In the Lisbon municipality the scenario is quite different. Here the demographic ageing ratio has decreased, in the same period, from 203.3 to 187.3 people aged 65 and over per 100 youngsters aged under 15, but still reporting a value well above the mentioned national average. Moreover, as can be seen in Table 1, 24.1% of the total population of Lisbon municipality is 65 years old or older whereas the percentage for the AML region is 18.4% (below the national percentage of 19.1%). The child dependency ratio (IDJ[11]), or the number of individuals aged under 15 as a percentage of those aged 15 to 64 years, grew in the AML region, between 2001 and 2011 censuses, from 21.3% to 23.5% (above the national ratio of 22.6%), reflecting a relatively younger population in the metropolitan region, among other things influenced by a significant and continuing influx of young couples to the peripheral municipal parishes of the AML. Nevertheless, the city of Lisbon percentage registered in 2011 (20.4%) is below the AML and national levels, although it has grown by almost 3% in the last decade.

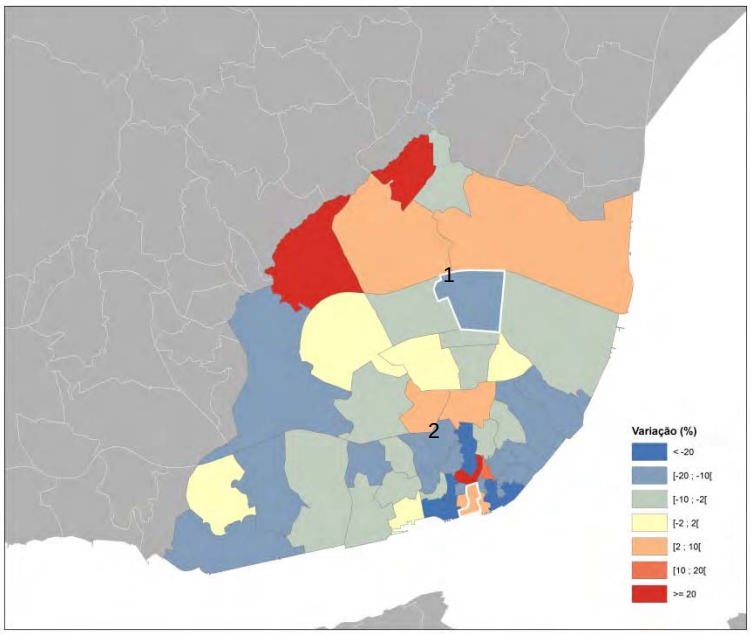

Figure 2. Population change (%) in Lisbon municipality. Author's calculation based on data from Censuses 2001 and 2011 (INE). 1- S Nicolau municipal parish; 2 - S. João de Brito municipal parishes

The aged dependency ratio (IDI[12]), or the number of individuals aged under 65 years and over as a percentage of those aged 15 to 64 years, grew highly in the AML region, between 2001 and 2011 censuses, from 22.0% to 27.8%, but still below the national ratio of 29.0% in 2011. The trend in the aged dependency ratio was also mitigated by the growth in immigration. This brings an increase in the working age population that compensates for decades of below-replacement level fertility. In the Lisbon municipality, the old dependency ratio grew, in the same period, from 36.4% to 38.3%, well above the national average, due to a large proportion of old buildings and elderly inhabitants, in particular in its historic centre.

[11] IDJ – Índice de Dependência de Jovens (Source: INE)
[12] IDI – Índice de Dependência de Idosos (Source: INE)

Table 1. Ageing ratio and dependency ratio in Portugal, AML and Lisbon Municipality (Source: Statistics Portugal – 2001 and 2011 (preliminary) census data)

	Lisbon Metropolitan Region		Lisbon Municipality		Portugal	
	2001	2011	2001	2011	2001	2011
Residents aged less than 25 - %	28.7	26.0	24.3	22.6	30.3	25.2
Residents aged 65 or older - %	15.4	18.4	23.6	24.1	16.3	19.1
Demographic ageing ratio (IE) nº.	103.4	118.3	203.3	187.3	102.2	128.6
Child dependency ratio (IDJ) - %	21.3	23.5	17.9	20.4	22.7	22.6
Aged dependency ratio (IDJ) - %	22.0	27.8	36.4	38.3	24.1	29.0

In what concerns to mortality rates, the variation in the last three decades is not significant. In Portugal, the crude death rate in 2010 was 10.0 ‰. This value is very much in line with the 9.7‰ European Union (27 countries) average for 2009. However, the fertility rates, in Portugal as in other European countries, are on a consistent downward trend: the Portugal total fertility rate in 2010 was 1.32 live births per woman, far below from the total fertility rate of 2.25 in 1980 and less than 2.1 live births per woman, considered to be the replacement level in developed countries. The general fertility rate in the same year, or the number of births in a year divided by the number of women aged 15 to 44 x 1000, was 39.8‰ in Portugal, 50.3‰ in the AML region and 60.8‰ in the city of Lisbon. If we notice that in 2009, the general fertility rate in European Union (27 countries) was 45.1‰, we can conclude that both AML and Lisbon municipality are widely above average (INE; PORDATA[13]). Despite that, as already mentioned above, until 2011 the Lisbon municipality experienced massive population losses in the last decades and the recent stabilization can be attributed to migration flows (Observatório Regional de Lisboa e Vale do Tejo, 2011).

As for housing, the number of conventional dwellings continues to exceed largely the number of households. At national level, between 2001 and 2011 censuses, the ratio of conventional dwellings grew 16.7% to 5 858 439 units (more 839 thousand units) and the household ratio increased by 11.7%, from 3 619 528 to 4 044 100 households, more 425 thousand households. The AML region, as seen in figures 3 and 4, in the same period, has registered an increase of 14.8% in conventional dwellings (more 191 885 units) and the number of households has increased by 14.1 %, corresponding to more 142 272 households. Since the 2001 census, the Lisbon municipality has shown a growth of 10.2% in the conventional dwellings, to 322 813 units and there are more 9 524 households (4.1%), totalling 243 975 households (INE, 2001; INE 2011).

[13] PORDATA – Base de Dados Portugal Contemporâneo, http://www.pordata.pt/ (accessed April 18, 2012)

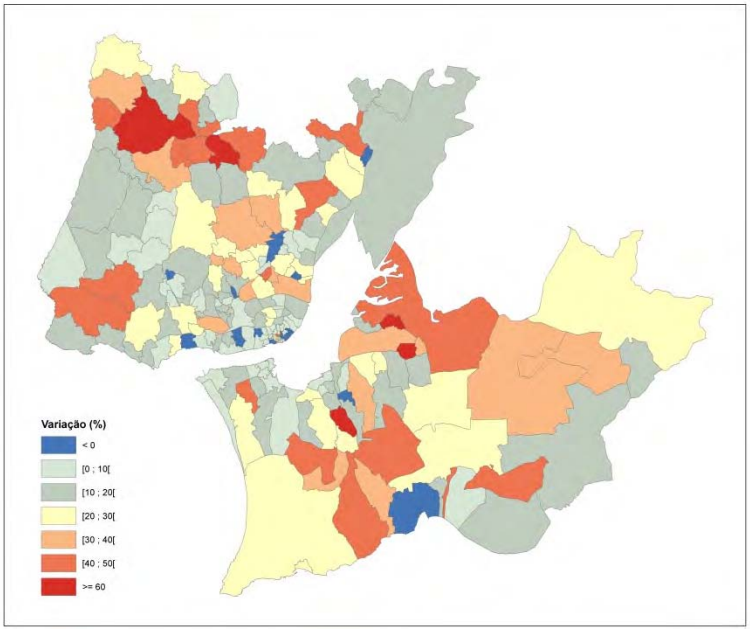

Figure 3. Household change (%) in Lisbon Metropolitan Area (AML). Author's calculation based on data from Censuses 2001 and 2011 (INE).

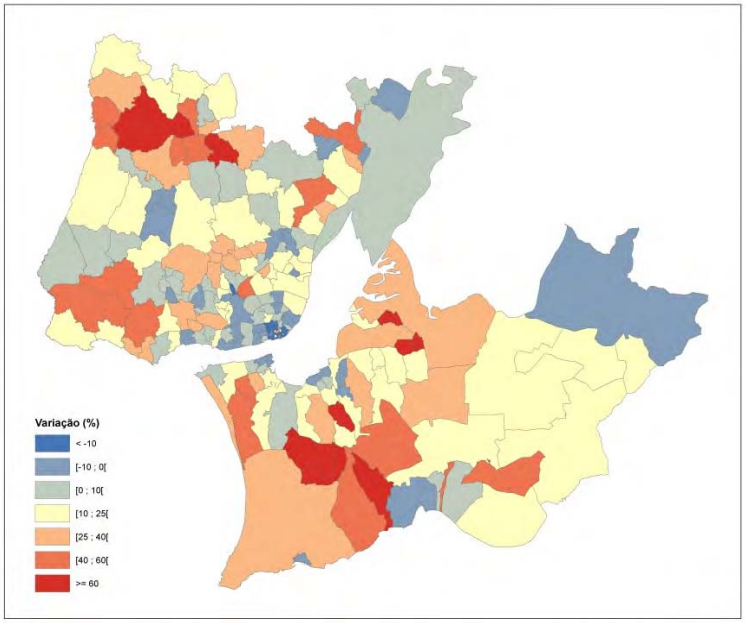

Figure 4. Conventional dwellings change (%) in Lisbon Metropolitan Area (AML). Author's calculation based on data from Censuses 2001 and 2011 (INE).

Ageing and housing

According to the 2011 Census preliminary results almost 1 in every 5 (18.4%) AML region residents are aged 65 and over, while 1 in 4 (26.0%) is less than 25 years old (see Figure 5.). These percentages are slightly below the national average of 19.2% in residents aged 65 and over and also below the 25.2% of less than 25 years old residents. This is mainly due to a high percentage of

young active population in the metropolitan area where there is greater demand for labour and also due to a very relevant influx of immigrant population. Moreover, 3 in every 5 (62.4%) of the residents aged 65 and over live in households where all members are from the same group age, and 1 of those 3 lives alone (35.7%).

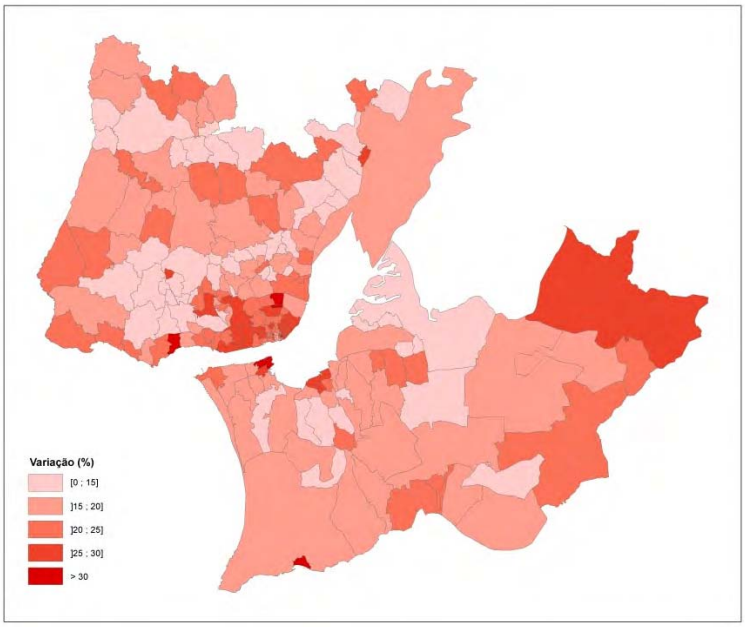

Figure 5. Proportion of elderly people (65+) in Lisbon Metropolitan Area (AML). Author's calculation based on data from Census 2011 (INE).

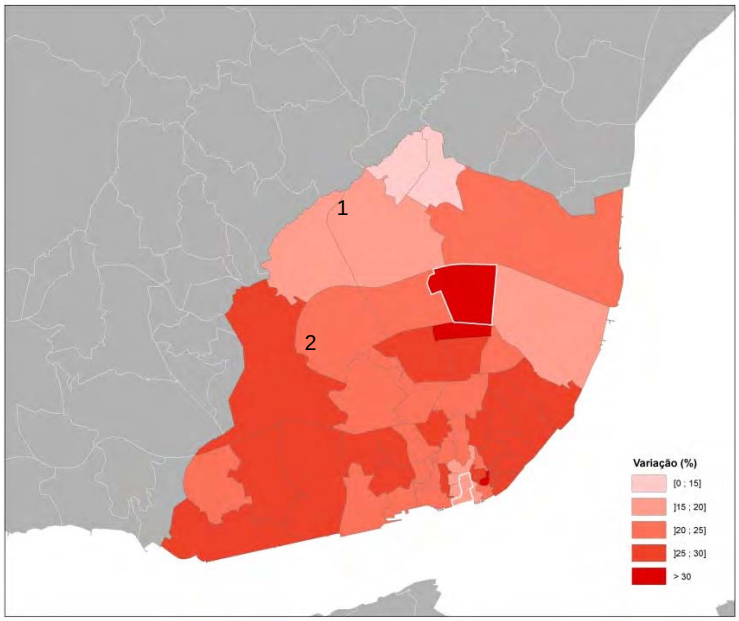

Figure 6. Proportion of elderly people (65+) in Lisbon Municipality. Author's calculation based on data from Census 2011 (INE). 1 - S Nicolau municipal parish; 2 - S. João de Brito municipal parishes

The scenario is quite different in the Lisbon municipality, where 1 in 4 (24.1%) of the city residents are aged 65 and over while 1 in 4 (22.6%) is less than 25 years old (see Figure 6.)

In 14.7% of the 1 483 380 conventional dwellings of the AML region, totalling 218 045 units, all the residents are aged 65 and over and in 52.9% of them (115 285 units) there is only one elderly resident living alone. In what concerns the Lisbon municipality, 18.6% of the 322 813 existing conventional dwellings (60 128 units) are occupied by residents aged 65 and over, and in 59% of them (35 470 units) there is only one elderly resident living alone.

The high number of low-income residents (aged 65 and over) living in relatively inexpensive rental dwellings close to the city centre, due to inflexible rent control laws in effect between 1948 and 1985, can explain the higher percentage of elderly in the capital city. On the other hand the fact that the large families and young couples, who choose to live in bigger dwellings in the periphery of Lisbon, can explain the lower youth percentage in the city centres. Moreover, 3 in 5 (64.8%) of the Lisbon residents aged 65 and over households live in households where all members are from the same group age and 1 of those 3 lives alone (41.5%).

Ageing and housing in Lisbon city core: The cases of São Nicolau and São João de Brito municipal parishes

The ageing and shrinkage processes within Lisbon municipality should not be studied only in a quantitative approach, since the numbers only reflect the existence of a deeper and structural problem. The demographic trends are largely a consequence of a deficit of choices, once the possibility of choosing to live in the city over living in the suburbs shows less affordable for the middle class, who cannot find an adequate housing supply that would fit their economic capacity and housing demands (CML, 2009).

Figure 7. S Nicolau municipal parish

Figure 8. S. João de Brito municipal parish

The choice of the S Nicolau and S. João de Brito municipal parishes (figures 7. And 8.), considered as case studies, was based on the analysis of the provisional 2011 preliminary–census data from Lisbon city municipal parishes, which indicated a set of demographic and housing variables (e.g. population count, number of individuals per age group, families, residents' education level, private households, housing type, conventional dwellings, vacancy rates, buildings age, etc.). Moreover, the main initial premise for choosing these two cases was that both municipal parishes have shown a population decline above the Lisbon city average and a higher percentage of residents aged 65 and over, but different results between the 2001 and 2011 censuses. In S. Nicolau municipal parish, despite the widespread decline in historic centre municipal parishes the population grew according to the 2011 census and reversing the trend of population loss in 2001. The growth was mostly due to a considerable influx of immigrants from Eastern Europe and Brazil. The offer of rents below the rental market average in very old and degraded dwellings, often lacking basic amenities, attracted these groups of immigrants who mostly see the municipal parish as a transitory place to live.

S. Nicolau municipal parish, it's one of the municipal parishes of the Lisbon city centre (Baixa Pombalina), along with Sacramento and Mártires and a part of Madalena, S. Paulo, Encarnação and Santa Justa municipal parishes. The urban arrangements follow the traditional orthogonal grid, greatly represented by landmarked buildings, many of them currently vacant, deteriorated or functionally obsolete. During the twentieth century it has recorded a sharp decrease in the number of local residents (in 1911 it had 10 428 residents), due to the increment of the tertiary sector at the city centre. Today the municipal parish built environment shows a high degree of degradation, with old buildings and it's less competitive in comparison with other AML areas.

Up until the mid-twentieth century, the area of the S. João de Brito municipal parish, nowadays completely urbanized, constituted a recreational and sports area and was also defined as an urban

growth area. In the second half of the 20th century, a rapid urbanization and urban development started, with particular emphasis on the Bairro de Alvalade (a district with 230 acres and planned for 45 000 inhabitants), the Bairro das Estacas and several other equipment's, services and facilities (e.g. commerce, schools, playgrounds, police stations, theatres, green areas, parks, etc.) were also planned for these areas. In this expansion context of the city of Lisbon, in the mid-twentieth century, the municipal parish of S. João de Brito is created, by the Decree Law no. 42142 of February 7th of 1959.

In 2001, as shown in Table 2, S Nicolau municipal parish had 1175 residents, of which 32.5% or 382 individuals were aged 65 and over and 17.3% (203 people) were aged less than 25. The S. João de Brito municipal parish had, in the same period, 13 449 residents, of which 33.5% or 4 499 people, were aged 65 and over and 19.0% (2561 individuals) were aged less than 25 years. The 2011 Census preliminary results show that the S. Nicolau population grew by 4.8%, to 1231 residents, of which 19.7% or 243 individuals were aged 65 and over and 15.6% (192 persons) were aged less than 25 years-old. In the same period, S. João de Brito municipal parish registered a decline in the resident population (- 13.0%), to 11 702 residents, of which 31.8%, or 3720 people were aged 65 and over and 20.2% (2366 persons) were aged less than 25.

Table 2. Ageing ratio and dependency ratio in AML and Lisbon Municipality (Source: Statistics Portugal – 2001 and 2011 (preliminary) census data)

	Lisbon Municipality		S. Nicolau municipal parish		S. João de Brito municipal parish	
	2001	2011	2001	2011	2001	2011
Population – n.	564657	547631	1175	1231	13449	11702
% change	-14.9	-3.0	-18.9	4.8	-21.5	-13.0
Residents aged less than 25 - %	24.3	22.6	17.3	15.6	19.0	20.2
Residents aged 65 or older - %	23.6	24.1	32.5	19.7	33.5	31.8
Private households – n	234451	243975	560	457	5690	5220
% change.	-4.3	4.1	3.9	-18.4	-6.8	-8.3

Though the S. Nicolau municipal parish gained population (+ 4.8%) between the 2001 and the 2011 censuses, the private households decreased 18.4%, from 560 to 457 households. This is usually due to larger families or an increase in the number of people sharing common flats. The S. João de Brito municipal parish has experienced the opposite situation. In the same period, the private households dropped by 8.3%, which is less than the 13.0% decrease of the population living in these households. S. Nicolau municipal parish is an exception, as it is also the contiguous municipal parish of Madalena, because in most of the Lisbon municipality municipal parishes the number of private households grew widely faster than the population living in them. The changing family patterns, with different living arrangements, results in an increasing number of smaller households and are the prime contributor to the growth of private households. There are more single person households, more families have no children or have them later in life and there are more single and divorced parents.

Another important change is the proportion of one person and two person households in both municipal parishes, outpacing all the other household sizes. In the S. João de Brito municipal parish, according to the 2011 census preliminary results, about 1 in 3 (36.6%) households has only one person and 1 in 3 (34.1%) is a two-person household. In the S. Nicolau municipal parish, in the same census tract, about half (43.5%) of the households have only 1 person and 1 in 3 (30.2%) is a two-person household. Moreover, the 1 person and 2 person households represent in the S. João de Brito municipal parish, 70.7% of the household living arrangements and 73.7% in S. Nicolau municipal parish. However, while the average household size in this municipal parish, between 2001 and 2011, dropped from 2.3 to 2.2 persons per household (below the Lisbon Municipality average that decreased from 2.4 to 2.2), the average household size in S. Nicolau municipal parish grew from 1.9 to 2.7 persons per household. This shows that in spite of the high percentage of small households there are fewer large households, probably due the lack of residential mobility of the inhabitants or the flat sharing situation among immigrants.

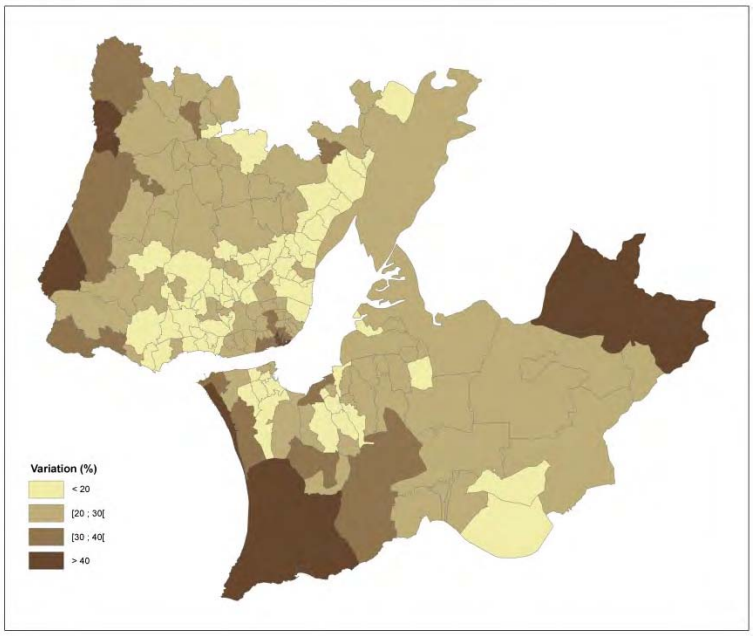

Figure 9. Proportion of non-occupied dwellings in Lisbon Metropolitan Area (AML). Author's calculation based on data from Census 2011 (INE).

According to the censuses, between 2001 and 2011 the number of conventional dwellings grew by 16.5% in S. Nicolau municipal parish, from 995 to 1159 units, as shown in Table 3. Nearly half (49.5%) of the municipal parish's conventional dwellings are vacant and almost 1 in 5 (17.4%) is a second residence, which means that only one-third (33.1%) or 383 units are occupied. From those, two-thirds (66.6%) are occupied by tenants and only one-third (29.8%) are owner-occupied dwellings. About 78% of the existing buildings in S. Nicolau municipal parish were built before 1945, in which 58% were built before 1919. Most of the existing buildings in S. João de Brito municipal parish were built after 1946, among which a high percentage (79%) was built between 1946 and 1970. In S. João de Brito municipal parish, the number of conventional dwellings slightly grew by 3.3% in the same

period, from 6566 to 6780 units. Most of the municipal parish's conventional dwellings are occupied (75.2%), or 5096 units, in which nearly half (51.0%) are owner-occupied dwellings and 41.2% are occupied by tenants. Only 10.4% of the conventional dwellings are vacant and 14.4% are used as second residence.

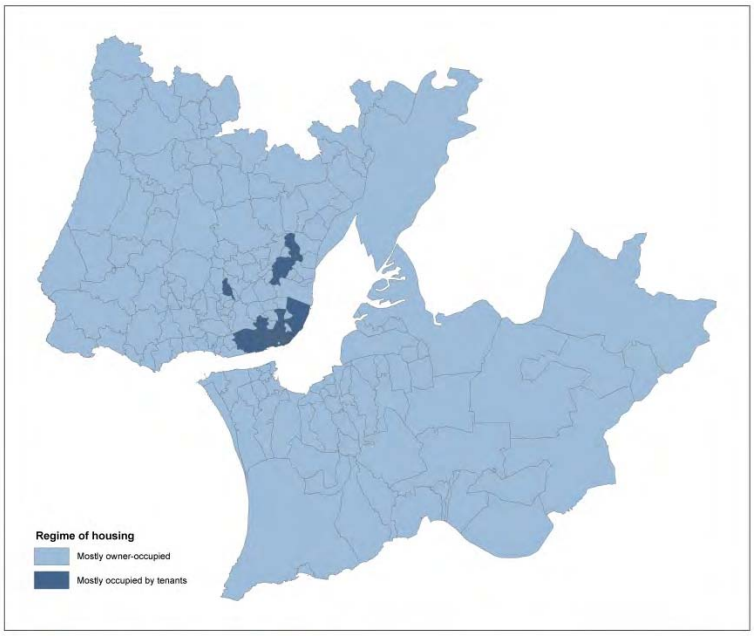

Figure 10. The regime of housing in Lisbon Lisbon Metropolitan Area (AML). Author's calculation based on data from Census 2011 (INE).

Table 3. Form and occupancy regime of housing (Source: Statistics Portugal – 2001 and 2011 (preliminary) census data)

		Lisbon Municipality		S. Nicolau municipal parish		S. João de Brito municipal parish	
		2001	2011	2001	2011	2001	2011
Conventional Dwellings - units		288481	322813	995	1159	6566	6780
% change		6.5	11.9	71.8	16.5	-1.4	3.3
Second Residency - %		9.1	11.0	9.8	17.4	7.6	14.4
Vacant - %		14.0	15.5	43.7	49.5	9.0	10.4
Occupied – units		-	237404	-	383	-	5096
	owner-occupied - %	-	52.2	-	29.8	-	51.0
	occupied by tenants - %	-	41.7	-	66.6	-	41.2

The S. Nicolau municipal parish shows signs of a long term physical decline with high vacancy rates and deteriorated infrastructures. Moreover, it has a high rate of rented housing, which normally are, according to the Carta Estratégica Lisboa 2010-2024 report (CML, 2009) more degraded than owner-occupied housing, and the conservation status of the buildings is inversely proportional to the income levels.

S. João de Brito municipal parish has a high ratio of elderly and in the last decade, according to 2001 and 2011 census data, lost almost 35% of its inhabitants. However, the municipal parish offers the sufficient amenities located nearby (e. g. physical, transportation and consumption) and have suitable typologies to the real estate supply and demand.

3 National, regional and municipal level urban policies, housing policies and programs

The design of more coordinated and effective policy instruments can take better account for interactions between different policy fields (e.g. socio-economic, housing market, the labour market, etc.) and mitigate their causes and effects in the negative demographic trends.

At National level, the new Urban Lease Act (NRAU[14]) aimed at revitalizing Portuguese real estate lease market. The law is applicable to all urban lease agreements and provides the gradual liberalization of rent control laws.

In Lisbon Municipality, urban decision-makers are outlining new housing policies and programs, and more accurate strategies in urban planning, mostly through incentives to support the rehabilitation of degraded buildings. The main goal is to increase housing dynamics in the city core and to reassert market forces and reduce public intervention, due to an unfavourable economic environment.

The Lisbon Municipality Master Plan (PDM[15]), approved in July 24, 2012, defines a set of strategic guidelines for the city of Lisbon regeneration, as the rehabilitation of buildings, improvements in physical infrastructures, retention of families and businesses in the city, the creation of more jobs and the highlighting of the cultural and historical identity of the most important Portuguese city. It includes a set of policies already implemented and other policies to be implemented, and a set of programs to support rehabilitation and preservation of private property. (CML, 2011) The Lisbon Municipal Master Plan (PDM) is the main policy tool to regulate urban development. The revised PDM reflects the concern of the local authority to reverse the process of city's depopulation and the increasing phenomenon of vacant and degraded buildings, more prevalent in the city centre.

The Institute of Housing and Urban Renewal (IHRU) has developed the Strategic Plan for Housing 2008/2013 that aims the Local Housing Program (PLH), urban tool that establishes a municipal or inter-municipal strategic vision for Housing, linking the various policies for urban regeneration and rehabilitation, among others. There are also some taxes benefits for the owners of buildings placed in areas that may be classified as "urban renewal areas", in particular in the Real Property (IMI) Tax and the Real Property Estate (IMT) Tax.

The Strategy for Urban Regeneration of Lisbon 2011-2024 (ERUL[16]), aims to create a boundary that defines an Urban Renewal Area that includes most of consolidated area of the city, classified as such on the Lisbon Municipal Master Plan (PDM). The measures to be implemented include: the delimitation of the Urban Renewal Area (ARU), the set of rehabilitation operations and the development of new Master Plans. In what concerns the programs to support rehabilitation and

[14] NRAU - Novo Regime de Arrendamento Urbano
[15] PDM – Plano Diretor Municipal
[16] ERUL – Estratégia de Reabilitação Urbana de Lisboa 2011-2024

preservation of private owned buildings, we highlight the Via Verde for urban rehabilitation projects, the temporary occupation of dwellings for temporary rehousing and the programme “rehouse first, and pay it later” (CML, 2012).

The inadequate traditional model of public administration is now focused through partnerships between the public and the private sector in order to achieve the desired objectives.

4 Findings

Housing, especially in Lisbon’s core city, is the sector most visibly affected by the population decline. Cheap rental dwellings close to the city centre, due to inflexible rent control laws in effect between 1948 and 1985, and the inability of owners to rehabilitate their dwellings, engaged in these low income rents, lead to a state of degradation in the buildings, a decline of expenditure on maintenance and to a devaluation of the municipal parish property and quality of life.

The already existing oversupply of dwellings, associated to a selective out-migration of younger households towards the city periphery, lead to a change in the age structures in city centre, housing vacancies and thus to a situation of underused urban infrastructures.

Policies that aim to respond to demographic change are even more challenged by the increasing mobility and fluidity of households. New household types in particular are often only transitory users of urban space, and are likely to change their structure, size and place of residence quite frequently. Demographic change is not a phase that leads to new fixed structures, but an ever on-going process. One of the basic characteristics of the structures that are evolving, regardless of whether they are households, housing markets or residential patterns, is their flexibility and transience. The result is an increase of social and demographic fragmentation in the urban space” (EUROCITIES, 2008).

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Social Participation in the context of urban public space renewal – The case of the Lagarteiro Neighborhood in Oporto

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In 1980, Giancarlo de Carlo wrote in the Perpecta: Yale Journal, "An Architecture of the Participation". De Carlo proposed a sequence of procedures: the problem definition, the solution, and the results evaluation, in all the three steps, the social communities should be integrated in as part of a share and dynamic process. This text corresponds to a new way of understanding the importance of the social communities in the architecture definition. From the Giancarlo de Carlo text, the main goal of this paper is to present the results of an intervention in public space renewal of the Lagarteiro neigbourhood (in oporto city) and the relation of this process with the participation of the resident population.
The urban context of Lagarteiro's neighborhood presented before the intervention the typical and classic signs of disqualification of environmental and urban peripheral areas of resettlement. The term "disadvantaged areas" is associated with these areas in urban or peri-urban case, was framed in a specific Portuguese policy, called Initiative Critical Neighbourhoods. Being a recent intervention, the renewal of the public space in Lagarteiro is a complete case study that allows comprehending the participation phenomenon in nowadays, at the same time that seduces a reflecting about technical and architectural solutions for "critical" neighbourhood

Keywords: Participation, Architecture, Public Space, Lagarteiro

1. Introduction

"[We architects] want to fill the programs and wishes, the restrictions and the voids that we see with direction and meaning in the city where we should be working"[1].

As the democratic process in Portugal has matured over the last 40 years, the relationship between architecture and participation has gradually faded in the architecture debate. Some civic movements have been more active and have made their presence felt mainly through online social networks, largely as a way of expressing opinions about works that have a strong impact.

Gone are the days when SAAL (Mobile Local Support Service) was where brigades of architects sat through endless meetings alongside neighborhood committees discussing direct interaction in the typological debate about housing programs. It was in this context that the objective of works was defined on the assumption that when the basic needs of a section of the Portuguese population were met in the post- revolutionary period, it would lead to housing being built with an unprecedented spirit and methodology of participation. In the short period between 1974 and 1976, when there was a ministerial dispatch that allowed the work of SAAL to be developed, the architects were forced to find representational mechanisms to support their arguments on the proposals made. One report that stands out from that era came from Siza Vieira in the documentary entitled

[1] DIAS, Manuel Graça "A Arquitectura não se Referenda!" in AA.VV. *JA – Jornal dos Arquitectos, Ser Populista* no. 234, Architects Association, Lisbon, Jan. Feb. Mar. 2009 (p. 4).

Operações SAAL[2] (SAAL Operations) in which he states that a residents committee came to his defense in the Bairro da Bouça in Porto when some municipal technicians questioned the oxblood color that had been planned for some of the masonry. The residents were of humble stock and had been seduced by the architect's discourse; they explained that the color in question represented Siza Vieira's anxiety about the work of Bruno Taut. Another extraordinary report was shared by Manuel Vicente with his architecture students at ISCTE-IUL and told of the Bairro da Quinta do Bacalhau in Lisbon. Vicente claimed that everything was explained by the proximity with which each person presented himself, given that it took more than different financial resources to create barriers between the architect and the future residents. According to Manuel Vicente, the residents would live with just as much affluence as the rich if they could, and he suggested that this was what made him come to the site in his red Alfa-Romeo, seducing the support and intrigue of people who had asked him for a house that was built in the knowledge that it could be occupied by the architect himself.

The SAAL process contained the momentum of the revolution and was linked to the optimism of a new generation of architects that were willing to do proximity work. To a certain extent, the program implemented immediately after the PREC (Processo Revolucionário em Curso / Ongoing Revolutionary Process) saw its role as one of finding ways to bring the ideas of equality advocated by democracy to fruition. In this sense, there was a change from the methodology adopted in Housing Development Fund (FFH) procedures of the so-called "Marcelist spring" era in the final years of the Estado Novo regime led by Marcelo Caetano.

The decade that preceded the revolution was characterized by the opening up of the economy, which triggered a surge in large scale construction, also motivated by the Colonial War. An attempt was made to respond to the need for housing and the effects of the rural exodus, which was already very significant at that time. This was when large consortiums[3] were responsible for localized construction with the aim of providing an alternative to the city centers that were already saturated and unable to meet the demands of the population. The use of innovative construction techniques allowing the rapid completion of large scale constructions was the common denominator for this wave of optimism among everyone involved at the time. This was when the structural systems of reinforced concrete appeared that were under the control of engineers, and in particular the prefabricated industry. In its idealism, the fascination with technology contained a mechanistic conviction in tune with European development and growth in the aftermath of the Second World War and the application of the Marshall Plan.

With the end of the Estado Novo, the flux from country to city intensified and this coincided with the arrival of Portuguese citizens returning from the violence that accompanied independence in the Portuguese overseas territories at the time. After Portugal became a member of the European Economic Community (EEC) in 1986, the first signs of some control were seen to tackle the heavy legacy of the conflicts resulting from the installation of democracy. European adhesion meant that public practices had to be more tightly controlled and procedures therefore became more institutionalized; this was accompanied by a steady change in the direct relationship between

[2] DIAS, José, As operações SAAL, film documentary, 2007.

[3] Consortiums such as: Solátia in the Carnaxide area, J Pimenta in Paço d'Arcos, Icesa in Santo António dos Cavaleiros.These are just some of the most striking examples in the area of Metropolitan Lisbon.

architects and communities. This was also linked to the political pressure to resolve the problem not only of settlements of clandestine housing but also the illegal construction that was building up on the periphery of the cities in general.

The 1980s and 1990s in particular saw an exponential growth in construction and it included both the supply of housing by private enterprises that took advantage of easier access to credit, and also work done by the State and the Local Authorities with the aid of the European cohesion funds. This expansion as a whole was also based on the opening up of new fronts of housing as a result of the new infrastructures developed as part of the European process.

As a result of shortages and the need to resolve precarious living situations of certain social sectors, the Central Administration took measures in the terrain that were rapidly implemented, doing away with all proximity and mediation work with future residents. This phenomenon was most apparent during the 1990s when the Special Re-housing Program (PER) was the mechanism used to frame the process.

Nevertheless, the change in the life styles from the shanty towns to the generalized verticalization imposed by the new neighborhoods benefited from the fact that the residents now adapted more easily to the urban context; this had not been the case following the revolution in 1974 when the population's bond with their rural roots was still very strong. Another situation that contributed to the peaceful implementation of this process was the application of diverse architectural models with more generous designs and typologies (normally based on the right/left model) and the importance given from the outset to the care of public outdoor spaces. The belief that the whole process would be redeemed through discipline in some cases extended beyond the need to encourage any advance mediation with future residents, though later the management of the units was assured usually by means of municipal companies set up particularly in local authorities to work in proximity with the people who had been re-housed[4].

2. Giancarlo de Carlo in "An Architecture of Participation"[5] versus "Architecture cannot be put to the vote!"[6] by Manuel Graça Dias.

Whilst the first steps were being taken that unleashed the strong urbanization process, in 1980 "An Architecture of participation" by Giancarlo de Carlo (1919-2005), rubbed salt into the wound of architects and political power in relation to the participation issue. An active member of Team 10, he believed that "an architectural operation [involved] three phases: the definition of the problem, the development of the solution and the assessment of the results". The users should be present throughout the entire operation and this should reflect directly and indirectly on the whole process; in other words: each stage of the operation would be like a phase of a project; the "use" would also be interpreted as a phase of the operation and, therefore, of the actual project; if the different phases merged, the operation would cease to be linear, unidirectional or self-sufficient.

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[4] Cases of GEBALIS in Lisbon, and GOP in Porto

[5] CARLO, Giancarlo de "Uma Arquitectura da Participação" in AA.VV" *Teoria Crítica de Arquitectura do Século XX*Caleidoscópio, Casal de Cambra, 2011 (p. 753-758) (original text CARLO, Giancarlo "An Architecture of participation, in Perpecta: The Yale Journal, vol. 17, 1980

[6] DIAS, Manuel Graça "A Arquitectura não se Referenda!" in AA.VV. *JA – Jornal dos Arquitectos, Ser Populista* noº 234, Architects Association, Lisbon, Jan. Feb. Mar. 2009 (p. 4)

De Carlo emphasizes the importance of the programmatic definition in particular, and notes that the architect should be involved in the project at this stage when the specific objectives of the operation are defined and a plan can really be drawn up that meets the needs of the community of users. To a certain extent his principle contrasts with the central Administration's programmatic definition which is pre-defined by legislative mechanisms or the typified mediation work with the communities. Giancarlo De Carlo underlines the importance of adjusting to the specificity of the cases; this position is set out clearly in 2002 in one of his last interviews, when he stated: "It is necessary to find the right path in each case. There is no one way that can be written down and applied to all situations. Some practice participation in this way, but it is not participation; it is demagogic bait. We must invent"[7]. The phase in which the problem is defined is therefore seen as part of the actual project insofar as the objectives of the operation and the resources made available become the subject of discussion with the future users.

The readiness to have a head-on encounter with the future users implies that the planners are willing to bring all divergences to the table so that they can explain their contradictions, and yet at the same time take advantage of the "explosive potential" in the resolution, or at least in the attempt to find a resolution to all the misunderstandings and conflicts. According to De Carlo, this procedure will stimulate the search for the most suitable and carefully considered solutions. The phase in which the architect comes up with the solution is therefore "the production of final and unalterable solutions, but extracting solutions from an ongoing encounter with the people who will use his work".

The idea of anarchy can be found in De Carlo's discourse; he believes that "true anarchy believes in human energy" and emphasizes that "anarchy is often misunderstood; indeed anarchists are always described as the people who put bombs in theaters"[8]. Giancarlo De Carlo was interested in the urbanist trends at the turn of the century, which "was set aside by zoning - the authoritarian trend which was mainly German and has a capitalist stamp"[9], and he noted Patrick Geddes in particular and the Tel-Aviv plan as the reference of "urbanistic anarchy"[10]. This ethical and idealistic vision recognizes the power of the people as a strong force that can intimidate all ideological dimensions of political power – even the left-wing – "the use of criticism stimulates direct intervention, and undermines the fixed principle of delegation once and for all."

> *Political power, even the left-wing, doubts the validity of the architecture of participation because it is scared by it; it extends to criticizing the encouragement of direct intervention, undermining the fixed principle of delegation once and for all. Local authorities hesitate because participation tends to lead to conflict; it confirms an intention to intervene in future programs, makes them accountable for what has already been done and they find it hard to accept and understand negotiations, transactions and compromises. Public administrators and technical staff are against participation because it implies detailed analysis, re-composition and promotion. It breaks the "routine" and upsets bureaucratic immobility. The professionals are against participation because it destroys the hidden privileges of the*

[7] PIZA, João "A experiência Participativa de Giancarlo De Carlo", interview on 1 August 2002, in the studio of Giancalrode Carlo in Milan and made available in *Portal Vitruvius* in November 2007

[8] Idem;

[9] Idem;

[10] Idem;

specialization, does away with professional secrecy, uncovers and exposes incompetence, multiplies the responsibility and changes them from the private to the social sphere. Academia is against it because participation invalidates the systems on which teaching and research is based[11].

De Carlo also manifests the acceptance that architecture is an ongoing process, setting aside the idea of the closed work and advocating direct and continuing action with communities; this is clearly visible in his participative experiences in the Detailed Plan for Rimini (1970-1972), in Bairro Matteotti (1964-1974) in Terni and the fishermen's houses in Mazzorbo (1980-86) in Venice.

Giancarlo Carlo's humanist dimension is in tune with a low-tech approach that everyone can easily understand, like that of the "Australian boomerang, that he compares to a computer – "It is made with simple technology, the Australian native knew what it was, how to make it, to carve it, to refine it: perhaps if he took off another millimeter it would fly better". De Carlo's reaction to technology was partly inspired by William Morris and the arts and crafts movement which was his inspiration as a student in 1947. A belief or faith in the human capacity to overcome the need for an institutional organization of procedures and replacing it with the marginal.

Giancarlo de Carlo's position is to some extent consistent with that of Manuel Graça Dias in "Architecture cannot be put to the vote!"[12], the editorial of JA- Jornal dos Arquitectos in an issue entitled Ser Populista (Being Populist). However, the underlying assumptions and the reflection on the topic are not exactly the same. Firstly, when intercepting the two positions, we find two distinct temporal contexts and a social organisation based on the democratic achievements of the right to vote. The vote serves as a barometer of balance and defines the ideological line manifested by Central and Local Administrations. Manuel Graça Dias' article gives an account of what happened during a debate in the Association of Portuguese Architects in relation to a project by Manuel Aires Mateus and Frederico Valssassina for Largo do Rato, in Lisbon. At the end of a heated discussion on the validity, or not, of the new building to be placed at the corner of Rua Alexandre Herculano and Rua do Salitre, "Nuno Teotónio Pereira got to the heart of the matter, clearly, succinctly and elegantly", according to Teotónio (n. 1922): "I come from the days when we were forbidden to discuss things, to exchange ideas and even to have meetings. So I am delighted to be here, to listen to and debate topics on architecture; but be careful! Discussing architecture does not mean putting architecture to the vote! Each and every one of us has the responsibility to discuss, to exchange opinions, to understand the opinions of others, to agree or disagree; but the responsibility for the approval of the projects lies with the architects, the technicians and the official departments that the law provides for this purpose. Architecture cannot be put to the vote!". Nuno Teotónio Pereira's undoubtedly lucid position was formulated in light of his experience as a political leader and active architect in processes governed by a strong proximity principle like that of the abovementioned SAAL for example.

It is the populist dimension that Manuel Graça Dias strived to isolate in participative

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[11] CARLO, Giancarlo de "Uma Arquitectura da Participação" in AA.VV" *Teoria Crítica de Arquitectura do Século XX*Caleidoscópio, Casal de Cambra, 2011 (p. 753-758) (texto origina lCARLO, Giancarlo "An Architecture of participation, in Perpecta: The Yale Journal, vol. 17, 1980

[12] DIAS, Manuel Graça "A Arquitectura não se Referenda!" in AA.VV. *JA – Jornal dos Arquitectos, Ser Populista* no 234, Architects Association, Lisbon, Jan. Feb. Mar. 2009 (p. 4)

processes. Populism that is always one step away from being realized when, in relation to architecture "we come across sentences or thoughts like: 'The City belongs to the Citizens, and it is for them to decide what they want for their city', [According to Graça Dias, these debates] have half-truths that may exalt meetings but, in fact, if taken literally can prove completely useless and inconsequential"[13]. This position does not refute the importance and use of public debates because they are what "feed the project."[14]

This openness does not however take away the architect's role as mediator; he is responsible for "understanding, interpreting, processing, adapting, displaying and delivering in ways that include, comprehend and enable them as well as other unmentioned reasons and doubts that are brought to the surface in the future". The moment when this whole process is summed up culminates in the interaction with "technicians from the official departments that the law provides for this purpose", and ultimately they are the ones that have been legitimately elected to represent the interests of the community in an informed manner.

Graça Dias' balanced position is reinforced by the limitations imposed by the norms and regulations which, from the start, guide and limit much of what an architect does. On the other hand, considering all the limiting effects imposed by the norms, namely with regard to architecture's freedom to experiment, we cannot ignore the fact that this legal root is necessarily the result of a democratic process discussed by the people's representatives in its forum – the Assembly of the Republic.

However, the proximity between the populations and their political representatives has not yet been assessed. It is necessary to reflect on the quality of a democratic process which, in the case of Portugal, goes back 38 years, This has been the root of solid public institutions; throughout this period they have managed legal instruments so that they themselves have become the place for mediation between designers and citizens, and the proximity ties between them are filtered by suitably established procedures.

This situation converges with the critical debate mostly among architects since the 1990s. Disciplinary matters are essentially at the core of the debate. Post-modern designs created and strengthened an architectural culture that, to a great extent, was supported by historical recognition, which in turn, allowed the quality of project work to be benchmarked and valued. This incidental hermeticism does not pertain only to architects; nevertheless, it can be said that specialized jargon requires the definition of limits that only encompass the discourse of each disciplinary field, be it in the scope of architecture, sociology, economics, technology, or art. The professional and/or scientific corporations that have gained shape within the democratic context have contributed greatly to this.

3. Critical Neighborhoods Initiative (IBC), Participation Criteria in the Context of the Urban Public Space Renewal of the Lagarteiro Neighborhood, Borough of Campanha – Oporto

The Secretary of State for Land Use and Town Planning launched the Critical Neighborhoods

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[13] DIAS, Manuel Graça "A Arquitectura não se Referenda!" in AA.VV. *JA – Jornal dos Arquitectos, Ser Populista* no 234, Architects Association, Lisbon, Jan. Feb. Mar. 2009 (p. 4)

[14] VIEIRA, Álvaro Siza, cited by Manuel Graça Dias in DIAS, Manuel Graça "A Arquitectura não se Referenda!" inAA.VV. *JA – Jornal dos Arquitectos, Ser Populista* no 234, Architects Association, Lisbon, Jan. Feb. Mar. 2009 (p. 4)

Initiative (IBC) in 2005 with the aim of compensating for some of the shortcomings in processes prior to participation in the promotion of housing. The aim of this new program, which would be coordinated by the Housing and Urban Renewal Institute (Instituto da Habitação e da Reabilitação Urbana - IHRU), was to act in several urban areas with critical factors of vulnerability. Thus, three priority areas were defined: the Cova da Moura neighborhood (in the Amadora municipality), the Lagarteiro neighborhood (in the Oporto municipality) and Vale da Amoreira (in the Moita municipality)[15].

Specifically in the case of the Lagarteiro Neighborhood, it was advocated that the whole residential area and public space was in need of complete renovation, thus providing a response to the concrete problem of renovating the extensive municipal real estate built mostly in the 1970s, which was in an appalling state of degradation just like Lagarteiro at the start of this century (built in two phases: 1973 and 1977). The urban isolation of these areas had led to significant delinquency problems and the buildings and public space reflected the lack of conviviality among residents.[16]

The Critical Neighborhoods Initiative is also a response to renovation dynamics that stands in contrast to all the other abovementioned urban planning programs, for which new construction is the common denominator. But this program not only provides an innovative solution within its field of action, it also includes a renewed participative methodology. It is the very concept of participation that provides the slogan for the preliminary diagnostic report on the Neighborhood, coordinated by Teresa Sá Marques, with the title: “Operation Lagarteiro – an intervention based on participation”[17], and it was the starting point for the architectural intervention and consequent work with the population.

From the outset, the report defined an idealist approach to the type of urban and social organization, which strived “above all to describe the collective areas as clearly urban, qualifying them as places where people could be, could meet and move about (squares, alleys, parks, etc.), and that the people using them would remember and feel an empathy for”[18]. It followed an urban model, similar to that of the standard town, and its structure was defined by conventional typologies of urban design, valorizing a network of proximity services and local trade within the perimeter of the neighborhood, as well as small collective support facilities for collective and family life.

Just as in the originals plans, the Lagarteiro neighborhood is based on a principle of functional separation, widely used at the time, which was basically a simple residential zoning model, supported by two facilities: a primary school and a sports area. In time, and aimed at extending the range of social support facilities available, several spaces were allocated to Private Social Charity Institutions (Instituições Privadas de Solidariedade Social - IPSS) where support services were provided for children and the elderly. In this way, unused areas of buildings, such as basements, were taken over and adapted for their new purposes.

To follow up “the intervention program being prepared, a partnership protocol was established which would implement the intervention and funding plans and management models during the process. To this end, a Local Management Model was defined, which included: an executive

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[15] Conf. PINTO, Paulo Tormenta A periferia Ausente;

[16] Idem;

[17] MARQUES, Teresa Sá (Coord.) *Lagarteiro – uma intervenção alicerçada na participação*, report available in www.ihru.pt;

[18] Idem (pag.13);

committee (responsible for the overall results of the intervention program and ensuring that all the planned initiatives were suitably coordinated), a monitoring committee (of an advisory nature to ensure synergies were created among all the local partners), an inter-ministerial work group (with follow-up functions, including representatives of the 8 ministries involved in the INBC) and a project team (comprising IHRU technicians and responsible for implementing the action program with the population).

The proximity work carried out by the so-called IHRU project team is extremely revealing within the intervention context. This team, which worked directly with the community, was set up in a residential unit within the Neighborhood[19]. It is through this team made up of social workers that a plan of activities was developed to build citizenship among the resident population.

Lagarteiro was estimated to have 1892 residents, all of whom had very little schooling. Although the average age was roughly 35 years, only 6.4% of those over 15 had completed secondary education[20]. The number of unemployed was also very high, i.e., about 16.6%. The activities carried out with the population were based on a number of actions targeting the general population, but focused more on the younger age groups, trying to bring them closer together through participation in a variety of workshops, such as: journalism, drama, photography, music, and others related to sports, or training for inclusion. Special note goes to the project “O Meu Bairro na Cidade” (My Neighborhood in Town), for example, which took place in November 2010 and involved the children from the after-school recreational center; and Lagarteiro’s Pre-School Social Center; these children were encouraged to get to know their neighborhood so as to make a model of the buildings and the surrounding area. The activities included interpretative readings and representations of the built up area.

All this social work was coordinated by specialized teams with a specific social focus; as a result, the Local Management Model separated the proximity actions with the population from the actions related to interventions in the public and built areas of the Lagarteiro Neighborhood. This separation meant that Office of Public Works of the Oporto Town Council (GOP-CMP) managed the whole urban regeneration process for the buildings; it launched three public tenders using the “Consultation, by Direct Adjustment” model: one for the urban layout project of the public space, and the other two for the work to be carried out on the buildings.

Specifically in relation to the intervention in the urban layout of the public space, which we will deal with in more detail, the architectural decisions were backed by criteria described in the preliminary intervention program defined by the GOP-CMP; this filtered the abovementioned “Operation Lagarteiro” diagnosis from a technical point of view. The projects were also coordinated by the different departments of the Oporto Town Council, who gave their expert opinions leading to the licensing of the projects.

Within the defined parameters, there was room for debate which allowed certain proposals to be included that were made by the team of architects (coordinated by the author of the present text) and established in light of specific intervention criteria. The fundamental principle was the need to

[19] Block 9, Door 152, Home 22;

[20] Data from the Government Portal in: http://www.portugal.gov.pt/pt/GC17/Governo/Ministerios/MAOTDR/Documentos/Pages/20061002_MAOTDR_Doc_Bairros_Criticos.aspx (accessed on 20/05/2010)

connect the Neighborhood to its surroundings, introducing it into a network of urban flows of metropolitan interaction. The aim of this principle was to overcome the negative effect of its peripheral location; this was aggravated by geographical factors that involved the Lagarteiro Neighborhood in the same system as the long Campanhã valley – a geo-morphological fact that separates the Oporto municipality from the Gondomar municipality.

4. Architectural intervention in the Public Space

There is no real idea of urban center in the Lagarteiro Neighbourhood. Instead, there are long rows of adjoining buildings along the roads; some set back, others set forward, or misaligned within the different lots, creating a diversity that can only be understood if looked at with the green area near the Town's Parque Oriental as a whole.

In its genesis, the Neighborhood seems to have a humanist dimension that can be seen in the type of buildings. Even as a project-type, the rows of buildings strive to establish an archetype idea of "house", manifest in the sloping rooftops, and the brick facing used in several lots.

Inadequate municipal access deprived the neighborhood's poorer residents of normal social integration; this was worsened by neither the somewhat impermeable configuration of the urban setting as neither the structure itself nor the proximity of neighbors' fostered social interaction.

The inner area of the Lagarteiro is divided into two sectors corresponding to the two periods of construction (1973 and 1977) and they are separated by topographic differences. Although physically close, these two areas were only randomly connected by rough paths prior to the intervention. The poor flow of traffic was also apparent; in most cases, the same road was used to enter and exit the Neighborhood, which became like a cul-de-sac where it was difficult to circulate freely. As a result, it was isolated and non-residents were pushed away or discouraged from using the public areas; this in turn meant that these areas were only used by residents which also contributed to the social fragility found in this «Problematic Neighborhood» in Oporto.

Figure 1 - The new road in Lagarteiro (foto by Inês d'Orey)

The basic question underlying the renovation project of the public area in the Lagarteiro Neighborhood involved the redefinition all the Neighborhood's links with road network of the Oporto

metropolitan area, making it more permeable and more in line with Oporto's Municipal Master Plan; the main aim of the Qualification of the Land Charter of the urban planning instrument is to create a series of road crossings to connect the Lagarteiro Neighborhood with a Hub for Urban Structuring and Inter-municipal Articulation. Anchoring the Neighborhood with its surroundings by means of the planned roads was essential to the start of the urban regeneration process.

However, the project was based on a new system of roads linking two sectorial areas in the Lagarteiro Neighborhood (connecting Rua Diogo de Macedo with Alameda Arq. Carlos Ramos). This hub was considered indispensable to articulate the internal connections with its surroundings.
The new road also permitted pedestrian access for people with limited mobility. Hence, it was the area running through the center of the neighborhood that required most expertise, particularly for the construction of a series of walls for ground contention that would control the irregular topography of the Lagarteiro Neighborhood and stabilize the area of the two existing facilities: the games field and the school.

Figure 2 - Detail of the pedestrian ways in Lagarteiro (foto by Inês d'Orey)

A very limited range of range of materials was used consisting mainly of yellowish granite for the pedestrian areas and grey for the roads. This material was chosen due to the cost and ease of supplying it in large quantities; it was also easy to maintain by a relatively unskilled workforce. Another consideration was the way in which the stone ages, resilient to wear and tear and any inappropriate use. A 2.5 meter mesh was used throughout the Neighborhood to highlight the joints between the granite cubes. The control base of the entire project was in the use of this mesh as it ordered the different compositions in terms of the design of the pedestrian areas, the parks and car parks.

The very marked topographic differences characterizing the Neighborhood meant that a series of support walls had to be put in place. These support walls were built with the help of cofferdams prepared especially for the purpose. The final appearance of the bare concrete is defined by triangular sections of high-relief which, together, create a kinetic effect when exposed to the light. As a whole, this solution created a strong expressive identity which was fundamental in a regenerative process but, thanks to its texture, also one that could prevent the negative impact of the most common acts of urban vandalism.

Figure 3 - Detail in Lagarteiro (foto by Inês d'Orey)

4. Conclusion – The Role of the Architect and Social Participation

The urban intervention in the Lagarteiro Neighborhood is an example of participation fostered by social work in which the architectural project serves as an instrument; as part of a policy defined upstream (in the diagnosis of the "Operation Lagarteiro"), it sought to fit in with the general criteria of the intervention. On the other hand, the entire institutional structure involved in developing the architectural projects stipulates regulatory mechanisms that guide and limit the general lines of the intervention.

This underpins the architect's involvement in a broader process of recognition and proximity in relation to the community of residents and in this way indirectly places the architectural intervention in the participative context.

It could be said that the intervention process in Lagarteiro is in line with Nuno Teotónio Pereira's vision when he claimed that "but the responsibility for the approval of the projects lies with the architects, the technicians and the official departments that the law provides for this purpose. Architecture cannot be put to the vote!"

The establishment of democracy institutionalized human relations, stipulating intervention criteria that are duly oriented and systematized in line with good practices. In the contemporary context in particular, the debate on the role of the architect should be open to parallel processes. Although the process described above on the Lagarteiro intervention involves a pacific space for the development of projects, the architect's role is to some extent peripheral in direct relation to the transformation advocated for this urban settlement. The more lateral positioning protects both the architect and the project itself in the different phases of the process. And yet this implies a withdrawal from direct contact with the people; this in turn implies a loss of contact with the arguments that foster a more idealistic approach to how "human activities in the territory" can be organized."[21]

The anarchy described by Giancarlo De Carlo for the purposes of an "Architecture of Participation" thus becomes an important base in the reflection on the architects' role in urban and

[21] See the Minutes of the Architects Association in the Statute of the Portuguese Architects Association.

social regeneration processes. This role is perhaps even more relevant for interventions in inherited territory, which require a decodification of the space into different scales, and the respective crossing of this procedure centered on morphological matters with other less tangible social questions.

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City and care

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The focus of my research deals with care practices that take place in urban spaces. Care practices concern the whole universe of actions addressed to children and elderly people that in a certain period of time need help from others, help offered most of all by female relatives. This theme is closely connected with issues regarding urban life, welfare spaces and policies, quality and accessibility of public spaces. In fact, care practices could be addressed not only to people, elderly or children, but also to the whole system of urban spaces, because of their relevance in daily life especially of elderly. The issue of "aging cities" closely refers to the issue of care, not meaning only the welfare side of the word, that recalls to mind assistance activities, but also the wider sphere of practices that take place in urban context, that take into account practices addressed to elderly and to urban spaces system. The expected outcome of the research is a portrait of Italian panorama on care issues grounded on urban areas, understanding the key urban factors that can improve the quality of life of care givers and care users and, especially looking on the Italian context, what are the policies implemented and what are the results and the possibility of improvement. The key factor of the research is connected with its innovative point of view on themes that are often related with gender issues, bringing them to a neutral field, the city with its spaces and the practices that here are held by inhabitants.

Keywords: practices; welfare spaces; social services; urban spaces quality.

1 Introduction

In recent years, the issue of hardness of living in urban areas has become more and more widespread not only in scientific literature, but also in not specialized one. Pollution, traffic congestion, widespread feeling of being not safe, transformation in urban and social structure, often are mentioned as elements that made a bad quality living in contemporary cities. This research aims to give a different point of view on these complex issues, looking to the world of care practices with a special attention on the sphere of aging population that lives in urban context, that seems to be more affected by this common feeling of un- wellbeing. In fact, the most important and common activities that are made difficult in urban contexts are connected with the sphere of daily practices (Istat, 2001) concerning care of relatives, most of all elderly and children (Costa, 2007) that I refer as "care practices". In addition, the issue of care becomes more and more urgent looking at statistical data that refer to demographical dynamics occurring in European and Western countries, showing an ongoing decrease of fertility rate and a increase of aging population and a transformation in the family structure (OECD, 2011). In such a context, the sphere of public action, especially in welfare policies, is slowly going back (Ferrera, 2007), reducing the areas of intervention in a geographical context with a particular welfare system, defined as Mediterranean Welfare state (Ferrera, 2007). Another element that shows up the relevance of care issue is its relationship with gender issues, because of women connotation of care work, that produces important consequences, not only from the labor market point of view (low rate of women participating in labor market, growing number of women that leave their workplace after the birth of a child or when an old relative needs help, difficulties in acceding to high position of management, but also considering society and economy. This kind of overlapping of the sphere of care and women affairs is often reinforced by the growing rhetoric of gender equality, that reinforces the stereotype of sex equality, instead of becoming aware of the deep difference between genders. Last, but not least, and this is the focus of the entire research, the sphere of care

practices takes place in the urban context, that has a set of characteristics that often make difficult to live in it in a satisfying way: the inadequate design of public spaces, the scarce accessibility to public services, are only few elements of the hardness suffered by elderly in living in contemporary cities.

The category of “care” is used in this research as an instrument to refer not only to the practices of care, that will be better defined later, but also to the sphere of cares and attentions paid to the public spaces that compose the city and that directly have consequences on the level of the quality of life of city dwellers, especially thinking to the elderly and to the recent policies for encouraging an “active ageing”.

The geographical context assumed in this research is the Italian one, positioned in the wider area of the Southern Europe, that is characterized by a similar set of welfare policies (Ferrera, 2007) and of demographic issues (ibidem). Some notes will be given on the case study, the experience of the XI Municipio of Rome, an administrative division of Rome City Council, autonomous in implementing policies, will be given in order to proof the sense of the research, because of its progressive way of acting in the policies field. The methodology followed in the research is composed by a references framework of the research theme, as briefly described before, that is attempted to be proved in the case study. The data collection concerns an analysis of policies adopted in this area and related with care issues, referring not only to people, but also to urban spaces, such as the “Sicurete XI “ policy, that deals with the recognition of the quality level of urban spaces.

This paper represents the current state of the research held in my ongoing PhD in Urban Policies and Local Project at Urban Studies Department, Architecture Faculty, Roma Tre University. The research focus is on the broader sphere of “care practices” in urban contexts addressed not only to elderly, but also to the younger part of the population. This paper represent not a definitive nor concluded work, it will be better implemented and enriched in contents and data; my participation to CITTA Conference will try to profit of all the suggestions, ideas and reflections on this wide issue of “Planning and aging”.

2 Background

The world “care” refers as first meaning to the relief by a state of sickness, giving to this word a closely healthy connotation; in a different sense, care is connected with the wider field of “( ) affect and actions that are responsive to an individual's needs and well-being within a face-to-face relationship “(Oliker, 2008), that moves to a broader sphere of practices that takes place in different spaces of the city, are made by people in different times. Actions of care could be addressed to people, relatives or friends (taking part to the large part of time spent in unpaid work) or to places and things, practicing measures that try to prevent their consumption and keep a good level of maintenance.

Considering this broader meaning, the theme of care has a multi-disciplinary background that includes social sciences, anthropology, sociology, geography and urbanism. In particular, issues of care are often connected with gender and women studies, suffering, in my opinion, of a basic error, the overlapping of work of care as a work of women. Obviously, the disciplinary field that has the first place in dealing with care issue is the medical one but, for its really specific kind of knowledge produced, I intentionally will omit to give an overview on this side of care themes. The research

operation that I have done tempts to consider the sphere of care as a whole of actions and constraints given by welfare policies, culture and labor market, and putting it in urban context, with its spaces and times, focusing on welfare policies and their relation with urban spaces and the practices that there are held.

In fact, often the world care, and most of all the word caregivers, assumes a gendered connotation. For years, and still nowadays, the work of care has a strong feminine connotation because of biological, cultural and socio-political factors: it is a woman duty to rise up children and to take care of elderly when they become no more independent, also because of a lack of public services that could solve this care demand, especially in southern Europe countries.

Sociology approached this issue of care for elderly considering the "( ) important policy implications (of graying population), especially in the areas of social security, pension, and health care policy" (Willson, 2006). Especially considering Southern Europe countries, social policies for supporting families are often deficient in providing public social services, making more important the private answer given by families and by the private sector (Saraceno, 2002). In fact, lacking an institutional policy for supporting families in their care needs, in spite of a long tradition in cash allowances (Da Roit, 2007), the only subject able to solve them was the family itself in the person of the woman; providing a not paid work of care, thus produced an controversial effect of enforcing solidarity between generations and families. Recent transformations in demographical trends (Istat, 2010), in labor market, in family structures (Istat, 2010) and in social policies (Ferrera, 2007) pushed the provisions of care needs also to the services offered by the private market, such as the typical Italian phenomenon of "badanti"( ) immigrant women hired directly by families to care for their dependent elderly ( ) (Da Roit, 2007).

Gender studies, dealing with"( ) the social, political, or economic arrangements that relate to gender. ( ) "(England, 2001), stated that "( ) many facets of gender inequality flow from social norms, beliefs, laws, and institutional practices" (England, 2001). The definition of "separate spheres" of home and work, introduced in the 19th century with the rise of market economy, gave a place for women, the home, and a work, caring to her relatives, distinction that was later institutionalized (Oliker, 2008). As already mentioned before, the transformation of social, cultural and economic context, changed also the amount of time addressed by women in care activities, still persisting, however, a gender gap in this kind of activities (Gerstel, 2008). Narratives on gender equality stress, according with their purpose, the idea of a fundamental condition of parity between genders, trying to remove all the obstacles that could limit the achievement of the equality condition. Gender equality policies often failed in their aim, stressing further a not equal division of work spheres. Many scholars criticize this perspective on gender equality, assuming the opposite point of view: the difference between men and women has to be underlined because of the richness embedded in it. Care work, in its nature of not paid one, has to be put in a proper light, no more neglected or relegated as a private affair, because of its relevance in the achievement of a good level of quality life for family members.

Also the field of geographical studies focused some works on geographies of care, designing researches on identifying care places in urban contexts and their users, often a descriptive way.

This multi-disciplinary background showed here briefly could be completed giving a framework

on the care themes in urban studies. The word of care positioned in the field of urban studies is closely connected with the sphere of practices (Pasqui, 2008) addressed to help the most fragile segments of population, children and elderly. For what concerns urban studies field, care practices interact directly with routines theme and daily life rhythm, looking at them with a special perspective that aims to show up the difficulties and problems of living in an urban context. Care practices are constituted by people that receive care and by people that give care; by places in which care is given and by places to be cared; by times of people, of spaces, of lives. Considering the side of people receiving care, a demographic profile is drawn, identifying a range of people that, for their age, could need of different kind of support, not only from the medical point of view, but also in everyday hands-on activities; concerning caregivers, a brief description was given before. Places for care are often identified with institutional spaces created by public or private actors with this purpose: typically, for children, day care centres, nursery, for the elderly, social centres; there is a broader sphere of places that are really important in improving life condition of care users, but not only, the sphere of public spaces. In fact, public space system, composed by spaces for mobility and open spaces, assumes a really important role in achievement of people's well-being, if it has a set of characteristics and qualities that make it enjoyable and easy to use by people of different range of age and physical ability. In this sense, welfare policies also affect public spaces, considering a set of actions aiming to build, maintain and protect territories (Tosi, 2011): actions of care are also addressed to public space system, not only to people. This aspect of the quality of public spaces, also the simpler ones as the maintenance of sidewalks, the design of street crossing have a huge influence in encouraging pedestrian accessibility in urban contexts. In fact, dealing with places, this concept of accessibility assumes a really important dimension not considering only the mobility side of this concept, but also all the factors that compose this wide notion, defining it as "(...) complex process, that doesn't correspond only to the possibility to reach different kind of opportunities, but correspond to the ability to access to a set of activities, values and goods responding to own expectations" (Borlini, Memo, 2009, personal translation from Italian). In this sense, the age of people could influence the possibility to reach a place, considering for example some characteristics of places, of activities that there have place and time constraints. Accessibility, as here defined, has also a direct influence in determining social inclusion "improving material and immaterial resources and informal potential of social support for frail populations (...) as improving social relations in neighbourhood for elderly." (Borlini, Memo, 2011, personal translation from Italian). Accessibility concept is also linked with time dimension: fragmentation of times (and spaces) of everyday urban life, especially for caregivers who deal with public services opening hours, with multi-directional movements and work time, make really difficult to mach together all these time constraints. Public policies for a rationalization of urban times, and private or public policies work-and-life balance could solve this kind of constraint in everyday life organization.

These brief notes about care practices background tempt to give a framework reference on the Italian context and on the case study chosen, a portion of the huge municipal area of the city of Rome, the Municipio 11.

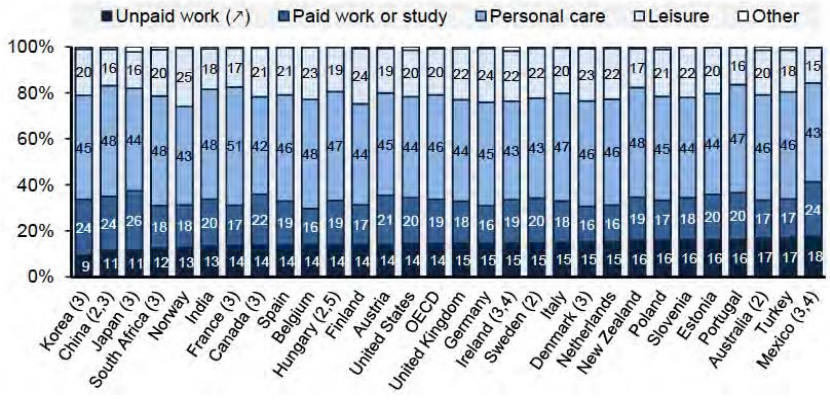

Figure 1. Time use by main activity in percentage of total time use for the population aged 15- 64 over the period 1998-2009 (Source: OECD's Secretariat estimates based on national time-use surveys, 2011).

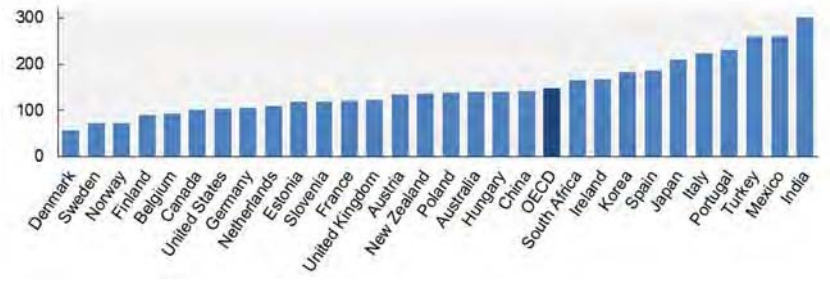

Figure 2. Female less male unpaid working time in minutes per day. (Source: OECD's Secretariat estimates based on national time-use survey)

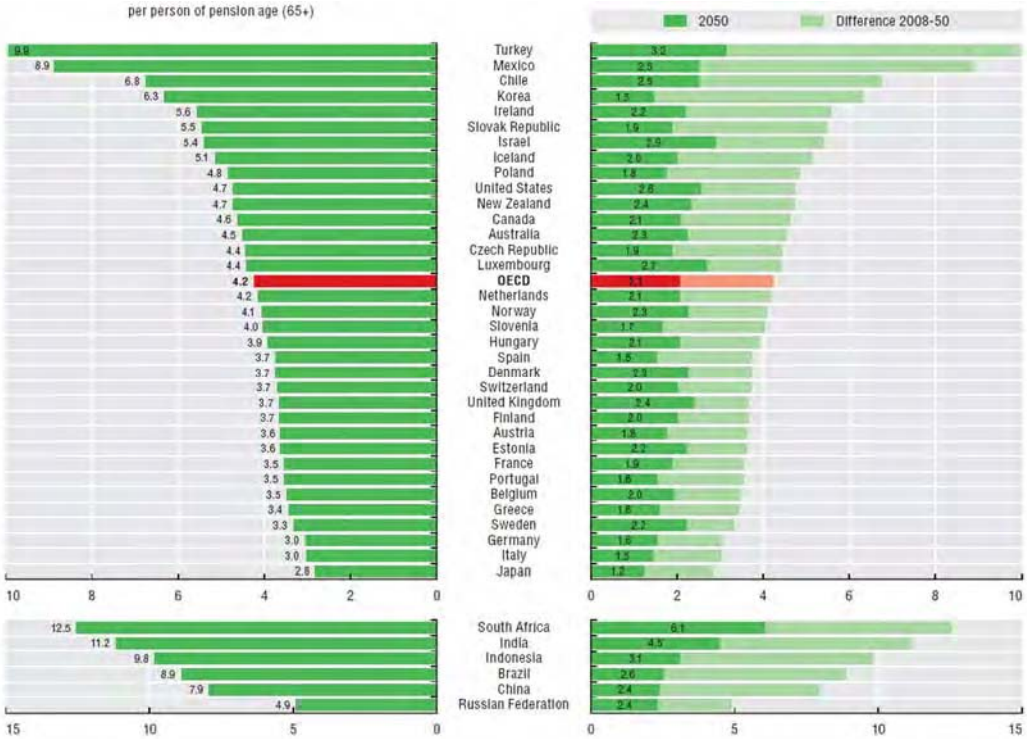

Figure 3. Panel A - Old age support ratio, 2008 (N. of people in working age (20-64) per person of pension age (65+); Panel B - Decline in the old-age support ratio 2008-2050 (Source: OECD, 2011), Pensions at a Glance, OECD Publishing, Paris (www.oecd.org/els/social/pensions/PAG); UN, World Population Prospects - 2008 Revision).

3 Care and aging population: the Italian context

The Italian context offers an interesting point of view on care and aging themes because of its particular characteristics in its demographic, socio -economic and welfare asset.

Information on Italian population are taken from different kind of reports published by the National Institute for Statistics (Istat) and from a database developed by Istat itself that collect various data from the Census and other sources; for this reason there is not an uniformity in the reference periods used and in the methodology used in the different report.

Considering historical series in demographic data, we can notice that Italian population is getting older. In fact, analyzing Table 1, we can see the continuous increasing of the number of people that are over 65: in 1951 was the 7.6 % of the total population registered by the Census, in 1971 was the 11.6 %, in 1991 was the 15.3 %, arriving in 2009 to reach the fifth part of the total population (20.2%). Going more in detail on the information on elderly people, other numbers seem important: first of all, the growing number of people in advanced age (more than 80 years), that in 1981 was the 3.6%, and in 2009 arrived at 5.6%of the total population. The second key information on greying population in Italy is its feminization: in fact, looking at Figure 1 we can see that from 1951 to 2009 the number of female over 65 grew from 8.8% to 22.8%.

Table 1. % composition of Italian population registered by Census, considering age groups and gender (in blue lines, male; in pink lines, female; in violet lines, total); total population in thousands; dependency index; structural dependency index. (Source: personal elaboration from Historical Series of ISTAT- April 2012) (Aging index: Total population over 65/ total population under 14 *100 - Structural Dependency Index: Total population under 14 and over 65 / total population between 15 and 64).

YEARS	AGE GROUPS									TOTAL POP.	AGING INDEX	STRUCTURAL DEPENDENCY INDEX
	0-14	15-64	65-70	70-75	75-80	80-85	85-90	90-95	95-100			
1951	27,3	65,2	3,0	2,2	1,4	0,7	0,2	0,0	0,0	47.516	31,4	52,3
			7,6									
	25,1	66,1	3,5	2,5	1,6	0,8	0,3	0,1	0,0			
			8,8									
	26,1	65,7	3,2	2,4	1,5	0,7	0,3	0,1	0,0			
			8,2									
1961	25,6	66,2	3,0	2,4	1,6	0,8	0,3	0,1	0,0	50.624	38,9	51,6
			8,2									
	23,5	65,7	3,9	3,1	2,1	1,1	0,4	0,1	0,0			
			10,8									
	24,5	66,0	3,5	2,8	1,9	1,0	0,4	0,1	0,0			
			9,5									
1971	25,6	64,8	3,9	2,7	1,6	0,9	0,4	0,1	0,0	54.137	46,1	55,5
			9,6									
	23,3	63,9	4,6	3,6	2,4	1,5	0,6	0,2	0,0			
			12,8									
	24,4	64,3	4,3	3,1	2,0	1,2	0,5	0,1	0,0			
			11,3									
1981	22,6	66,2	4,2	3,4	2,0	1,0	0,4	0,1	0,0	56.557	61,7	53,1
			11,2									
	20,3	64,5	5,0	4,3	3,0	1,8	0,8	0,2	0,0			
			15,2									
	21,4	65,3	4,6	3,9	2,5	1,4	0,6	0,2	0,0			
			13,2									
1991	16,8	70,4	4,9	2,9	2,7	1,6	0,6	0,2	0,0	56.778	96,6	45,3
			12,8									

	15,0	67,3	5,7	3,8	3,8	2,7	1,3	0,4	0,1			
			17,7									
	15,9	68,8	5,3	3,4	3,2	2,2	1,0	0,3	0,1			
			15,3									
2001	15,1	69,0	5,2	4,5	3,3	1,6	1,0	0,3	0,0			
			15,9									
	13,4	65,3	5,6	5,4	4,7	2,7	2,0	0,8	0,2	56.996	131,4	49,0
			21,3									
	14,2	67,1	5,4	4,9	4,0	2,2	1,5	0,6	0,1			
			22,2									
2009	14,9	67,6	5,1	4,7	3,7	2,4	1,2	0,3	0,1			
			17,5									
	13,3	64,0	5,4	5,3	4,7	3,8	2,5	0,7	0,3	60.340	144,0	52,1
			22,8									
	14,1	65,7	5,2	5,0	4,2	3,1	1,9	0,5	0,2			
			20,2									

Considering the demographic structure of families, they reduced their dimensions, reducing the number of their components, as you can see in Table 1: if in 1951 the large part of families (20.7% and 19%) was composed by 3 and 4 people, in 1971 the number average family components started to reduce, passing to 2 (22%) and 3 (22.4), arriving in 1991 and 2001 to the average number of 2 (24% and 27%).

Table 2. Families classified by the average number of components (Source: Istat, 2010).

Census Years	Families classified by number of components					
	1	2	3	4	5	6 e più
1951	9,5	17,4	20,7	19,0	13,3	20,1
1961	10,7	19,6	22,4	20,4	12,6	14,4
1971	12,9	22,0	22,4	21,2	11,8	9,7
1981	17,9	23,6	22,1	21,5	9,5	5,4
1991	20,6	24,7	22,2	21,2	7,9	3,4
2001	24,9	27,1	21,6	19,0	5,8	1,7

Table 3. Families divided by the age of components (Source: Istat, 2010).

Components by age	At least one ederly (>65)	At least one ederly (>75)	All components are elderly (>65)	All components are elderly (>75)	At least one child	At least one child and one elderly (> 65)	No children or elderly (>65)
Average 2002-2003	35.0	17.2	21.7	10.2	29.8	1.5	36.7
Average 2008 – 2009	36.5	19.2	23.1	11.7	28.0	1.3	36.8

Looking more in detail in the composition of Italian families (Table 3) by the age of their components, considering the average two range of years, 2002-2003 and 2009-2009, we can see the increment of family composed only by elderly members, from 31.9% in the first range to 34.8% in the second range, and families composed by at least by one elderly member, from 52.2% to 55.7%. On the other side, the number of families with at least one child is reducing, passing from 29.9% in 2002-

2003 to 28 %.

Continuing on analyzing the family structure, looking at the families composed only by one person (Table 4), it is interesting to see that the great part of them is constituted by elderly (26.2% in 2002- 2003 to 28.3% in 2008-2009), and, looking at the gender division, by female elderly: the average value in the years 2008-2009 arrived at 38%, while the male one person family reached the 15.1%. This result is coherent with the reflections given before on the current feminization of aging in Italy.

Table 4. People living alone divided by gender and age groups (Source: Istat, 2010).

Years	Male				Female				Total			
	<45	45-64	>65	Total	<45	45-64	>65	Totale	<45	45-64	>65	Totale
2001-2002	7,4	8,1	14,3	9,0	4,8	8,1	38,1	14,2	6,1	8,1	28,2	11,7
2003-2005	8,7	8,3	13,4	9,5	5,3	9,1	38,0	14,9	7,0	8,7	27,7	12,3
2006-2007	9,1	9,4	13,6	10,1	5,7	9,2	36,9	15,0	7,4	9,3	27,1	12,6
2008-2009	9,8	10,5	15,1	11,2	6,4	10,5	38,0	16,1	8,1	10,5	28,3	13,7

This aging population enjoys of a good level of health condition, because of the progresses in medical field and because of the transformation in lifestyles. An example could be given by the data on the practice of sport activities: looking at Table 5, we could mark an increase of the number of people that spend time in sport activities, almost doubled in the higher frequencies, and overcomes and people that never do it (in 2010 the 52.7% practice sport against the 47.1% that don't do it).

Table 5. % People over 65 and sport activity frequency (Source: Istat web database – April 2012).

Year / Sport activity frequency	2001	2002	2003	2005	2006	2007	2008	2009	2010
Continuously	4,4	4,9	5,9	7	6,3	7,5	8	8,5	9,8
Occasionally	2,7	3,2	3,1	3,9	4,5	4,3	4,2	4,6	5,3
Sometimes	35,9	34,4	36,1	35,3	32,7	38,4	37,9	37,1	37,6
Never	56,5	57,3	54,7	53,3	56,2	49,5	49,4	49,4	47,1
Not available	0,5	0,3	0,2	0,6	0,3	0,3	0,5	0,5	0,3

Also the use of time of elderly changed, especially in the quantity of free time available: time for physiologic activities is reduced, leaving more minutes of the day to free time (Istat, 2011). Gender division in this table makes clear the differences in time spending between male and female in the different age groups: considering the central range of age, women use more time than men in unpaid work, addressing it to their family components. Table 7 gives a specific focus on caregivers, dividing data on age groups: the range of age 35-45 represents the large part of the caregivers group (41.2%), is more involved in care of children (61%); the older range, 45-54 (23.8%), is on the contrary more involved (30.4%) in caring adults (elderly, disable, sick).

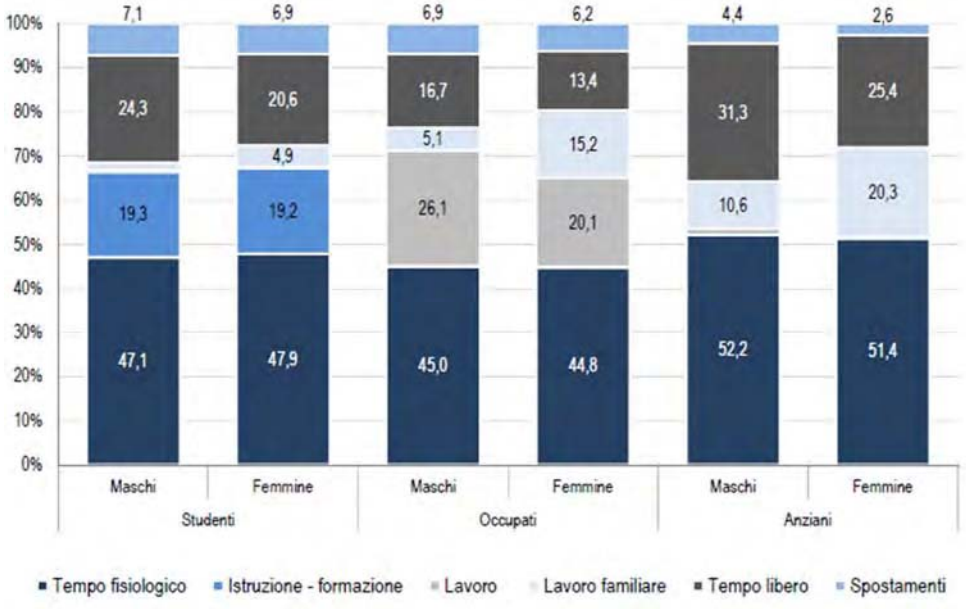

Figure 4. % compostion of time use in 24 hours of an average week day divided by gender – Years 2008-2009 (Source: Istat, 2011).

Table 7. % of 15-64 population that takes care of adults (elderly, sik or disabled) divided for age group – year 2008 (Source: Istat, 2011).

Characteristics	*Caregivers*	*Of own children*	*Of others children*	*Of adults (elderly, disable, sick)*
	% composition			
	Male and Female			
Age groups				
15-24	4,0	1,2	14,2	5,1
25-34	18,4	22,3	12,1	8,1
35-44	41,2	52,9	18,1	20,4
45-54	23,8	22,1	19,3	36,0
55-64	12,6	1,6	36,4	30,4

In fact, as these table confirm, in Italy, as in the southern European welfare model (Ferrera, 2007) intra-family solidarity has played an essential role in furnishing support for dependent elderly relatives and for children care, in the context of a substantial lack of family support policies. Even if a large part of the Italian public spending goes to support disabled (2502.5 Euros per capita) and elderly (117.4 Euros per capita), comparing to other kinds of social support, and the large part of the municipalities offer home care services for elderly (85.4%), showing a good index of territorial coverage of this services for elderly (91.1%), as you could note in Table 8 and Table 9, there is still a large part of caregivers, most of all women, that encounter problem in acceding and remain in the labor market.

Table 8. Social spending per capita – Year 2008 (Source – Istat website – April 2012).

Social spending per capita- catchment area							
Family and children	Disabled	Drug dependency	Elderly	Immigrants and Roma	Poverty, social disadvantage, homeless	Multiuser	Total
115	2502,5	1	117,4	49,5	13,6	7	111,4

Table 9. Home care services and presence on the territory – Year 2008 (Source – Istat website – April 2012).

Tipology of home care											
% of municipalities that offer home care services				Index of territorial coverage for home care service				Index of taking charge of home care services users			
Family and children	Disabled	Elderly	Poverty, social disadvantage, homeless	Family and children	Disabled	Elderly	Poverty, social disadvantage, homeless	Family and children	Disabled	Elderly	Poverty, social disadvantage, homeless
50,2	66,3	85,4	25,7	53,2	69,5	91,1	22,4	0,2	6,6	1,6	0

In fact, as you can see in Table 10, the employment rate of women, even if it is increasing, is still lower than the corresponding value of men and it changes a lot depending on their role inside the family: lower employment rate are in group of women that have children (year 2009, 52.9%) and higher rate are in group of single women (year 2009, 81%) (Istat, 2010). These framework on the employment condition of Italian women is also enriched by another research published by Istat in 2010 on work-life balance theme, showing the reasons that pushed unemployed women to leave their work (Table 11).

Table 10. Employment rate (Source: Istat website – April 2012)

Employment rate	2004	2005	2006	2007	2008	2009	2010
Male	69,7	69,7	70,5	70,7	70,3	68,6	67,7
Female	45,2	45,3	46,3	46,6	47,2	46,4	46,1
Total	57,4	57,5	58,4	58,7	58,7	57,5	56,9

Depending by the age group, reasons connected with the needs related to the growing of a new family have a great role in discouraging female employment; in older age group (45-65) also needs of an elderly relative push women to leave their work.

Table 11. Women that left their work for familiar reasons: age groups and reason – Years 2002-2003. (Source: Istat, 2010)

Reasons	AGE GROUPS <34	35-44	45-54	55-64	>65	Totale
Wedding	8,9	17,1	18,8	10,3	8,3	10,9
First chidl birth	13,1	18,3	12,7	9,7	3,6	8,5
Second /3rd/…child birth	6,1	13,6	7,4	3,5	2,1	4,6
Care of elderly people	..	..	3,5	1,7	..	1,3
Care of sick relatives	..	..	1,5	1,9	1,1	1,2
Others reasons	6,1	7,1	11,9	7,2	4,1	6,2

Another research, published by Istat in 2011 (Table 12), investigates the opinion given by unemployed women about the services for elderly, considerate not adequate for different kind of reasons: first of all, services are considered too expensive or not accessible because of their location away from the neighborhood then other reasons connected with the quality of the service provided.

Table 12. Unemployed women (age 15-64) caregivers because of the lack of public services for care – Tear 2008. Source: Istat (2011)

Reason of Inadequate services for elderly	
Opening hours	4,6
Too expensive	49,7
Bad quality	10,6
Inadequate number of beneficiaries	8,6
Not present in the neighborhood	25,2
Total	1,3

All these information reported in this paragraph try to show the Italian panorama on ageing of population and on the great role given by informal relationship among family members in care sphere, both in children care and in elderly care. A greying population that lives in better healthy and economic conditions but can't no more count on informal familiar relationships as in the past: in 1983 the 23% of families composed by elderly were helped by some relative but, in 2003 only the 18% received the same treatment (Istat, 2010). This is an evidence to take into account because, even if its important role, familiar solidarity is getting weak and this is an important problem – to take care of population that is getting older and that can't find support only within the familiar field, mostly because of the greater female labor market participation. Social policies addressed to elderly care (and family support in general) are required, changing the point of view on "care-receivers" and considering families as an important subject of society (Donati, 1996 in Istat, 2011).

4. A focus on the 11th Municipio of Rome

The city of Rome is the first municipality in Italy in terms of the number of inhabitants (3.991.078, Census 2011); from the administrative point of view, the city is divided into twenty regions, called "municipi" (Figure 1) that have autonomies from financial and management side and they are the

product of a strategy of central power decentralization that started in Rome in 70s. The city of Rome, aligned with the Italian dynamics on aging population, as you can see on map below (Figure 2), that show a high average age in every “municipio” of Rome; also some structural indicators could help you to have a framework of graying population in the Capital City. To better understand how the care theme has been treated by the institutions, the example of Municipio XI will be given, even if in brief notes. Municipio XI is located in southern part of Rome city area and is composed by different urban region with populations and urban characters very different one by the others. It is well know at the urban level because of his progressive attitude in policy making, especially in social policies. It is interesting from the point of view used in this paper because this administrative division promoted a really innovative policy, called “Sicurete”, a word that matches the terms Safe (sicura) and Network (rete) that aims to obtain safer public spaces towards a better involvement of inhabitants that have to pay attention to the maintenance of public space, supporting the idea that a safer place is a place that we cared about.

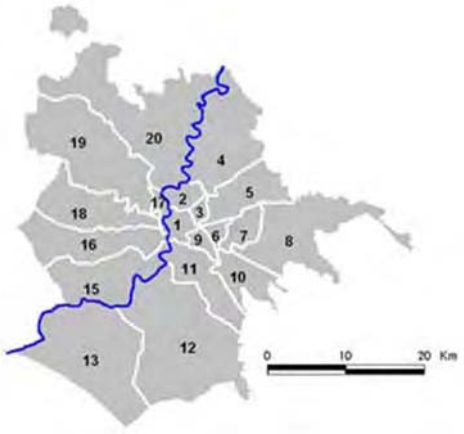

Figure 1. Rome and its “Municipi” (Source: Wikipedia – April 2012)

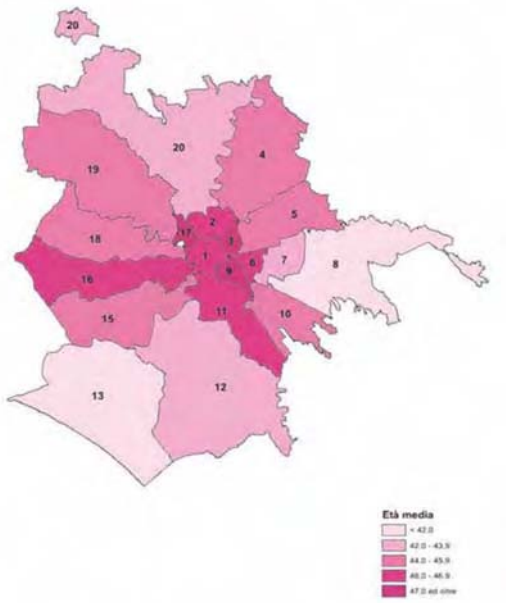

Figure 2. Average age – 2009 (Source: Ufficio Statistica – Comune Roma – 2010)

Table 13. Structural indicators of Rome population – Year 2008. (Source: Ufficio Statistica- Comune di Roma – 2010). (Dependency index = (pop. 0-14 + pop. >65)/(pop. 15-64) *100 - Aging Index= (pop. >65 / pop. 0-14)*100 - Number of elderly for each child = pop.>65 / pop.< 6 - Replacement Index = (pop. 60-06 /pop. 15-19) *100)

Roma	Average age			Aging Index	Dependency Index	Number of elderly for each child	Replacement Index
	M	W	MW				
	42,6	46	44,4	162,3	52,3	3,4	141,7

From the point of view of care policies addressed to elderly, the key factor on which public institutions are focusing, are supporting home care actions, giving cash allowances, orienteering services, residential solutions, transportation aids and support for socialization (Roma Capitale, 2010). Municpio XI in his Social Plan (2008) set up a series of actions (Table 14):

- Assistance Service for Elderly – Home Care and Socialization; that tries to avoid the institutionalization in residential structures of elderly, keeping them in their familiar spaces;
- Social Centres for Elderly: public spaces located in different neighborhood with a program of social and cultural activities;
- Soft Hospital Dischargment: set of care action to help elderly people to come back to their home;
- Telecare and Helpline services: useful in case of medical deseases;
- Holidays for Elderly: for preventing isolation of elderly and promoting socialization;
- Residential structure for Elderly or Disabled Elderly;
- Contribution for residential structures.

Table 14. Elderly attending social services provided in Rome and in Municipio XI (Source: Statistical Office – Rome City Council – 2010)

	Elderly social Centres			Urban Holiday Stays		Holiday for elderly				
		subsctiptions								
	Number	Number	% of >65 population	Number	Participants	Number	Participants	Day of Holiday	Average days of holidays	% participants on total suscription number
Rome	141	91317	15.03	19	1247	150	5793	74780	13	63
Municipio XI	7	7281	22.0	-	-	7	245	3160	13	3,4

"Sicurete" is public policy that aims to make safer the territory of Municipio XI making its inhabitants more conscious of the different kind of factor that contribute to make an urban area safer: maintenance of public spaces, empty areas, weak public lighting, and occupation of abandoned buildings. Inhabitants are involved in actions of active mapping of this mis-functioning of public spaces, thanks to the institution of a desk office that receive all the signalations and to the involvement of primary and secondary schools. This policy, as here very briefly mentioned, closely deals with the care of public spaces and concur to improve people's well being. In this sense could be considered a welfare policy that addresses public spaces, because is composed by a set a set of

actions aiming to build, maintain and protect territories (Tosi, 2011).

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Part B. Inclusive Communities – Tools and Approaches

Communities of Assisted Living: the case of Home-Villages in Portugal

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Communities of assisted living with a special focus on the typology Home-Villages in Portugal are the theme of this work. It sets off to analyse and characterize in their macro and micro scale the selected case studies: the Home-Villages of São José de Alcalar (Portimão), Monte da Palhagueira. It aims to identify the physical and spatial components of their housing units, their social facilities and their support services, and also identify the movements of the residents in the territory, through the analysis of mobility systems and relationships in the location map of the support facilities available in the region.
In such a way, the reading of the macro scale will identify the neighbourly relations on the territory and the relative proximity to the central services, while the reading of the micro scale will analyse the specific parameters of the village, such as the relationship between the built and non-built areas, identifying their role within the organizational structure (housing typologies and services available). It also presents a characterization of the resident population (total number of residents; differentiated by gender; by ages and existing family relationships). The paper suggests that the model of Home-Villages may be a promoter to the implementation of inclusive communities in an approach that takes care of the needs of the (elderly) population and takes advantage of the territory specificities.

Keywords: Home-Villages; Territory; Housing; Aging; Revitalization

Preamble

This research deals with the problem of aging of the population and how it interacts with habitat and territory. It considers the analysis of case studies of Home-Villages in Portugal, in micro and macro scale, and explores how they can be an enhancer of a sustainable territory. This could be done through the development of an intergenerational architectural structure, which minimizes or eliminates barriers in order to improve the quality of life style for elderly people and ensure their integration in the family and social community of support. In this wide community of support, apart from qualified housing and services, oriented to the needs of the elderly population, a diversified supply of jobs can be developed and will hopefully promote the establishment of young people and with that combat the desertification and the abandonment of the territory, and establish an integrated strategy for economic development and tourism geared to seniors.

1. Introduction

World population is aging - as a result of temporal stabilization of population growth. It is expected that in the future, the world demography will be marked by an increase in the number of individuals with 65 or more years, resulting from the combination of two factors: the increase in life expectancy and the decline of birth rates. This phenomenon appears as a reflection of advances in medical, scientific and technological knowledge, as well as of the improvement of hygiene and sanitary conditions of the dwelling and the territory; this result from the urbanization process, which has contributed to the increase in average life expectancy of the population. Still relevant to this situation,

are to be included factors of educational, cultural, political, social and economic order, that influence fertility rates of the countries, as well as their migratory flows, where immigration attenuates the aging process and emigration accentuates-it.

In this context, and by its demographic expression, the elderly population is a significant fraction of the population, which tends to increase and presents specific needs of living, mobility and accessibility, both inside the home and in the area - where these citizens live and move. The permanence in their homes and in their communities of reference (socially and family-wise) will be the greatest challenge for the development of planning and housing. The possibility to live near their family (in the same house or in a relationship of physical proximity) not always presents itself as a viable alternative. The use of nursing homes or assisted living residences ends up being the possible choice, however it is not always the most desired by the elderly citizens and their relatives (Schwarz, 2001).

For the elderly population, the continuity in their dwelling, permanent or temporary inserted in their territory and physical knowledge, in their social community and family, extends their autonomy and independence, as well as encourages the correct interaction between the elements: Housing | User | Time.

In this context lies the importance of integrated and accessible urban planning and architectural production, where the case of Home-Villages in Portugal could be evidence for a real alternative to concrete problems. Not only for a specific (and significant) sector of population, but for a whole social and urban structure. It is a fact that the Portuguese and world population are aging; the Home-Villages emerge as an alternative to the aging of the country's own territory. When looking at it depopulated hinterland the aged population could be seen as a solution and not as a problem.

2. The Aging Of The Population

2.1. Global Aging

The substantial population growth registered in the course of the 20th century eased the process of demographic aging. However, according to Jorge Gaspar (2009)[1], if the 20th century was the century of growth population, the 21st century will be the century of aging. This demographic transition will affect both the industrialized and the developing countries.

If we take as reference the current pace of populations aging, in the medium term the systems of social assistance, economic and housing, for the elderly population, will not be enough. The concerns related to the specific needs of dwelling for the third age - from the point of view of territory planning, social systems support, services, typologies, ergonomics needs and design - are the follow-up of concerns of demographic, social and economic order, resulting from the observation of the aging of the world population.

The social and demographic changes that occurred in the last century implied a transformation in family structure. Women, traditionally caregivers of the family, began to work outside the home and they no longer have the necessary time to take care of their elders.

[1] Jorge Gaspar (2009) – O envelhecimento e a dinâmica demográfica na Europa: Posicionamento de Portugal. In: O Tempo da Vida: Fórum Gulbenkian de saúde sobre o envelhecimento 2008 | 2009

The mechanization of work (a result of processes brought about by the Industrial and Technological Revolutions) meant that the majority of professions would be performed by younger professionals (with higher academic training and professional specialization); this has led to many individuals being untimely conditioned for a process of early retirement. At the same time, medical, scientific and technological advances increase the quality of life and the physical well being of individuals. This process generated a group of people, who, despite already positioned away from professional life, remains active and with a prospect of a long life, equating the timespan of retirement to the timespan professional activity.

Since the end of the nineties until today, it is clear that the subject of aging of the world population and its consequences - social, political, economic and structural - has been the target of discussion and debate. This is evidenced by the interest established from entities such as the United Nations (UN), the European Union (UE), and from different public and/or private organizations for the theme, which is widely debated in congresses and conferences, some of which have generated guidelines with global impact.

Table 1. Table Summary: socio-political initiatives reference

year	entity	initiative	Objectives
1982	**UN**	I World Assembly on Aging (Vienna)	1. To foster international response to the problems of the aging of the world population, from the economic, cultural, educational, social and human point of view and its impact on the overall development; 2. To implement policies and programs of action designed to ensure economic and social assistance to the elderly, thus promoting the improvement of their quality of life.
1990	**UN**	Proclamation of 1 October as the International Day of the Elderly	
1991	**UN**	The UN General Assembly	Endorses the principles in favour of the elderly: Independence, participation, care, self-realization and dignity.
1993	**UE**	European Year of the Elderly and of Solidarity between Generations	
1994	**ICPD**	International Conference on Population and Development (Cairo)	Initiatives in the framework of the demography, of the law, equality, culture, health, the environment and the reduction of poverty through an approach centred on human development.
1995	**UN**	World Conference on Social Development (Copenhagen)	Eradication of poverty on a global scale.
1999	**UN**	International Year of the Elderly	
2002	**UN**	II World Assembly on Aging (Madrid)+	1. To define guidelines for guidance of policies relating to the elderly population for the twenty-first century; 2. To promote the concept of active aging.
2007	**UN**	Revision of the Plan of Action International in Madrid on the Aging (Madrid +5)	
2010	**UN WHO**	Year of debate and reflection on the theme: "The influence of architecture and urban planning in health"	
2010	**UN**	Worldwide network of cities friends of the elderly	
2012	**UE**	European Year of active aging and Solidarity between Generations	
2012	**AGE**	For an EU friend of elderly people, 2020	"Support the creation of a European Network of Environments Friends of the elderly, which offers support to the local actors, regional and national, which seek to promote active aging and healthy using the participatory methodology developed by WHO".

In the developed countries, in the second half of the 20th century, there was an inflection in the degree of aging of the population. The decrease in population growth and the increase of aging are directly related, so during the 21st century, when people's numbers fail to grow, with the increase in average life expectancy of the population and the reduction of fertility rates, global aging will be a reality.

Reference values, presented by the UN[2], show that, between 1900 and 2000, the world population has seen an unprecedented growth in the history of demography. More than quadrupling the number of individuals of 1,5 billion to more than 6 billion, it is expected that this figure will rise from 8 to 9 billion until 2050. In other words, during the 20th century, there was a significant increase of the population, while, for the first half of the 21st century developed countries - Europe, North America, Japan, Australia and New Zealand – are expected to provides, at most, a slight growth, being that, since the middle of the century – the population will stabilize, and may even decrease slightly. In developing countries, it is expected to stabilize, as a result of the decrease in the rate of fertility (Wilson, 2009).

2.2. Portuguese Aging

In the beginning of the 21st century, Portugal appears as one of the most aged countries in Europe. For anyone, who was born in 1960, there was an average life expectancy of 60.7 years for men and 66.4 years for women and for anyone who was born in 2010 this hope rose to 76.14 years for men and 82.05 for women. This represents an increase of about fifteen years in six decades.

Table 2. Evolution of average life expectancy for women in Portugal (Data INE)

1980-1982	1984-1988	1988-1990	1992-1994	1996-1998	2000-2002	2004-2006	2008-2010
75,15	76,27	77,30	78,09	78,88	80,01	81,30	82,05

Table 3. Evolution of average life expectancy for men in Portugal (Data INE)

1980-1982	1984-1988	1988-1990	1992-1994	1996-1998	2000-2002	2004-2006	2008-2010
68,19	69,31	70,48	71,12	71,93	73,24	74,84	76,14

There is, also, the increase of population with 65 or more years. While in 1960, this range of population accounted for 34% of the total population; in 2001 it represented 41% and in 2008 it corresponded to as high as 46 %. Another element that characterizes the aging of Portuguese population is the fact that for every five individuals with 65 or more years, at least three are women[3].
The preliminary results of the Census 2011[4] made available by the Portuguese National Institute of Statistics (INE), in December 2011 (and in a continuous updating), indicate that in the last decade has seen a growth of 2% on the resident population, lower than the value recorded in the previous decade (1991-2001) were there had been a growth of 5%. There is also the aggravation of the double aging of the population; where 19% of the population has 65 or more years and only 15%

[2] Chris Wilson (2009) – *O Envelhecimento no século XXI: Perspetivas Demográficas.* In: O Tempo da Vida: Fórum Gulbenkian de saúde sobre o envelhecimento 2008 | 2009
[3] Maria João Valente Rosa & Paulo Chistas (2010) - *Portugal: Os Números*
[4] XV Census of Population and V Housing Census (2011)

have between 0 and 14 years. Thus, the aging index [5] is now 129, in other words: for each 100 young people there are 129 elderly - while in 2001 this index was 102. The autonomous regions of Azores and Madeira are those which exhibit the lowest indices of aging in the country, respectively 74 and 91, while the Alentejo region has the highest rate (179), followed by the Centre region (164).

An aggravation was verified in the index of dependency. In the last decade that index has increased from 48 to 52, which means that for every 100 people in active age, there are 52 dependent. Furthermore, the index of dependency of the elderly people reflects the same upward trend: from 24 to 29. And the situation becomes worse, if the relationship between the number of people that contribute to the social security systems and the people that are reliant of them, calling into question the retirement and health systems, among others.

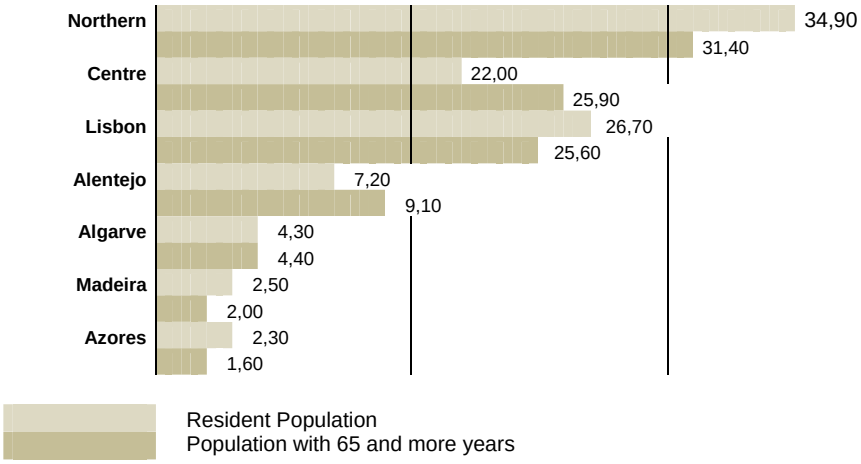
Table 4. Index of aging in Portugal (Data INE)

1970	1975	1980	1985	1990	1995	2000	2005	2010
33,97	38,35	44,86	51,28	68,07	85,84	102,23	110,10	129,00

The distribution of population by regions has remained the same, as in the previous decade. About 35% of the population resides in the Northern region. The Algarve and the autonomous region of Madeira are those where there has been an increase of the resident population, respectively 14.1% and 9.3%, while the regions of Alentejo (-2.5 %) and the Centre (-1 %) saw a decrease of its population, which moved essentially to the metropolitan area of Lisbon, as inferred from the Census 2001.

It is also in the Northern region that lies the largest percentage of individuals with over 65 years (approximately 31%), followed by the regions of Lisbon and Centre (both with about 25%).

Graphic 1. Distribution of the Portuguese population and the population with 65 or more years in 2011 (Data INE)

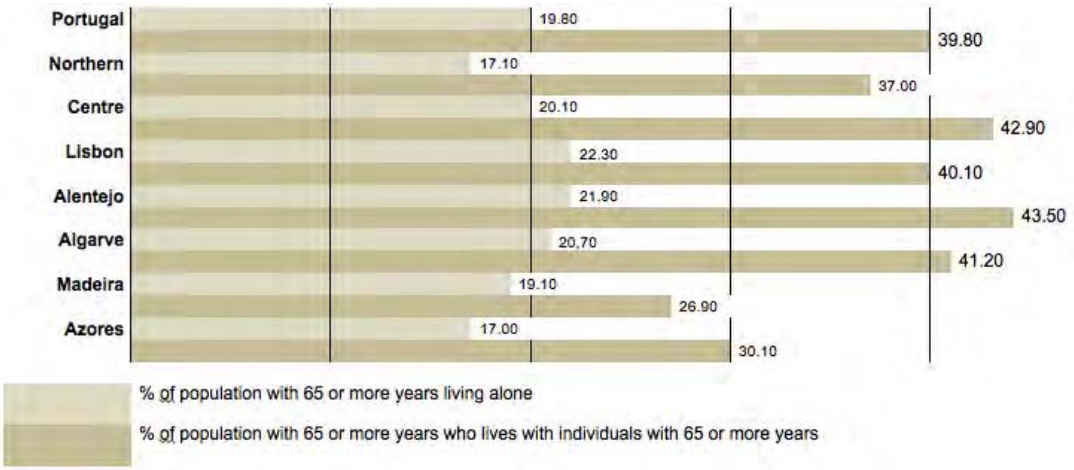


As regards the parameters of housing and its relationship with the elderly population, the Census 2011 revealed that: 60% of elderly people live alone or in the exclusive company of people also with 65 or more years. These values, when compared with those obtained previously (2001),

[5] Relation between the number of elderly people and the number of young people in the population

reflect a 29% increase in the number of elderly living alone and a 28% increase in the number of elderly people who lives exclusively in the company of another people also with 65 or more years.
The regions of Lisbon (22%), Alentejo (22%) and Algarve (21%) exhibit the highest rates of elderly people living alone. The Northern region and the autonomous region of Azores have the lowest rates (17%). It is known that a fifth of the family accommodations in the country[6] are inhabited, exclusively, by older people, which reflect an increase of 28.3% in the last ten years.

Graphic 2. Percentage of elderly people living alone or exclusively with people with 65 or more years in 2011 (Data INE)



As it has been already recorded in 2001, the data obtained in Census 2011 reinforce the intensification of the depopulation in inner regions and the concentration of population in coastal regions, near the metropolitan areas of Lisbon and Oporto, which assert their capacity to attract and retain people. The municipalities of Mafra (+41%), Alcochete (+ 35%) and Sesimbra (+32%) are those, which have the largest population increases. And the regions of Alentejo and Centre registered a decrease of population, respectively: 2.5% and1%. As such, the aggravation of the unbalance is verified in the distribution of population throughout the territory. The great majority of municipalities in the interior regions have registered a loss of population in the last decade: 198 of the municipalities against the 171 that were found in 2001.

So, it is possible to conclude that the Portuguese population is aging and, with her, is also aging a significant part of the territory, which is living a process of desertification and abandonment, in the interior regions; in particular in the line of boundary between the regions of Alentejo and Algarve.

3. Space To Live For Seniors

In the act of design, in the architect's mind, should be present a concern to minimize, or even eliminate, small architectural barriers - such as stairs or other physical barriers that limit the mobility

[6] Family Accommodation occupied that constitutes the habitual residence or principal of at least one family (INE)

in the space of (elderly) users and decrease their ability to maintain their autonomy and independence. The architect should also consider the introduction of the appropriate dimensions of passage; the creation of rooms with good ventilation, illumination and flexibility (rooms large enough for people to be able to move around and which allow, for example, the reorganization of furniture, in accordance with the needs of the users over time); or which allows the introduction of appropriate equipment (such as handrails, door handles, faucets, systems of support and protection, among others).

These are concerns that arise on basis of the special needs of individuals with disabilities. However, although these are applicable to the needs of the elderly population, they are not the only ones. Even the person who ends up to being a wheelchair user (or using another way to support this walking), or those who may see their capacities of hearing and seeing reduced, has other kind of needs for using the space, in a comfortable and safe way.

Authors like Marsden (2005), Lawlor and Thomas (2008) or Worpole (2009) argue that the resident systems, thought out as appropriate to give answer to the needs of the senior population, must be designed on basis of the "humanization" of its scale, with strong references to the concept "home environment" (away from the image of institutionalization). Whenever possible, the housing unit should be developed in buildings with just a ground floor, with a strong relationship between the inside and the outside, with generous and cosy green areas and with good solar exposure. It is also important that there exists a diversified supply of services, facilities and activities to promote the feeling of security and the concern of how the residents interact with the space and the territory around should be present.

Also in the design and in the organization of outdoor spaces, these concerns should be present. The street is the first area of contact with the world through the neighbourhood, the village or the town. The existence of low thresholds, crosswalks unimpaired, visual and vocal signalling, spaces for rest and shelter, among others, are elements that promote the use of the territory and minimize the isolation, of the elderly population. Thus, the characteristics of a quality space for the elderly must (whenever possible) be implemented in all types of built structures, because they mean quality of spaces for all (Bohn, 2008).

The space where elderly people live and the territory around them are critical factors for the promotion of an *active aging*[7], as well, as the bonds with their family and social structures. It establishes a direct influence on the experiences of living of its users (Mens and Wagenaar, 2009). Gavin (2005) argues that the development of a broader search about the places, the cultural components, as well as the experiences of life of the individuals, would allow a more knowledgeable perception of the needs of the senior population – that in spite of presenting a common factor (the age), each one possesses specific cultural characteristics (customs, habits and different needs).

Design taking these parameters into account will allow aging with dignity, as well as provide an improvement to the conditions of housing and the region. And, in such a way promote a place for an

[7] In 2002, the UN organized in Madrid (Spain) the *II World Assembly on Aging*, with the purpose of defining the guidelines for guidance of policies relating to the elderly population for the XXI century and promoted, through the WHO the concept of active aging, which is more comprehensive than the concept of healthy aging, recommended until then, with a vision that goes beyond the issues of health and extends to the trade-related aspects socio-economic, psychological and environmental. Presents key concepts: autonomy, independence, expectation of life healthy, Quality of Life and the Social Participation, Health and Safety as key factors for its implementation.

intergenerational experience, since it provides to the aging population a greater social involvement, which upholds their integration and interaction in society (Schittch, 2007).

4. Home-Villages

4.1 The Concept

The concept of Home-Villages include new structures, designed and constructed to create houses, and services dedicated to the elderly people; as well as the recourse to old villages and towns existent in the interior of the country (Portugal), in a process of depopulation and desertification. It is foreseen that these structures offer, in addition to the housing, all the services and facilities necessary to its operation (and for the needs of its residents), which may diversify according with the specificities of the resident population and of the territory where the village is inserted.

These kind of structures could be the preferential place to install residential and support services to the elderly population (local, national and foreigner), cater to the improvement of their quality of life and simultaneously promote the fixation of young population - through the creation of an offer of specialized jobs (in areas like: health, continued care and, geriatric service, administration, commerce, among others), and, in such a way, promote their intergenerational component.

The Home-Villages should be implemented in the territory where the population is already aging, where the offer of employment is small and where the depopulation implies the existence of numerous uninhabited houses. According to Martins (2009) this scenario creates the possibility to introduce products and services with quality for a population with 65 or more years (resident or tourist)(8), through the valorisation and differentiation that the national territory offers. These structures may contribute to an integrated regional planning, considering its revitalization, as well as to the improvement of living conditions of resident populations, through the implementation of a physical structure and a specialized economic structure: in particular, as regards the residential and health services, as well as all supplementary services (such as: laundries, hairdressers, banks, pharmacy, restaurants, accommodation for visitors, playful activities, among others) – in other words, to generate urbanity.

For besides the integration in a perspective of the planning of the territory, the Home-Villages will be able to be one of the bases for a strategy of tourist and economic development, directed at the third age. The offer of specialized services associates itself to the differentiated conditions, that the national territory offers, such as: climate; cultural, gastronomic and architectural heritage; landscape; among others. According to Carlos C. Ferreira (2006) the affirmation of our territory as a preferential destination for European and International senior tourism “is founded on (ac)knowledge of factual importance, but also in the various implications associated with this demand. Such in the perspective of a segment - transverse to the majority of tourist products - such as in reading more confined to a certain programming tourist profile, directed exclusively or predominantly to senior citizens (prospect of product) the national territory, and the Algarve in particular, have attributes that have already been signed and/or with the potential for the show as tourism destinations for the elderly population European”[8].

[8] If we consider the potential tourist of the villages, we can have as reference the range of population with 55 or more years.

We must also consider that the senior tourists tend to be greater in number, but also older, with greater economic power and more active (Cavaco, 2009), and, thus, acting as a dominant factor and stimulating the economic development of regions and countries with a tourism vocation[9].

4.2. Residential Structures Similar To The Home-Villages Concept In The International Context

In what concerns models or structures with a similar concept to the Home-Villages, in the international panorama it stands out the *Cohousing's.* The concept originated in Denmark in the 20th century (in the sixties decade), was subsequently implemented in other countries in Northern Europe and in North America - *Cohousing's* also seek the promotion of intergenerational integration between the resident communities - participation in the conception of the project and in its construction. There are currently *Cohousing's* developed to meet the specific needs of the population with 55 or more years, where these senior citizens are looking forward to stay in a community that promotes neighbourly relations and mutual assistance among the individuals, regardless of their age, aiming at a respected and autonomous aging. This concept is also implemented in *Green Houses*, in the United States.

Between the end of the 20th century and the beginning of the 21st century, there appears the development of models that reconcile the expansion or restructuring of urban structures of cities with models of intergenerational housing. Of these the foremost is the expansion plan for the city of Vienna (Austria) for ten thousand residents. Peter Ebner and Franziska Ullman (1998-2001) designed its urban and architectural planning, who had resorted to the insertion of intergenerational buildings, to allow young families to share their experience with their parents, combined with the existence of small lofts for students. Another example is the expansion of the city of Ypenburg (Holland), whose urban plan was the responsibility of MVRDV studio, in 2002. The housing buildings for 120 families, were the responsibility of the architectural studio Van den Oever, Zaaijer & Partners, who have considered, equally, the intergeneration issue. They relate the developed apartments, in the different floors, with a seniors residence in the ground floor.[10]

A mention should be made, on the international scene, to the development of conceptual projects directed to the specific needs of older people, like the *Geropolis* project, started in 2004, by the Bauhaus Foundation; with the intention to explore how the German cities may be "enhanced" to satisfy the needs of aging population in the year of 2030. The project is being developed by the team of architects Elizabeth Kramer, Mathias Hollwich, Matjhias Böttger, Reiner Weisbach and Rosemarie Neumullers and seeks to be the basis for the development and implementation of a preventive architecture, which intends to provide a significant improvement in quality of life, well being and security of individuals, in their mobility within the housing, as well as in the territory where it belongs[11].

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[9] Carlos C. Ferreira (2006) - *Portugal destino turístico da população idosa europeia: Abordagem geográfica do turismo sénior internacional*. Lisboa: Coleção Temas de Turismo, nº6 Turismo de Portugal, p.368

[10] Christian Schittich (ed.) (2007) - *Housing for People of All Ages: Flexible, Unrestricted, Senior-Friendly:* Berlin, Detail Edition

[11] Mathias Hollwich – *New Aging* (Text donated by the author, February 2010)

5. Home-Villages In Portugal

In Portugal, there stands out the existence of the Home-Villages of São Martinho das Amoreiras (Odemira - Beja), São José of Alcalar (Mexilhoeira Grande - Portimão) and Monte da Palhagueira (Gorjões - Faro). It is still relevant to refer, the Village of Santa Isabel (Albarrraque – Sintra), property of the Santa Casa da Misericórdia of Lisbon, which in spite of not having in its programmatic genesis the concept of Home-Village, reconciles multigenerational activities. There are technical-professional courses for youths (who are out of the conventional education system), home for children in risk (who sleep in the village, but frequent the school outside the village) and home for a few needy seniors.

The study presented here portrays the Home-Villages of São José de Alcalar and Monte Palhagueira. The choice of these two cases studies, lies in the fact that both belong to the same geographical region - Algarve - and because they have similar programmatic structures. However, they are intended for distinct groups of aging people: The first is inserted in the Portuguese network of Private Institutions of Social Solidarity (IPSS), while the second is a private institution, with an occupation of entirely foreign population.

5.1. São José De Alcalar

In May 1989, began the construction of São José de Alcalar village, in Mexilhoeira Grande (Portimão). It was an initiative of Father Domingos Monteiro da Costa, after checking the specific needs of accommodation found in the Home in the parish. This social structure was developed, despite their age and specific needs, in a traditional configuration of shared rooms, differentiated by sex, indifferent to the separation of families. On the contrary, families should stay together and continue to share the same home, although they are unable to remain in their own homes.

The village was designed by architect Martin Garcias and was developed in a structure of five blocks that responded to the functions of residence, to the supporting services to the village and to the visitors, the whole arranged in a radial and concentric design plan. The model proposes an intergenerational experience, enabling improved life-style quality of local residents and integration in the local community and families, being interconnected with the existing territorial network.

5.1.1 The Macroscale Of São José De Alcalar Home-Village

Based on the cartographic reading of São José de Alcalar village was analysed the neighbourhood relations and the proximity to central support services identified in Figure 1.

It was possible to conclude that the village is removed from its urban area of influence (the village of Mexilhoeira Grande and the city of Portimão). In a region where the public transport network is deficient, there remains the recourse to private transport or to the fire brigade to access the central services of support, such as: central hospitals (private and public); health centre; leisure and cultural facilities; sports facilities; banks; post offices, airport; communication routes; Marina of Portimão and the coast line.

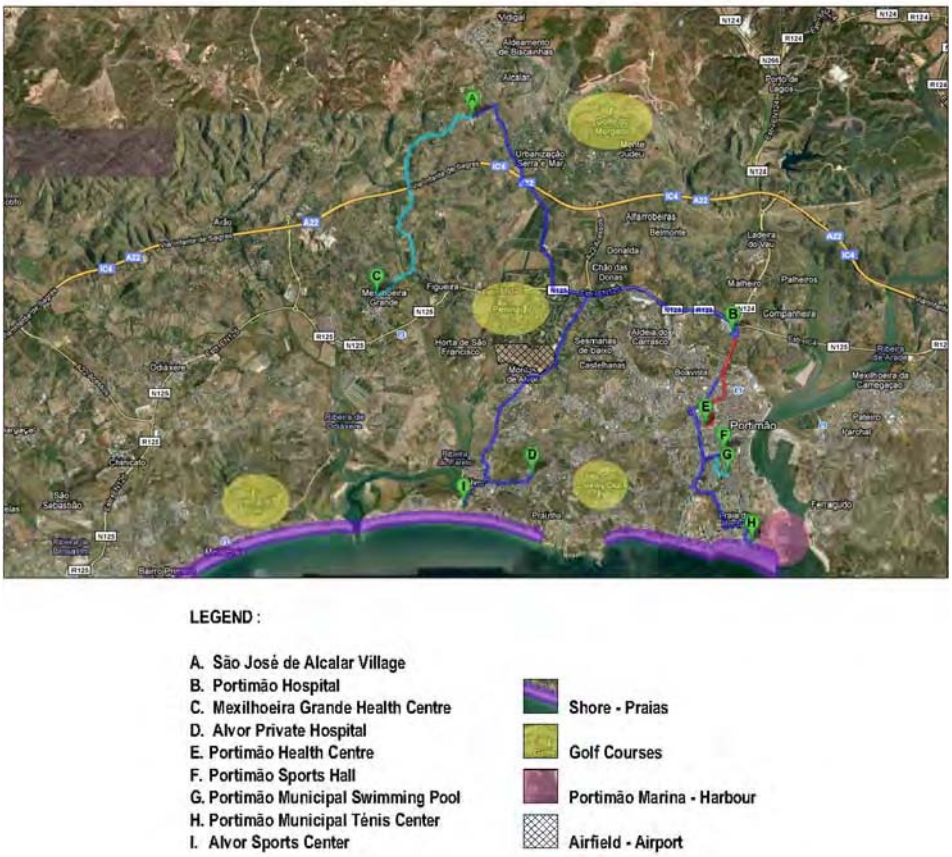


Figure 1. São José de Alcalar Home-Village – Ortophoto/Aerial view, Area and surrounding Services.

The village is served by good communication roads (including highway), as well as telecommunications services (terrestrial and mobile).

Moor Mens and Cor Wagenaar (2009) in *Health care architecture in the Netherlands*, present the formal evolution and the typologies used in health equipment in the Netherlands, between 1750 and 2010 - including hospitals, sanatoriums, residences for the elderly, health centres, among others. They present, as one of the main conclusions, for the development of buildings dedicated to health care - where the main concern is the promotion of well being - that the architectural design has a direct effect in the health and in the well-being of users/residents. It establishes a direct influence on the experiences of living of its users, which extends to psychological effects and to the implementation of medical therapeutics. The building's preferential location is outside the major urban centres, since the serenity is a key factor for these users (and professionals).

5.1.2 The microscale of São José De Alcalar Home-Village

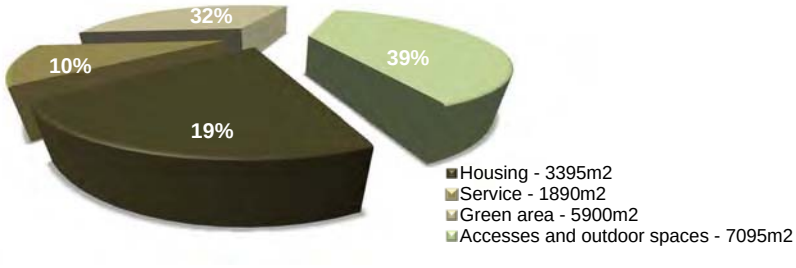
The reading of the microscale of São José de Alcalar Home-Village was developed through a survey and interviews, conducted in May 2011, which considered the parameters of analysis interpreted below.

- **General characterization of areas** (Graphic 3)

The village extends over an area of 18.280,00 m^2. 71% of the total area is not built and it is used as entrance, green spaces, areas where the residents cultivate vegetables, remaining wasteland and outdoor equipment, like an amphitheatre and a Geriatric Park.

The housing area represents the largest percentage of the built area (19%), which is developed in two blocks - East or West - subdivided in to four semicircles, where are the apartments (one, two and three bedrooms), in the ground floor. These converge to a common garden, preceded by a porch area.

The remaining area is intended to the support services of the village (10 %).



- **Characterization of the available services and facilities**

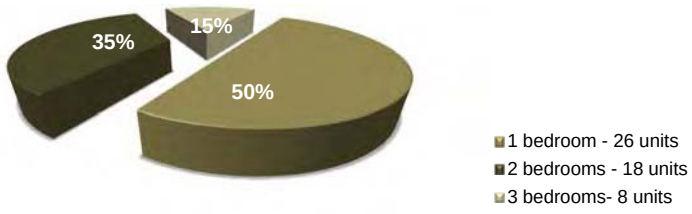
There is available: medical service, permanent nursing service, physiotherapy, occupational therapy, laundry, coffee shop, supermarket, hairdresser, small library, geriatric park, kitchen and dining room - where residents can have their meals, if they wish (although all the houses have kitchen, the responsible of the village transmitted us, that the vast majority of the residents prefer to have their main meals there).

Figure 2. São José de Alcalar Home-Village – hairdresser, laundry, geriatric park, dining room, catholic chapel and nursery and kindergarten building

The village also provides other support services to the residents and to the neighbouring community, like: a catholic chapel, a day-nursery, a kindergarten, leisure activities for young people and accommodation for visitors.

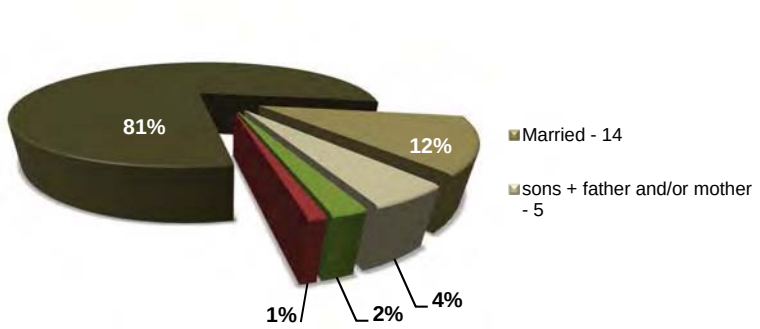
- **Characterization of capacity and structure of the houses** (Graphic 4)

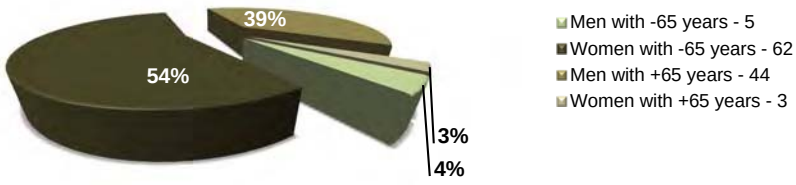
The maximum occupation in the village is stipulated to 130 residents, in 52 houses, consisting of 26 houses with one bedroom, 18 houses with two bedroom and 8 houses with three bedrooms. All bathrooms and kitchens are tailored to the needs of individuals with disabilities.



- **Characterization of the resident population** (Graphic 5 and 6)

At the date of completion of the survey, the occupation in the village were 114 inhabitants, of which 65 were women - representing 57% of the total population, mostly with 65 or more years (54%) - and 49 men - 43% of the total population, mostly with 65 or more years (39%). Another significant finding of the characterization of resident population, is the fact that 14 houses are occupied by couples (12%) and 8 with people with direct kinship relations (7%). Thus it appears that the majority of houses (81%) are shared by people who do not have any degree of relatedness between them. All residents were Portuguese.





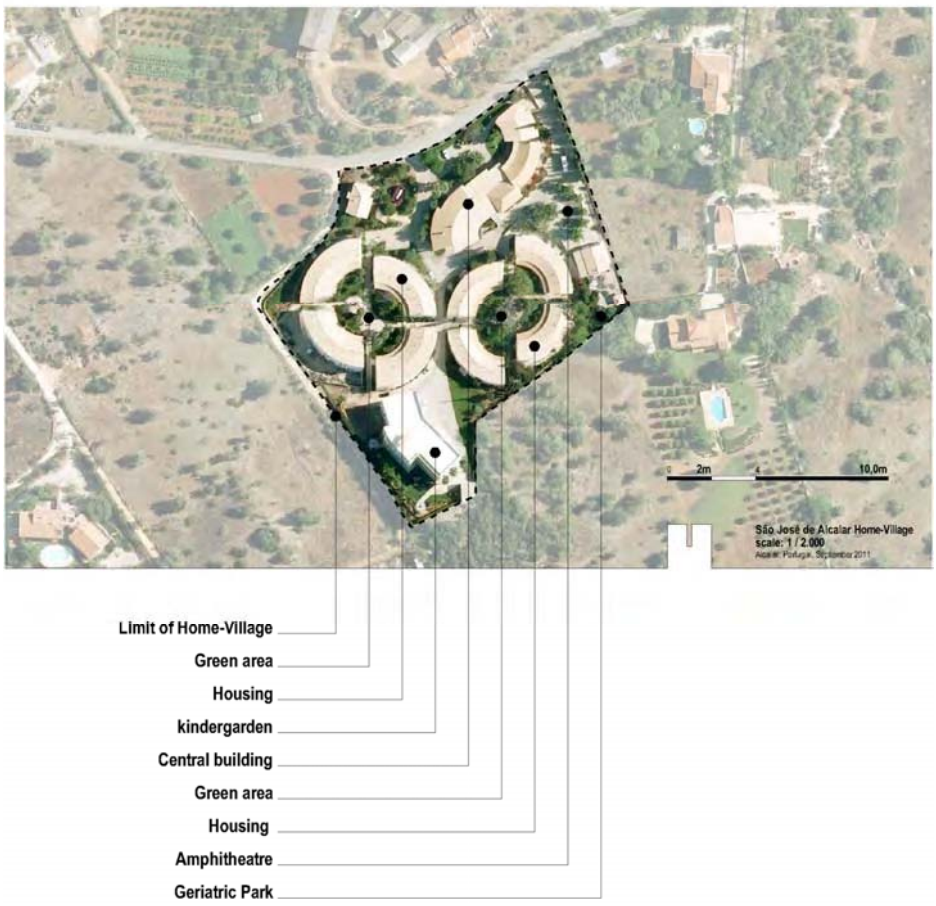


Figure 3. São José de Alcalar Home-Village structure

5.2. Monte Da Palhegueira Home-Village

Located in Gorjões (Faro), the construction of Monte da Palhagueira began in 1992, with the building of the Nursing Home. It was an initiative of Mary Cornelius-Reid, who with her family owns the Amesbury Abbey Group, founded in 1972, and has three more units of residence for the elderly in the United Kingdom: Amesbury Abbey, in Wiltshire, Winton House and Sutton Manor, in Hampshire. The village was designed by architect Carlos Gregorio who created the concept from the pre-existence of a country-house in ruins and was inspired in the local architecture, the village of Alte. It was conceived bearing in mind each house as a unique identity. The housing structure is developed in apartments, townhouses and villas with typologies of one, two and three bedrooms, with large gardens areas and no physical limit. The village offers privacy, independence, security and facilities dedicated to the needs of residents, and who must have 55 or more years, who buy the property rights for a value that starts at £140,000, for a one bedroom apartment.

5.2.1. The macroscale of Monte Da Palhagueira Home-Village

Based on the cartographic reading of Monte da Palhagueira village was analysed the neighbourhood relations and the proximity to central support facilities identified in figure 4.

Figure 4. Monte da Palhagueira Home-Village – Ortophoto / Aerial view, Area and surrounding facilities.

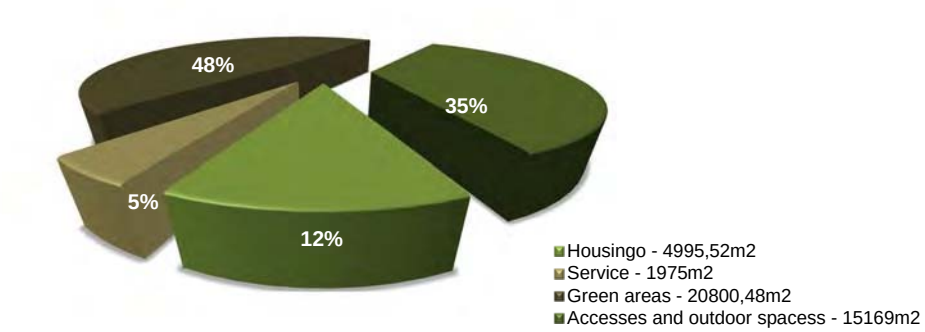
It was possible to conclude that Monte da Palhagueira is removed from its urban area of influence (Santa Bárbara de Nexe and Faro). As in Alcalar, it is always necessary to get private transport to get to the central services and facilities of support. It is also well served by access communications routes (including a highway) and avenues of terrestrial and mobile communication. The nearest town, Santa Barbara de Nexe, has commerce and services like post offices, banks, among others. The proximity to Faro International Airport presents itself as an added value, since the resident population is foreign

5.2.2. The microscale of Monte Da Palhagueira Home-Village

The reading of the microscale of Monte da Palhagueira Home-Village was developed through a survey and interviews, conducted in January 2012, which considered the parameters of analysis, interpreted below.

- **General characterization of areas** (Graphic 7)

Monte da Palhagueira occupies a total area of 42.940,00 m^2, where, like in Alcalar village, most of the percentage corresponds to inbuilt area (83%), and the highest percentage of constructed area is intended for houses (12%).



- **Characterization of the available services**

One of the most important services is the Nursing Home, which is the generating structure of the whole village, with 22 rooms (spacious with private bathroom), developed over two floors with stairs and lift. Residents can choose to bring their own furniture or use the one that is available in the institution. There is a permanent nursing and medical service, a dining room on each floor, a kitchen, and toilets adapted to special baths for the dependent patients, a living room, a television room and an outdoors pool. The residents of the village can choose to transfer themselves to the Nursing Home, when or if they consider it more convenient. If they wish, they can also have daily meals in the Nursing Home.

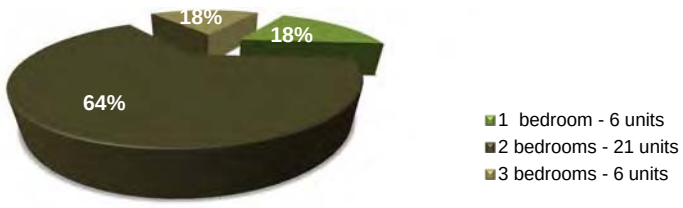
Figure 4. Monte da Palhagueira Home-Village – outdoor pool, Anglican Chapel, toilet adapted to special baths for the dependent patients, lake, bookstore/library and garden

Other services available are: a second outdoor pool (with ramped access to wheelchairs), a games room, a tennis court, a mini-golf course, a small bar with a bookstore and a library, a restaurant, a hairdressing salon, a medical and nursing service and a physiotherapy room, whose service runs from Monday to Friday. There is also an Anglican Chapel, with celebrations on Wednesdays and Sundays that support the resident community and the British community in the nearby villages.

- **Characterization of capacity and structure of the houses** (Graphic 8)

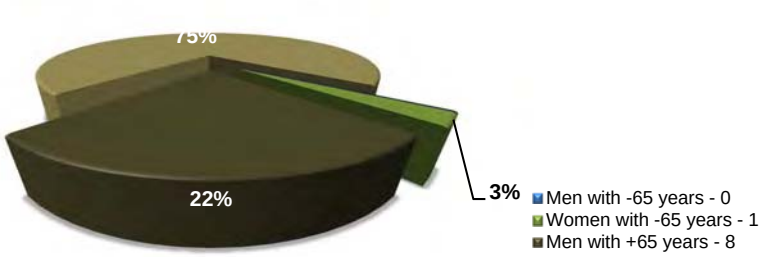
The stipulated maximum occupancy is 99 people, in 33 housing units consisting of 26 units with one bedroom, 21 with two bedrooms and 6 with three bedrooms. In their majority they are isolated villas, however, there are some apartments.

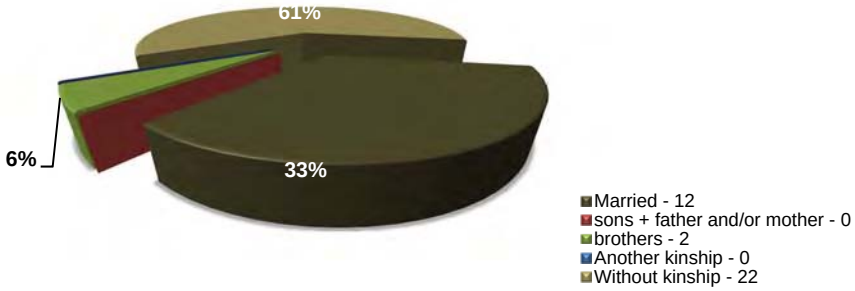
All the houses have an emergency call system connected to the Nursing Home, housekeeping services (twice weekly), a laundry service, housing and garden maintenance, satellite TV, and in some cases, heated flooring. Eleven houses have garage, nine have carports and one has a basement. In the houses with two level floors, one has a lift and in the others, whenever desired, a system with platform lift in the stairs can be installed.



- **Characterization of the resident population in the houses** (Graphic 9 and 10)

At the time when the survey was developed, 36 people lived in the village, mostly women with 65 or more years (75% of the total population, corresponding to 27 individuals), only one woman was younger. The remaining residents are men also with 65 or more years (22% of the total resident population, which corresponds to 8 individuals). As regards the family structure of the resident population, mostly (61%) share the same house with people just for company, without any family relationship. All residents are foreigners, mostly British, except one who is from Belgium and another one from America.





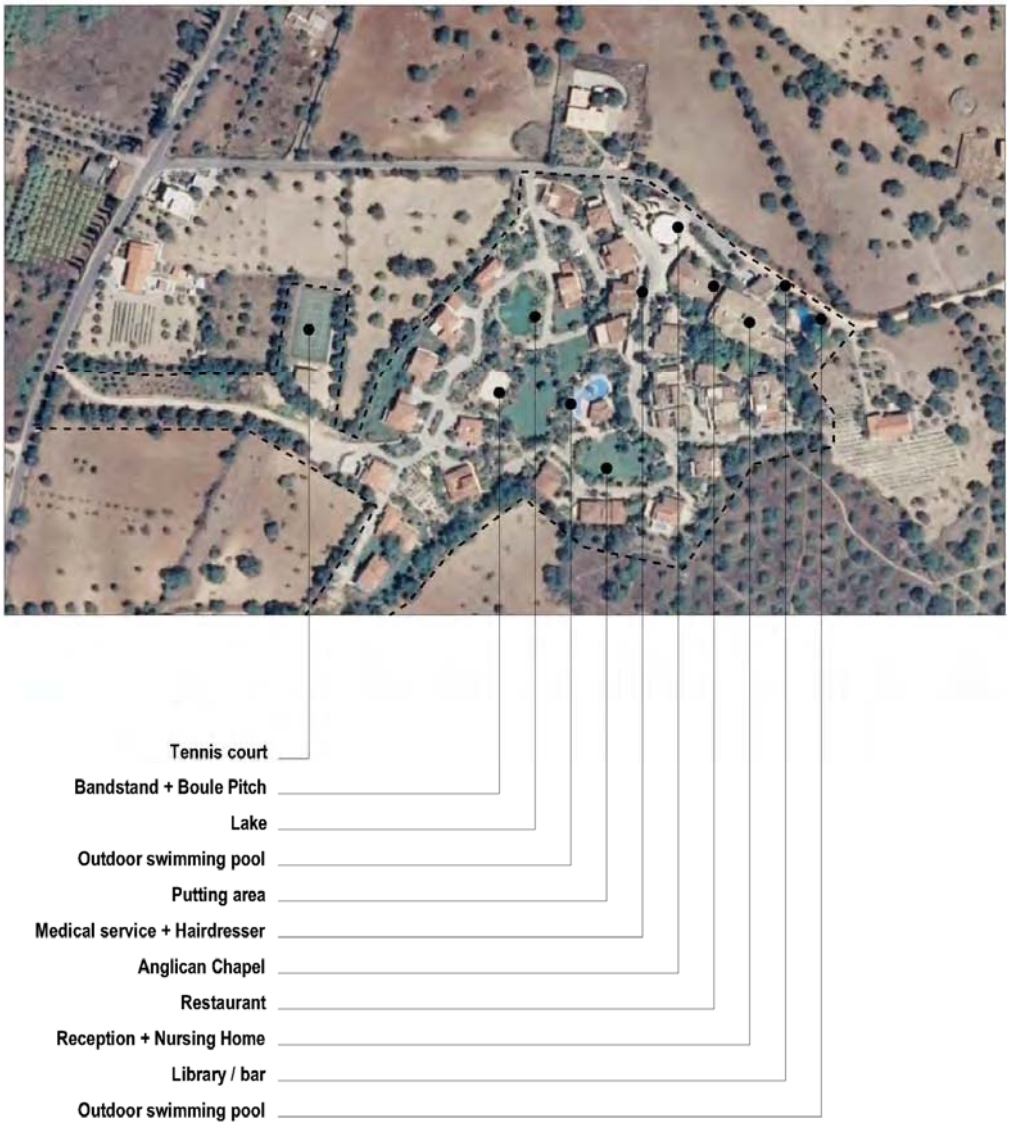


Figure 5. Monte da Palhagueira Home-Village

6. Conclusions

The aging of the population should mark the way we see the space where we live and its inter-relationships with the territory and with the individual (elderly). The elderly are increasingly larger in number, with greater vitality, independence and autonomy. Their contribution and interaction with family and social structure is preponderant for all society.

Through the demographic challenge we must increase and promote spaces of dwelling that manage a sustainable territory. This will be obtained by establishing relationships of proximity and by the revitalization of the territory that is also in a process of aging. Structures such as Home-Villages, in Portugal, may arise as a response to those needs and contribute to the economic development, particularly through the development and promotion of the tourism sector, in the regions where they are based; as well as though implementation of numerous activities, inherent to their operation, and this could allow the attraction of young population and thus the revitalization of the territory.

Home-Villages like São José de Alcalar and Monte da Palhagueira present a structuring base in common: housing and service facilities, oriented to the specific needs of the elderly, and the close relationships they establish with the neighbour communities - in particular, in medical services supporting, religious celebrations and in the case of Alcalar, with day-nursery, kindergarten and leisure activities for the local young people.

Both villages are inserted in a position of disadvantage in the territory. However, the fact that they are close to the road network and well served by terrestrial and mobile telecommunication networks reduces the risk of isolation of the resident population. In both cases, the public transportations network is deficient; it is always necessary to resource to private transportation for longer journeys. The substantial difference between the two villages, is the fact that Alcalar has a social character and is integrated in the Portuguese network of Private Institutions of Social Solidarity, while, Monte da Plhagueira is a totally private structure, dedicated to the foreign population resident in Portugal, particularly in the Algarve region - some residents of the village are already in the country since the 60's and 70's.

To improve the programmatic base of these kinds of structures it is essential to create good facilities like: health care, sports facilities, cultural and leisure services. The partial occupation of the available time for the residents is also an important factor, for them and for the community.

According to authors like Marsden, Huber and Lawlor, among others, for the design of systems to residence for the elderly it will be important to introduce, as a reference, the concept of "home" or "domestic environment", as well as the existence of a diversified supply of services and activities, that promote the independence and privacy of the elderly residents, as well as the feeling of security, which is verified in the Home-Villages that we had analysed. And, in both cases, the major percentage of the area is not used with construction – it is intended for gardens, pathways and sports activities support in the open air.

Another important factor is the quality of living spaces and their physical characteristics. In Alcalar and in Palhagueira, they do not present insurmountable physical barriers, in the interior or in the territory around them. In the case of Alcalar, by the social characteristic of the village, the homes are smaller; however, they have the space and the equipments needed for a proper existence.

Table 5. General characterization of areas between the Home-Villages of São José de Alcalar and Monte da Palhagueira

	Total		Housing		Service		Green area		Accesses and outdoor spaces	
São José de Alcalar	18,280,00	**100%**	3,395,00	**19%**	1,890,00	**10%**	5,900,00	**32%**	7,095,00	**39%**
Monte da Palhagueira	42,940,00	**100%**	4,955,52	**12%**	1,975,00	**5%**	20,800,48	**48%**	15,169,00	**35%**

According to the analysis realized, we can conclude that this model should be restructured to promote a more numerous and different kind of activities (jobs), aimed at including within the village younger persons. This model's integration in tourism activity, in the capturing of national and international tourists, can contribute to a sustainable economic development of the villages and of the region[12].

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Spatial paradigms for inclusionary housing: the ethic construction of the city

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In the proposed paper the authors attempts to make a diagnosis of areas of habitation that exhibit high concentrations of elderly people in the target area of the Larnaca metropolitan region. As a result of this process the authors have attempted to map this population's lifestyle, their habits, their culture, their occupations and above all their quality of life. Data and information collection consists of on-the-spot visits and surveys, spatial observation and documentation and interviews and meetings with the various stakeholders. Out of the various sites surveyed, two contrasting areas were selected: the traditional historic core of the village of Aradippou and the refugee settlement of Ayii Anargiri.
This paper's aim is twofold: first, it sets out to map and analyse how current provisions of housing for the elderly in Cyprus seek to move away from an institutional model of care. It attempts to explore through an in-depth analysis, which factors may have an effect to the extent to which an environment might feel domestic or institutional (such as privacy, independence, control) and the relation to spatial layouts. Secondly, based on the preceding analysis and findings, the paper moves on to propose a spatial configuration of elderly housing, which according to the authors provides a domestic setting focusing on the individual.

Keywords: public housing; inclusion; elderly population; non-institutionalization

1 Introduction

Due to the rapid development of new - innovative technologies in the medical field and contemporary anti-ageing prevention techniques, people's average life span has greatly increased. Consequently, there have been reports in recent years affirming that "Europe is getting older." In Cyprus as well, a considerable decrease in the birth rate and an increase in life expectancy gradually means that older people will constitute a large section of society. It is expected that in the next 10 years people over the age of 65 will reach 20% of the general population. In other words, one in five Cypriots will be over 65 years.

Consequently, issues such as provision of the most appropriate forms of housing for this section of the population as well as choice of housing typology are gaining significance. Recent research suggests that as the number of elderly people increases, we are faced with changing aspirations, which place particular importance on issues of privacy, autonomy and independence (Hanson, 2001). There is a significant move away from institutional care provision to one that focuses on the concept of domesticity and the individual. These changing aspirations seem to affect the way future housing models are developed.

2 The case in Cyprus

Recent studies in Cyprus have indeed shown that only 3.8% of elderly people are currently living in seniors' residences of an institutional nature. It is therefore challenging to conduct in depth studies of the living conditions surrounding this segment of society and to highlight the challenges they face in maintaining their autonomy and in being housed in appropriate living quarters. Architectural and

Urban designers are hard pressed to propose alternatives for housing that anticipate the needs and changing aspirations of this sector of the population.

In the case of the elderly population at Ayii Anargiri the entire population is made up of refugees dating from the Turkish invasion of Cyprus in 1974, displaced from different regions in the occupied areas. The areas they had to vacate were filled with their life experiences and despite a considerable length of time since their displacement, they are still trying to come to terms and to become integrated in an environment where their social networks needed to be rebuilt not only amongst those people in the settlement coming from their own village but also those coming from other villages as well. To this day many feel that their residence in the refugee settlement is temporary and they live with the hope that they will eventually return to their villages.

One of the first things to strike the casual observer is that here too the settlement and the people in it are ageing. The elderly people's daily life, residing in the settlement, is inextricably linked to services that the state provides for the elderly people's socialization and these are known as Open Care Community Centers (KAPI). Even though these centres are intended to be operated as venues for leisure and education as well as places where the elderly may receive medical attention, physical therapy, laundry services and last but not least meals, nonetheless they are mostly perceived as a simple coffee shop.

In the case of the traditional core of the village of Aradippou, the daily life of the elderly – especially for those having reached retirement age and still in good physical shape – is characterized by an intense and unselfish effort of assist in servicing the daily needs of the families of their children and grandchildren. For the majority, having spent their entire lives in this village, they are filled with intense and localized life experiences and they are not troubled by the insecurities and misgivings of a temporary existence that characterizes the counterparts who had to move from their ancestral places. This is the case where the elderly want to be near the land that they grew up in and in close proximity to the residences of their children. Their hope in all cases examined is that their children will be able to care for them when they will not be able to mind for themselves.

In the study of the village of Aradippou, particular attention was paid to the social networks as they were manifested in and around the village square. This square has been their traditional meeting point and the place where they spend most hours of the day. Other points of interest examined were a sampling of selected homes housing elderly residents, the elderly nursing home that operates in the village and the town hall itself and its staff which manages the activities and programs that are offered by the municipality for the elderly. Further data collection and analysis resulted from questionnaires that were intended for three groups of stakeholders: the elderly, their children and grandchildren and for the caregivers, provided to the elderly people either privately, in the majority of cases or state funded in selected situations.

According to the data gathered, the results from the interviews and the observations and documentation of the physical spaces of the facilities and homes that house this segment of the population, an initial diagnosis has been reached. Namely that the elderly population and their needs and aspirations as typified by these two Larnaca region case studies is at a crossroads where their options with regards to housing and the autonomy retained therein are at a point of transition as different alternatives are on offer or are in the process of development. One important consideration

that has to be taken into account is the fact that the elderly, just like children, are a very vulnerable group, in need of assistance and additional support as they get on in years and their physical and mental condition is deteriorating. Unfortunately today, a new social model is in effect whereby the children and grandchildren of the elderly population are not often in a position to care for them and to provide the assistance that they require.

Thus, the aim of this proposal is to present a design framework that though specific to a location, that of the case study, nonetheless typifies the issues faced by the architects and planners called to address issue of housing and socialization networks of an elderly population in Cyprus. The aim is to create spaces and facilities that run contrary to the idea of the institutionalization of the elderly population and which at their core have as a goal the preservation of independence and autonomy of the individual (Hanson, 2001). At the same time another goal is the incorporation of this segment of the population into a framework of continued production and usefulness whereby the elderly will be able to make a contribution to their own existence and that of their fellow inhabitants by leading creative and productive lives (Henderson, P. & Thomas, D., 2002).

The design stage of the investigation proposes a new neighbourhood at the heart of the village of Aradippou, where existing and proposed buildings create collective spaces suitable for people of all ages and backgrounds to coexist, while it gives the elderly the opportunity to reserve an individual place of residence and to provide them with social welfare services, which are not widely available (Austin, C., et al. 2001). This occurs in residential quarters that provide accessible places for all and conditions that allow for the appropriation and the exploitation of space by the tenants. The particular neighbourhood could, in a future stage, be used as a model for other neighbourhoods and be developed in such a way that it would preserve the relationship between the elderly and the rest of the population, while providing them with the flexibility to lead a more sociable yet autonomous existence in an environment that will enhance and consolidate their collectivity and their direct interaction with people of all ages and backgrounds (Rowe J. W. & Kahn R. L., 1998).

According to the latest research and statistics that took place (*Population structure and ageing, European Commission – Eurostat, EUROPOP2008 - Convergence scenario, regional level (proj_r08c*) the results that have been obtained indicate changes of a demographic nature. The number of elderly people and elderly people with disabilities is growing rapidly in Europe. The European communities are characterized by an increasing proportion of elderly people, since, according to prognoses, in the coming decades in the European countries life expectancy will continue to increase while births will progressively be reducing.

According to demographic studies, it is estimated that by 2050 the percentage of people over 60 will be 37% of the total European population. Among this group of population there will be a significant increase of people living above the age of 80. Today, these people constitute 7.5% of the population, while in 2050 they will represent 14.4% of the population. The same characteristic results will prevail also in Cyprus according to Cyprus' statistical agency. According to the World Health Organization's the population's ageing is one of the biggest problems of humanity, but at the same time its greatest challenge. For this reason, it becomes imperative to find ways that this increase of the expectancy age responds to "positive ageing".

In Cyprus 13% of the population is over 65 years. It is expected that in the next 10 years those over 65 years will reach 20% of the general population, specifically, one in five Cypriots will be over 65 years. Surveys show that only 3.8% of people in the third generation are currently living in seniors' residences. Life expectancy has changed in Cyprus too over the last 70 years. From 57.3 years and 59.3 years for men and women respectively, it has reached 77.9 years for males and 82.4 years for women. According to statistics, it is expected that by 2051 men's life expectancy will reach 79 years and women's 85 years. Simultaneously, what is noticeable is the phenomenon of reduced fertility. Within a period of 10 years (1990 - 2009) the number of births has been decreased by 1000 people. While in 1990 the number of births were 10 622 in 2009 they are reduced to 9 608 consequently the total fertility rate is decreased from 2.4 to 1.5.

Apart though from these demographic changes, another situation that arises in recent years comes from the marginalization of the elderly. Particularly, a new social family model is created, one in which often there seems to be no room for the older members, since the children are now working. The result for the elderly is to either stay at their home with the help of a foreigner caretaker, or be transported to senior residences.

Therefore, there is a need for a more delicate and sensitive treatment of this particular age group as well as the realization that these people not only make demands but they are also able to provide services when they are in an ideal environment that supplies them with what they need. An element that activates the elderly is volunteering for an activity, which makes them feel more independent and most importantly that they feel that they are able to make a contribution to their community.

3 Study area

Consequently, challenged by the above demographic changes, which are taking place, a question arises as to what extend the younger generations may intervene in order to promote a more productive and successful way of ageing. Also, in what ways could a situation be established, in a non-institutionalization framework of elderly people, so that all services needed would be offered in spaces that are directly accessible to them and also will be nearby appropriate accommodation?

As mentioned above, the focus is on two contrasting areas of the Larnaca District. In the first circumstance where the traditional core of the village is studied, the elderly are characterized by an intense and unselfish effort of giving to their children and grandchildren. Being in their space, they are filled with intense life experiences, and thus they are exempt from any hesitation to move from their ancestral places. In the case of elderly people in the refugee settlement of Ayii Anargiri they are all refugees, displaced from regions that were filled with their life experiences and are now trying to integrate into a new situation of living with people from various areas of Cyprus. However, they feel that their habitation in the particular area is temporary since they live with the hope that eventually they will return back to their villages. The main characteristic of this place is that the settlement is ageing.

4 The village of Aradippou

To study the region of Aradippou, visits to the village square took place, which is the meeting point for all older people and the place where that they spend most hours of the day. Also visits were scheduled to some selective elderly homes; to the elderly nursing home that operates in the village and to the town hall to be informed of the activities and programs that are offered by the municipality for the elderly.

The interviews designated that what strongly characterizes the elderly is their intense involvement with their extended family issues. They have dedicated their entire lives to the selfless care of their children and grandchildren. Their occupations are mainly associated with agricultural issues - traditional issues and a very important aspect in their daily lives is the intense – and the experiential relations in their community observed at the neighbourhood's scale. This is mainly due to the fact that the majority of people are indigenous to the area.

> *"I was born and raised here. I am 70 years and the only thing that I would not want is to leave my village. Here, I have my children, my grandchildren, my friends, my home. It's true that I face difficulties with the house maintenance and taking care of my grandchildren, but it pleases me to do that ... though sometimes I feel that I too could use some help. "*

Regarding their residence they almost all live at their original houses and in cases where their health does not allow them to operate independently the state provides them with a caretaker (in cases of extreme need and poverty), who usually works as a housemaid too. It is a rare phenomenon for elderly people to be living in a nursing home hence in the entire village there is only one nursing home which serves people from neighbouring villages as well.

The elderly men's daily routine involves manual activities and the need for collegiality and interaction. They are occupied mainly with livestock and crops with the purpose of providing to their family organic products but also many times to sell them and earn an extra income in addition to their pension. They spend the rest of the day in the coffee shops which are all clustered around the central square.

> *"I wake up around four-thirty in the morning and go to the fields where I grow a variety of products such as tomatoes, cucumbers, black eyed beans, potatoes, etc. Then I go to my neighborhood coffee shop to have my morning coffee along with my fellow villagers. At noon, I go home for lunch and then I go to sleep. In the afternoon I go back to the fields and then at the coffee shop and then again back home again. "*

All of the women are busy with the household and taking care of their grandchildren. They spend their free time at improvised seating spaces that they create by the roadside along with other people in the neighborhood.

One of the problems that directly affect the elderly in their daily lives has to do with the state of the buildings they live in. Regarding their residency none of the villagers can be reconciled with the idea of a nursing home so they make renovations to their buildings in order to be able to live there for the remaining years of their life.

> *"The problems that we, the elderly, face in our homes are difficulties of mobility. We usually have difficulty accessing toilet facilities. There are still many stairs and it is difficult and dangerous for us to move about. "*

Another problem the elderly encounter involves the difficulties they have maintaining their home because of its size.

"We also face problems with the maintenance of our homes. A small house is better so as to serve the older people's main needs."

"What complicates my routine immeasurably in my house is that there are many steps and levels. Also what I find challenging in my house is the big courtyard with flowers as it needs constant care and maintenance. Also, my house is big; there are many rooms and it is difficult for me to clean it. "

"I waste a lot of time and effort every day to clean my house."

Therefore, we conclude, that due to such a life style and the conditions that exist in a village, the elderly have more responsibilities and obligations over the years. Their daily routine becomes more complicated and demanding once the responsibility of their grandchildren is added to their daily tasks; their contribution, however, to the extended family's everyday life is great and critical.

"My grandchildren come to my house every day for lunch while at night they eat at their house, upstairs. I like this constant contact that I have with my grandchildren. I have never felt lonely but there are times that I would like not to have so many worries and chores. "

"I wake up in the morning at six thirty. I clean, I wash, and I cook. At noon, when my grandchildren come back from school they come to my house for lunch or dinner. The afternoon is usually my time to rest unless something comes up. I usually spend my hours watching TV, or hanging out with my grandchildren or in the community with my neighbors."

Their life and their worries are directly related to their grandchildren's lives. Due to the fact that most parents work, their children's care is carried on by the grandparents. What helps this situation is the strategic proximity of residences between children and parents. The study of the area shows three residential typologies. In the first residence the children's home is right above their parents' house, in the second the children's and parents' houses are in the same neighborhood and often there may exist a common open space while in the third case, the parents' and children's residence are within a few minutes distance of each other. This situation aims at the continuous and direct contact between the grandparents and the grandchildren.

Another great part of the villagers' life is the contact and relationship they have with each other at the scale of the neighborhood. What characterizes the traditional core of the village is the creation of outdoor seating areas at the boundary between the road and the pavement. Despite the fact that the majority of traditional buildings have an inside courtyard, still, many women prefer the open space of a street to sit down and chat and spend their time, so that they will maintain a direct contact with the passersby. Moreover, this habit reveals the friendly relations that exist among the elderly at the scale of the neighborhood but also the way they manage the road boundary and the privatization of the road by its users. The choice of the specific space and not of a random house for

a collective dwelling is done having as a goal an equal social standing among users as well as a direct relationship with the passersby.

4.1 The village square

Another important locale in the elderly population's daily lives is the village square space. This particular space is located in the centre of the village; it expands radially from the church's courtyard and extends to the main shopping street of the village. What characterizes the above area is that the space hosts a variety of uses as well as a distinctive segmentation of the elderly depending on the party faction they follow. The square's uses range from political, religious, and musical organizations, to cafes, stores, workshops and places of leisure. These overlapping uses are also observed in some buildings, where various clusters of diverse age groups come together and despite the fact that the space of the square is characterized by an intense use by the elderly, it cannot be described as a kind of ghetto by them.

The square's open public space is used by pedestrians and motorcyclists to pass through, as well as a sitting area at the existing points and at the extensions that the cafes create in the public area. The reasons why older people are attracted to spend their free time at this particular point initially are the pre-mentioned uses of it, the relaxing vegetation that exists at particular spots and the shaded parts that are used by the elderly. Also helpful is the indeterminacy of the boundaries of the square's open public space since it functions simultaneously as a pedestrian way, a cycle lane and a road, in some instances. Finally, the last reason is that the visual contacts, where strategic areas are being selected have as a goal attaining the ideal visual contacts with their surrounding area.

4.2 The village council

From the point of view of the community services, the municipality provides day trips and excursions for the elderly twice a year. Lately, the municipality is also in the process of evaluating a proposal to create a Centre for the Elderly, in the form of a daily care centre that will be used by the older people to receive medical examinations and physiotherapy and to carry out simple chores such as taking care of their laundry, accessing a small library and reading room and even encompassing a swimming pool for physiotherapy and leisure.

For these services they are charged a monthly fee that covers operational costs. The proposal is being evaluated and the municipality is to proceed with the works provided the amount needed for the construction is partially covered by European Union funds. The area that is selected for the project is on district public land outside the municipal boundary of the village of Aradippou. The location within the particular region has been chosen having in mind that the elderly centre will be used by the elderly people of Aradippou and by the wider area of Larnaca, Kalo Horio Koshis and other neighbouring villages.

It is the authors' belief that the stereotypical perception of an institutional nursing home still prevails, and this is the reason that many of the elderly are not reconciled with the idea of living in such premises. For older people the idea of being relegated to a nursing home means that the beginning of their institutionalization has begun. At the same time they lose their independence since

they live under the supervision of others and the next stage is that they feel that they can no longer be active members of their community.

The fact that in the entire village there is only one nursing home, which basically functions poorly due to reduced attendance by the elderly, reveals the denial by these people to join in a situation of institutionalization. The caretakers' part has also played an important role. Most people prefer to live at home and to be taken care of by their children or hired help (who often do not have the expert knowledge of a professional caregiver) rather than to be "locked up" in a nursing home.

5 The refugee settlement at Ayii Anargigi

The second area of investigation is the settlement Ayii Anargiri in Larnaca. This space was the scope of an Europan Competition and despite the fact that there were proposals for change and adaptation of the plans, these were not put into effect because as the municipal engineer indicates, there is a problem with legislation:

> *"The proposed plans cannot be implemented until they are reworked to meet the conditions and design guidelines of existing legislation"* and *"proposed housing needs to be securitized first. Additionally in terms of amenities, the current residents will not accept anything than what others area elderly residents have been promised."* Certain land ownership issues have since arisen of the nature that *"The refugees want a house with their own proprietary courtyard, or at most an apartment"* and there are also *"Requirements and comparisons as to what other refugees have been granted."*

Consequently, current interventions take place only in existing buildings and not in any large-scale construction that affects both the privacy and management issues of the proposed works. Other changes include those made to a strip of land in the village where there is a proposal to demolish the old apartment buildings and replace them with new ones. The new buildings designs remove the stores on the ground floor since the tenants complain of noise and dirt in their vicinity. An additional floor has been proposed to attract young families in converted duplexes in an attempt to create a mixed-age settlement. A shopping area is also proposed at the gateway to the settlement in order to gather all the public services there, and these include a clinic, a coffee shop, the community council area, a supermarket and a hair salon.

One more issue that is being observed in the settlement is the addition and appropriation of public space. Due to the small outdoor spaces inherent in the housing units at the settlement, residents have taken to the habit of partitioning public outdoor spaces and they manage them as vegetable gardens according to each family's needs. Another issue that has been observed pertains to difficulties of managing public and private areas with the resulting deterioration of both. As the residents come from different villages and bring with them different customs and cultures, the resulting dynamic change proposed has been in conflict with varying and diverse opinions as to the future management of the facility.

6 The daily routine

The daily life of the elderly people residing in the settlement is inextricably connected with the facilities the state provides for their leisure and known as Open Care Community Centers (or KAPI in

Greek). Although these are intended to be operated as a space for recreation, entertainment, education and training, the preparation of meals, etc., the elderly themselves perceive it as being a simple coffee shop. The building's manager has specifically stated that,

> *"This fact is due to the educational level of the older people, all of whom are farmers or breeders. They sleep and wake up in the hope that they will return back to their homes". "Even when we had a teacher to offer them theater lessons, music, pottery, gymnastics we did not manage to run the program for a long time. Again the education level played a role in this as a majority of the elderly made fun of whoever took part in these activities! "*

The proposed facility will therefore serve as a place through which government will be able to offer the above facilities for the elderly and to some extent address their needs and aspirations. A social worker visits the site three times a week in order to monitor the medical condition of the elderly and to help them with any possible problems they may be facing at home. They are also provided with inexpensive breakfast and lunch meals that they may consume on premises or to take back to their home. Free educational tours and field trips are also organized by the governing authorities.

The most striking fact of these people's situation is their perception of their living space and its meaning to them and what an important role the concept of a neighborhood plays that is to be able to live on in the place where you have had your life experiences. The centre's manager, who has worked with these people daily for many years, also notes that,

> *"These people are refugees and they all live with this heartache that one day they will go back to their properties."*

Also, similarly to the case of the Village of Aradippou is that the welfare office also provides this group with in-house care takers in case of extreme need, ailment and poverty. As the head of the centre has stated,

> *"There are many people who have their caretakers and they also come to KAPI for their entertainment; that person just cleans for them."* She also mentioned that *"Now at KAPI there are only about 30 residents involved, a decrease from past years due to the fact that the settlement is getting older and the younger people who move out for work or school do not return to live here anymore."*

7 Housing Conditions

Regarding the settlement's housing stock condition as reported by the residents, the apartments are getting difficult for them to use as many of the units are in apartment buildings and residents face additional mobility issues when having to move between floors. Moreover, many residents disagree with each other because of arbitrary situations they fabricate and most of the times they are not concerned with the possible negative impact this behaviour has on their fellow residents. The head of the centre notes that this may be the result for the need for companionship and socialization,

> *"Most of them are on their own and do not have someone to help them. They are not reconciled with the idea that someone can stay with them and they do not even want to stay in a nursing home. Human mentality plays a role. This is strongly designated by the fact that there are a number of people who do not have good relationships between them; they are*

sarcastic, they argue over political party issues and over pensions. They are peculiar, fussy people."

Problems are also identified concerning the maintenance of the buildings. Many buildings have been neglected over time and the ones that are still inhabited have their owners demand from the state to provide them the maintenance expenses, an indicator that shows that these people do not want to transition to eventual ownership of the property because they view it as essentially a temporary phenomenon before relocation to their original homes in the occupied areas.

Similarly in the case of the Village of Aradippou, almost all the elderly in the settlement live with the help of a caretaker. In such cases the need for a caretaker is essential due to their children's absence; although the elderly may not always feel comfortable receiving help from a stranger, they often have no other choice. The idea of a nursing home, like in Aradippou, occurs when the elderly are bedridden and therefore they necessarily have to be transferred to a space with trained people capable of administering proper care.

8 The public welfare melathron

The municipal welfare melathron is a centre for the elderly owned by the town council and its users pay an "alimony" – or essentially monthly fees. The fee is €513 which is essentially the entirety of their pension. This centre is located in Larnaca City proper so that it is easily accessible for people from all areas of Larnaca District. The particular settlement currently employs 12 caregivers and hosts 15 elderly people. Although its capacity is for the accommodation of up to 30 people, the decreasing number is the result of the choice people make to stay at their homes and to be taken care of by a caretaker, while only moving to the nursing hope when they become bedridden.

"For one who is well (healthy), it is better to stay at home with the caretaker. But for someone who is not well it is preferable to be living at a home that provides the elderly person with twenty-four hour care." "There are cases where the elderly are alone and their children do not come to see them so they are neglected. Their children neglect them."

The building did not operate as a nursing home from the start. In fact its initial function was as a dormitory for the elderly. Therefore, the spaces do not efficiently satisfy the needs of a bedridden older person that has become the standard type of resident of late.

"The problem we face is that the building is old and needs renovation, the fact that it is big is not a problem as we would like to refurbish it so that each room will have its own bathroom and toilet." "As far as the building is concerned it is in a good location, it is breezy. Moreover the building catches the sun from all sides, it is full of light and it is spacious ... As a building it is among Larnaca's best facilities for the elderly. But it needs to be repaired. "

The foundation in charge of the facility in its early years of operation used to organize activities for the elderly for recreation, such as gymnastics, crafts, theatre and music. But over the years it was no longer possible to carry on with these activities to occupy the elderly because nowadays most people who arrive are bedridden and do not have the mental state or even the physical strength to partake in these activities.

9 Concluding thoughts

The initial diagnosis achieved through interviews, observations and on-site visits to the two areas that are under study allowed for a thorough documentation of the living spaces of the elderly population in this region. Therefore, the needs and personal aspirations of these people are being represented through these two studies which indicate that new alternatives for housing the elderly need to be proposed as in the majority of cases the elderly population may no longer be effectively cared for by their immediate family. In addition, far from being marginalized and with a little bit of help this segment of the population yearns to keep being active and to contribute in taking care of their children and their grandchildren in any way they can, while also maintaining a level of personal freedom, autonomy and independence.

So the goal of this proposal has been to provide a planning framework that even though it may be applied to a particular situation in the Village of Aradippou it may nevertheless inform broader development guidelines that will constitute a model for other regions too learn from and adapt, since it represents all the issues architects face when they are being asked to deal with housing and socialization issues of the elderly in Cyprus. These include the creation of spaces, which will aim at non-institutionalization of the elderly and at the same time they will also provide and maintain the independency and autonomy of the individuals. It may also be concluded that the proposed spaces should struggle to integrate these people in ongoing cycles of social and economic production and to a enhance solidarity of the community, caring and inclusion of the elderly in their traditional areas of residence and synergistic coexistence amongst all age groups in the community.

In the case of Aradippou, a new neighborhood is proposed in the heart of the village, where collective spaces will be created in existing and proposed building sites with the primary purpose of forging a community which is encompassing and respectful of all ages and where all people of may coexist productively while maintaining their freedom and autonomy through their own efforts and through the provision in appropriate spatial settings in which the welfare services may act efficiently. The particular design study aims at maintaining the positive relationship between the elderly and the rest of the population in a collective environment, while at the same time it aspires to premises that may be individually managed.

Lastly, housing units are proposed to coexist with public spaces used for healthcare, education and leisure, all in an environment whose main goal is collectivity both in outdoor environments and in indoor spaces (Schittich, C., 2007). The open outdoor spaces are divided into different scales of a public space that create either public roads or semi-public streets and alleyways or passages that enhance permeability and connectivity of the site to the rest of the village, while at the same time providing supervision and privacy of the elderly housing units.

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Ageing patterns: trends from Oporto's metropolitan region

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The challenges of an ageing society call for a closer look at its regional socio-spatial patterns. In the present paper, we use a spatial autocorrelation technique to analyse the clustering trends of high values of ageing at Oporto's metropolitan region, from 1991 to 2011. Firstly, we identified four main high ageing clusters, persistent in time and space. Secondly, we compared different age-related attributes to assess the consistency of the ageing spatial patterns – number of senior residents, senior masculinity ratio, number of seniors living alone and average age of the building stock. We discovered that ageing results in different spatial arrangements for different ageing characteristics. Therefore, the present paper concludes with a call for a broad attentive political agenda to counteract the local specificities of regional ageing patterns.

Keywords: ageing; spatial patterns; spatial dependence; urban policy.

1 Introduction

Demographic sustainability is at risk in developed and developing countries worldwide. Population ageing is a result of the second demographic transition, by which countries tend to have lower fertility and mortality rates, higher life expectancy, disproportionate male-to-female ratios and general population decline (Kinsella and Phillips, 2005). One main consequence of demographic unsustainability is on the economy – the European Commission estimates that the total cost of ageing is approximately 23% of its GDP, solely accounting for pensions, health care, long-term care, unemployment benefits and education (European Comission, 2009). Moreover, not only these costs are estimated to increase in time, but also the proportion of working people diminishes, thus undermining even further the sustainability of a welfare economy (Leitão, 2010). Finally, there is evidence of a strong relationship between age structure and economic growth, being the active cohorts of population the ones with the strongest positive effects (Brunow and Hirte, 2006). In particular, regions within countries with lower shares of 60 to 74-year-old residents perform relatively better, which not only attests for the detrimental effects of ageing, but also suggests the relevance of a local and contextualized scale on ageing patterns.

A second challenge of an ageing society is the quality of life at an older age. Seniors are one of the most vulnerable groups in Portuguese society, depending mostly on family and care institutions for emotional and financial support, and 63% of people over 75 years old are estimated to be vulnerable to poverty (Costa, Baptista, Perista and Carrilho, 2008). One of the explanations for poverty among seniors is the low average value of retirement pensions (Leitão, 2010). A second explanation is a life of low paying careers, anticipated by early abandonment of formal education and early entry into the labor market (Costa, et al., 2008). Furthermore, retirement from work and other

productive activities has a detrimental impact on their role in society and consequently on their self-esteem, community involvement and social inclusion (Burns, Lavoie and Rose, 2012).

In an effort to promote better quality of life at an old age, there is extensive research and some public policy involvement on the goal of 'ageing in place' (Vasunilashorn, Steinman, Liebig and Pynoos, 2012). This point of view defends that older people usually prefer to remain in their own homes, at the community of their choice, in opposition to an institution. The advantages of ageing in place draw mainly from the continuity of social networks, which are essential to successful ageing (Kinsella and Phillips, 2005). However, spaces are not static – residents get older while their neighbourhoods suffer through socioeconomic changes as well. Seniors' social connection to their surroundings may experience gentrification, immigration and diversity (Burns, et al., 2012). In parallel, the focus of public and private investments shifts to younger and wealthier populations, with political, economical and physical consequences to older people. Therefore, ageing in place does not guarantee continuity of what the place has to offer.

Moreover, ageing residents' needs evolve and their environment seldom follows. The requirements for an age-friendly city make for a long and expensive list, from hard alterations to transportation systems, health support systems, housing legislation and supply, public spaces and buildings, to improved soft skills for the overall society on communication, information, political, social and economic inclusion (World Health Organization, 2007).

The connection of ageing and place is vastly recognised. However, research on ageing patterns usually refer to global and national scales, despite the ageing process being linked to social and economic factors at a much finer scale (Moore and Pacey, 2003). On the one hand, there are regional aspects that have direct influence on the demographic age structure – fertility and mortality rates, life expectancy, family structure and family values, individualism and materialism. On the other hand, broader local characteristics have a great deal of influence on net-migration, which in turn is one of the most important components on ageing, such as health care and childcare facilities, household structure, housing affordability, employment opportunities and regional economic growth (Moore and Pacey, 2003). The relevance of local differences, on Portuguese fertility patterns, was already highlighted by Caleiro (2008). The author demonstrated that fertility rates show uneven spatial distributions at a regional scale, which are better explained by the impact of local-specific cultural and social factors, than with the influence of national and supra-national policies. Additionally, Caleiro (2008) underpinned the relevance of geographical proximity on behavioural similarities and spillover effects on the formation of heterogeneous and persistent demographic patterns.

Given the role of space and geographical proximity in the formation of socioeconomic patterns, we would like to consider these as we look into regional spatial trends of ageing. In the next section, we delineate two research questions and the methods to follow them through; the following section is dedicated to the findings from our case study and the section after that discusses these results. The conclusion of this paper returns to the research questions and examines its own implications to ageing spatial patterns.

2 Aims and methods

This paper aims to contribute to urban policy by focusing mainly on two research questions:

i. How do ageing spatial patterns evolve through space and time?

ii. How do ageing spatial patterns relate to other age-related attributes?

To answer these questions, we need a technique capable of assessing spatial patterns by geographical proximity, comparable at different periods of observation. Truly geographical techniques in social sciences are few and most are based on spatial autocorrelation (Rae, 2011). Spatial autocorrelation is the degree to which the value of a variable correlates to its location – i.e., the neighbouring average. It is an exploratory spatial data analysis technique fit for identifying patterns and atypical spatial distributions, such as clusters or outliers (Anselin, Sridharan and Gholston, 2007).

This technique works at two scales, global and local. Global spatial autocorrelation measures the overall level of clustering – positive values mean that similar attributes tend to be closer together, negative values mean that similar attributes tend to be dispersed and null values mean that the attributes and space do not correlate (Longley, Goodchild, Maguire and Rhind, 2005). Moran's index is a well-known measure of global clustering, ranging from -1 to 1, respectively strong dispersion and strong clustering. This kind of analysis depends on the conceptualization of spatial relationships of one place to its surroundings – border adjacency (rook), border and corners adjacency (queen), n-nearest neighbours or inverse distance, among other variations – which, in turn, depends mostly on the nature of the application and the inclination of the investigator (Rae, 2009). Moran's index is accompanied by a significance test evaluating the level of certainty by which the spatial distribution is not the result of randomness. In the case of ageing presenting evidence of clustering, one concludes that the social process of ageing is a spatially differentiated process and may proceed to a local patterns analysis.

Local indicators of spatial association (LISA) compare the value of each areal unit to its neighbours and indicate which have high values in a neighbourhood of high values or low values in a neighbourhood of low values, marking these units as high and low clusters respectively (HH and LL) (Anselin, et al., 2007). In the case of existing outliers, they will be identified as high values surrounded by low values (HL) or low values surrounded by high values (LH). In practice, the local autocorrelation analysis simplifies the spatial patterns of a social phenomenon such as ageing – patterns thus defined are easily comparable through time and to other social phenomena.

The methodology followed in this paper firstly assesses the level of clustering of the ageing index by parish, at three different points in time, 1991, 2001 and 2011[1]. We compare results from various spatial relationships and choose the one that best reflects spatial dependence. Given significant clustering, the methodology then identifies local clusters and outliers, permitting a systematic pattern analysis over space and time.

Secondly, we compare the ageing spatial clusters with the spatial distribution of other age-related attributes. Namely, we look into the spatial distribution of the senior population (65 years old and over), senior population living alone, senior masculinity ratio and average age of the building stock. The comparison of ageing characteristics aims to evaluate the consistency of ageing patterns – in other words, to understand whether the process of ageing is homogeneous or if it processes differently in different spaces.

[1] Data from 2011 is provisory.

3 Findings

3.1 Oporto's metropolitan region

The area for our case study corresponds to Oporto's metropolitan region (Figure 1). Greater Metropolitan Area of Oporto has been surpassed by a larger, more fragmented and polycentric region (Ramos and Silva, 2007), for which we included 27 municipalities[2] and 546 parishes. The parish is both the smallest Portuguese public administration unit and the smallest scale of disaggregation for available Census data to date. Oporto's metropolitan region covers approximately 3340 km^2.

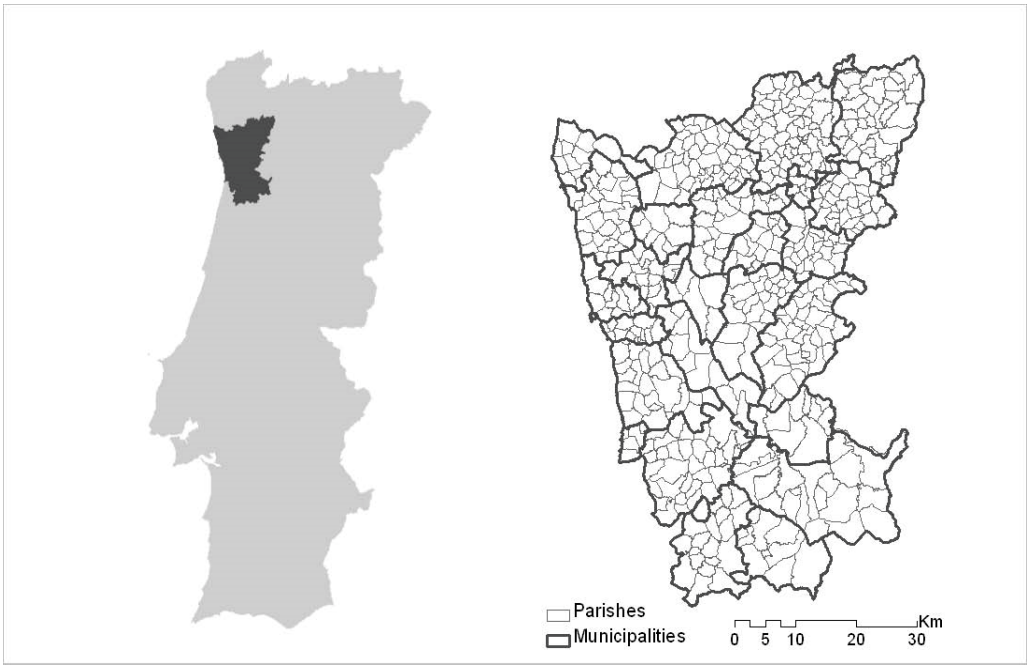

Figure 1. Oporto's metropolitan region.

Population grew 9% between 1991 and 2001 and 2% in the following decade. In 2011, it is estimated at 2 374 531 inhabitants, which averages at 700 people per km^2. As one may observe in Figure 2, over the last two decades there has been a slow urban expansion and therefore a thinning out of population density. Nevertheless, there are clear concentrations of residents around primary and secondary urban centres, along the coast and in the northern region.

[2] Arouca, Castelo de Paiva, Espinho, Fafe, Felgueiras, Gondomar, Guimarães, Lousada, Maia, Matosinhos, Oliveira de Azeméis, Paredes, Porto, Póvoa de Varzim, Santa Maria da Feira, Santo Tirso, São João da Madeira, Trofa, Vale de Cambra, Valongo, Vila do Conde, Vila Nova de Famalicão, Vila Nova de Gaia and Vizela.

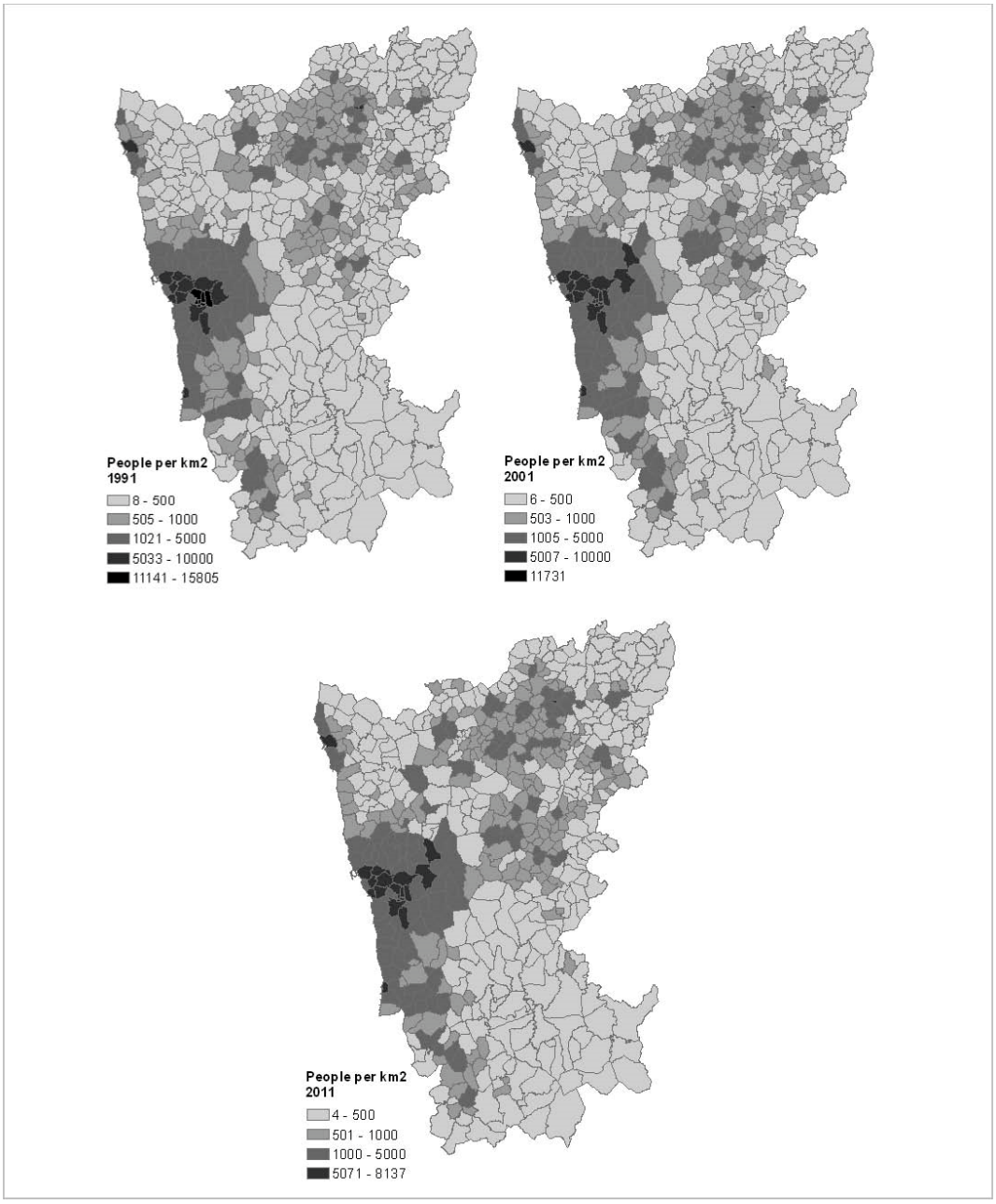

Figure 2. Population density in 1991, 2001 and 2011.

3.2 Ageing spatial patterns

Oporto's metropolitan region has been rapidly ageing and, as of 2011, the number of seniors has surpassed the number of youngsters, today with an average ageing index superior to 1 (Table 1). Moreover, standard deviation (SD) is increasing and maximum values have tripled from 1991 to 2011, suggesting a tendency for aggravation of ageing in already aged populations. Visual inspection of the index's spatial distribution confirms the trend of generalized increase and accentuated local disparities (Figure 3).

Table 1. Summary description of the ageing index by year.

	Mean		SD	Minimum	Maximum
1991	0,42		0,20	0,12	1,49
2001	0,66	+57%	0,36	0,22	3,01
2011	1,03	+56%	0,55	0,28	4,56

Figure 3. Ageing index.

Spatial distribution also suggests important clustering of ageing populations. In fact, global spatial autocorrelation confirms significant clustering at the three periods observed, independently of the spatial relationships considered (Table 2).

Table 2. Global Moran's I of the ageing index (p-value inferior to 0.01).

Relationship	Rook	Queen	5-nn	3-nn	Inverse Distance
1991	0,66	0,66	0,65	0,68	0,55
2001	0,68	0,67	0,70	0,72	0,59
2011	0,53	0,52	0,50	0,53	0,46

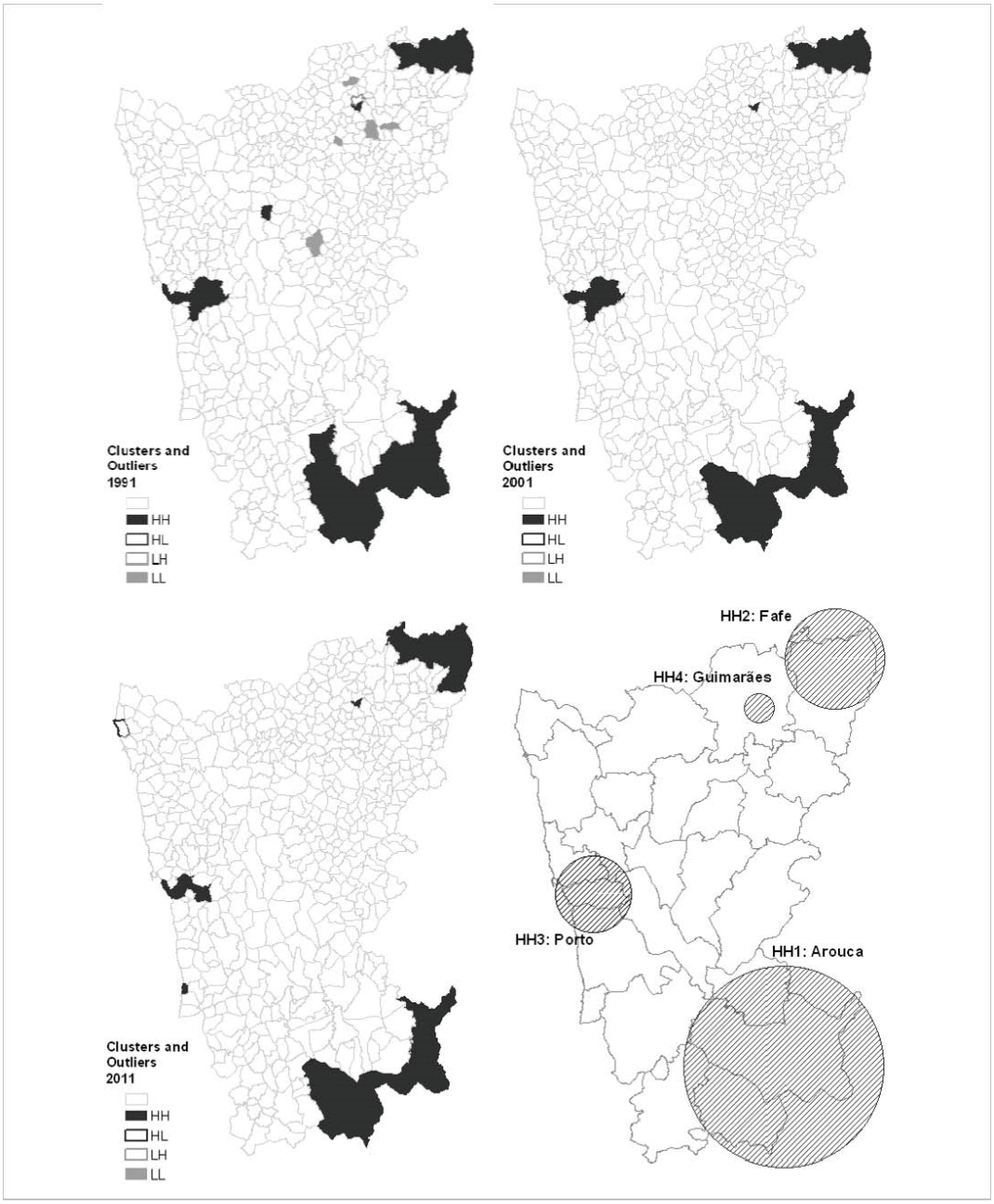

Figure 4. Clusters and outliers of ageing in 1991, 2001 and 2011 and identification of four main ageing clusters

The '3 nearest neighbours' (3-nn) is the most expressive of the spatial relationships and, for that reason, it is the one used on local analysis. LISA outlines four main clusters of high ageing (HH),

which are persistent throughout 1991, 2001 and 2011 (Figure 4). These clusters cover approximately 10% of the metropolitan region (Table 3). Alternatively, clusters of low ageing (LL) and high and low outliers (HL and LH) are intermittent in time. The trends observed from the evolution of the local clusters are as follows: importance and persistence of high ageing clusters with increasingly less population, dissolution of low ageing clusters after 1991, dissolution of one high local cluster after 1991 and emergence of a different one in 2011.

Table 3. Numbers by type of cluster/outlier

Cluster/Outlier		HH	HL	LH	LL
Number of parishes	1991	41	0	1	7
	2001	36	0	0	0
	2011	39	1	0	0
Area	1991	11.9%	0.0%	0.1%	0.7%
	2001	10.2%	0.0%	0.0%	0.0%
	2011	10.5%	0.2%	0.0%	0.0%
Population	1991	14.8%	0.0%	0.4%	0.6%
	2001	11.3%	0.0%	0.0%	0.0%
	2011	7.5%	0.4%	0.0%	0.0%

3.3 Other age-related attributes

The senior population, defined as residents with 65 years of age and over, suffered accentuated growth over the last two decades (Table 4), disproportionately to the overall population. Seniors are predominantly concentrated on old urban territories, spreading along the coast, with a distinct configuration from the location of the ageing clusters (Figure 5). The ageing clusters of Porto and Guimarães correspond to high numbers of seniors, although they leave out many parishes with an expressive senior population. On the other hand, the ageing clusters of Arouca and Fafe include relatively very few seniors, on relatively small populations.

Table 4. Senior population by ageing cluster.

	HH1	HH2	HH3	HH4	Region	
1991	3,257	837	41,695	1,395	209,217	
2001	2,897	948	46,108	1,638	283,560	+36%
2011	3,192	1,504	33,182	1,938	370,032	+30%

The average masculinity ratio among seniors, defined as the number of senior males by 100 senior female residents, has remained roughly stable in the metropolitan region from 1991 to 2011 (Table 5). However, the average of about three male seniors for every four female senior residents shadows a highly irregular distribution (Figure 6). Again, this spatial distribution is dissimilar to the location of the main ageing clusters, resembling a deeply fragmented mosaic. One important distinction is evident for the ageing clusters of Porto and Guimarães, which present fairly lower senior masculinity rates of about 1:3.

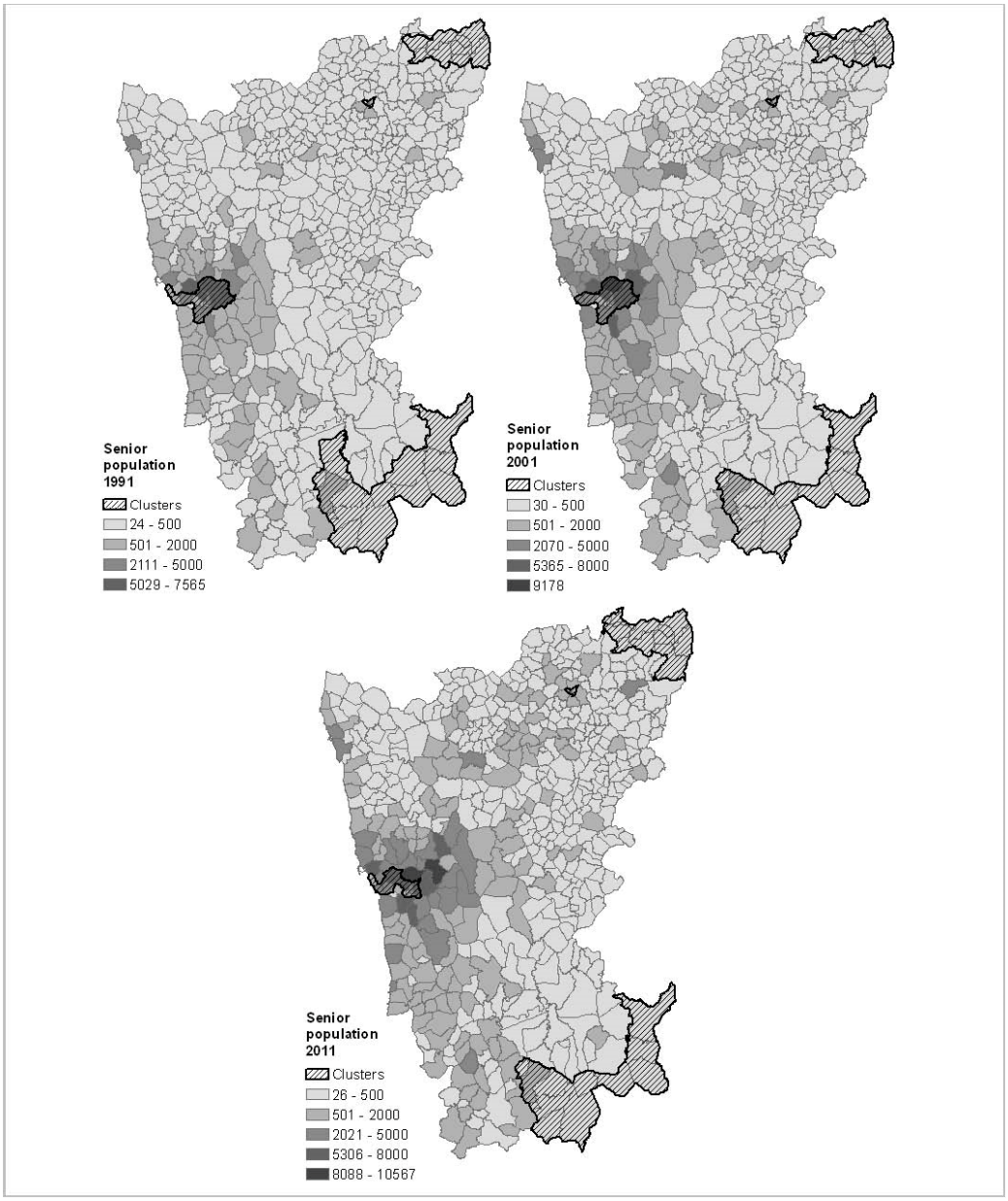

Figure 5. Senior population and ageing clusters.

Table 5. Senior masculinity ratio by ageing cluster.

	HH1	HH2	HH3	HH4	Region
1991	74.5	66.2	53.0	53.4	71.9
2001	83.6	66.4	55.1	59.2	73.6
2011	76.9	71.3	59.0	61.5	74.2

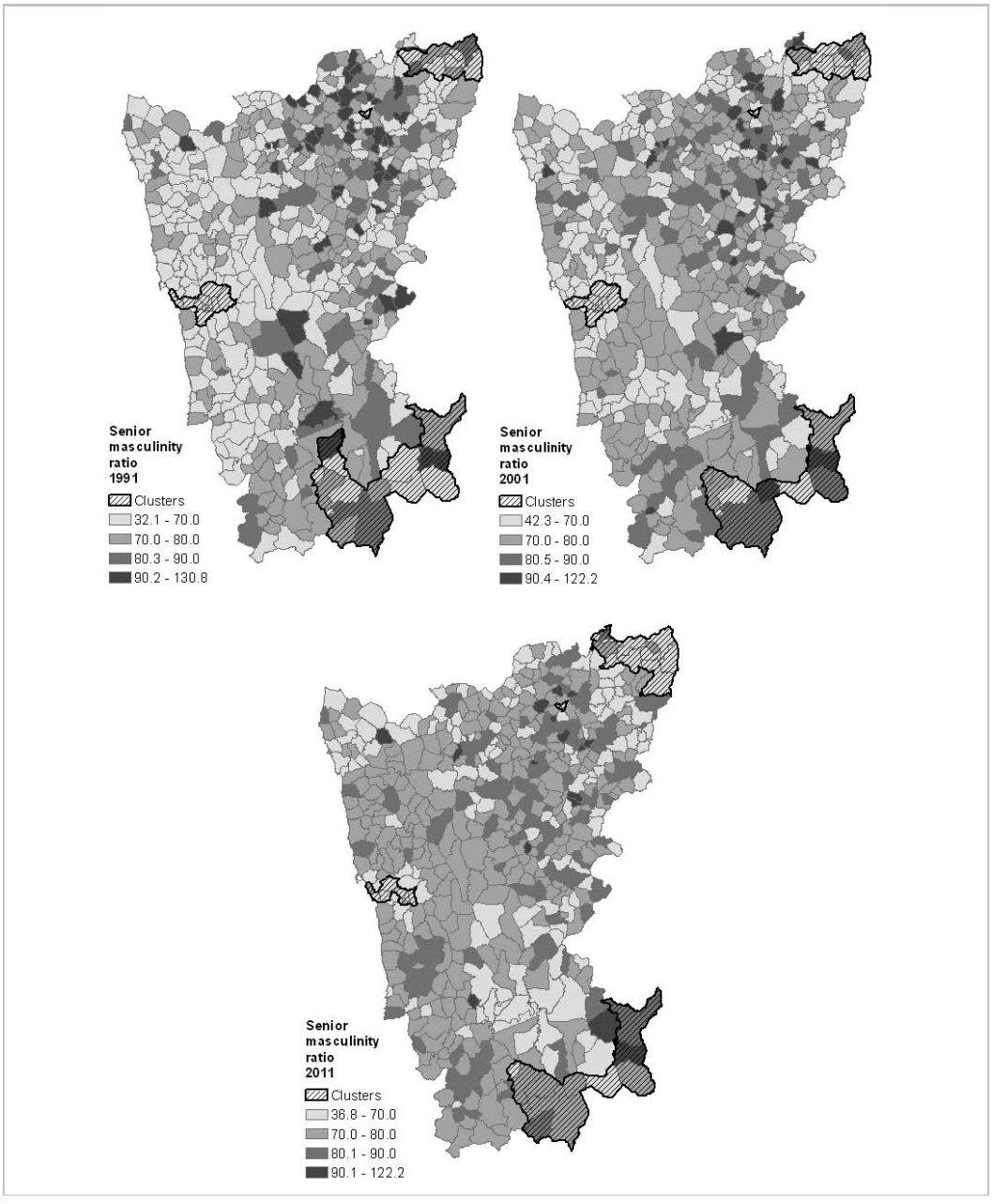

Figure 6. Senior masculinity ratio and ageing clusters.

Table 6. Seniors living alone by ageing cluster.

	HH1	HH2	HH3	HH4	Region	
1991	465	122	7,125	266	30,169	
2001	469	168	10,204	265	44,403	+47%
2011	546	329	8,015	353	61,628	+39%

The number of seniors living alone[3] has been rapidly increasing over the years, at a faster pace than the overall senior population, having doubled in two decades (Table 6). This phenomenon is particularly concentrated in the ageing cluster of Porto and neighbouring parishes and it has been progressively expanding (Figure 7).

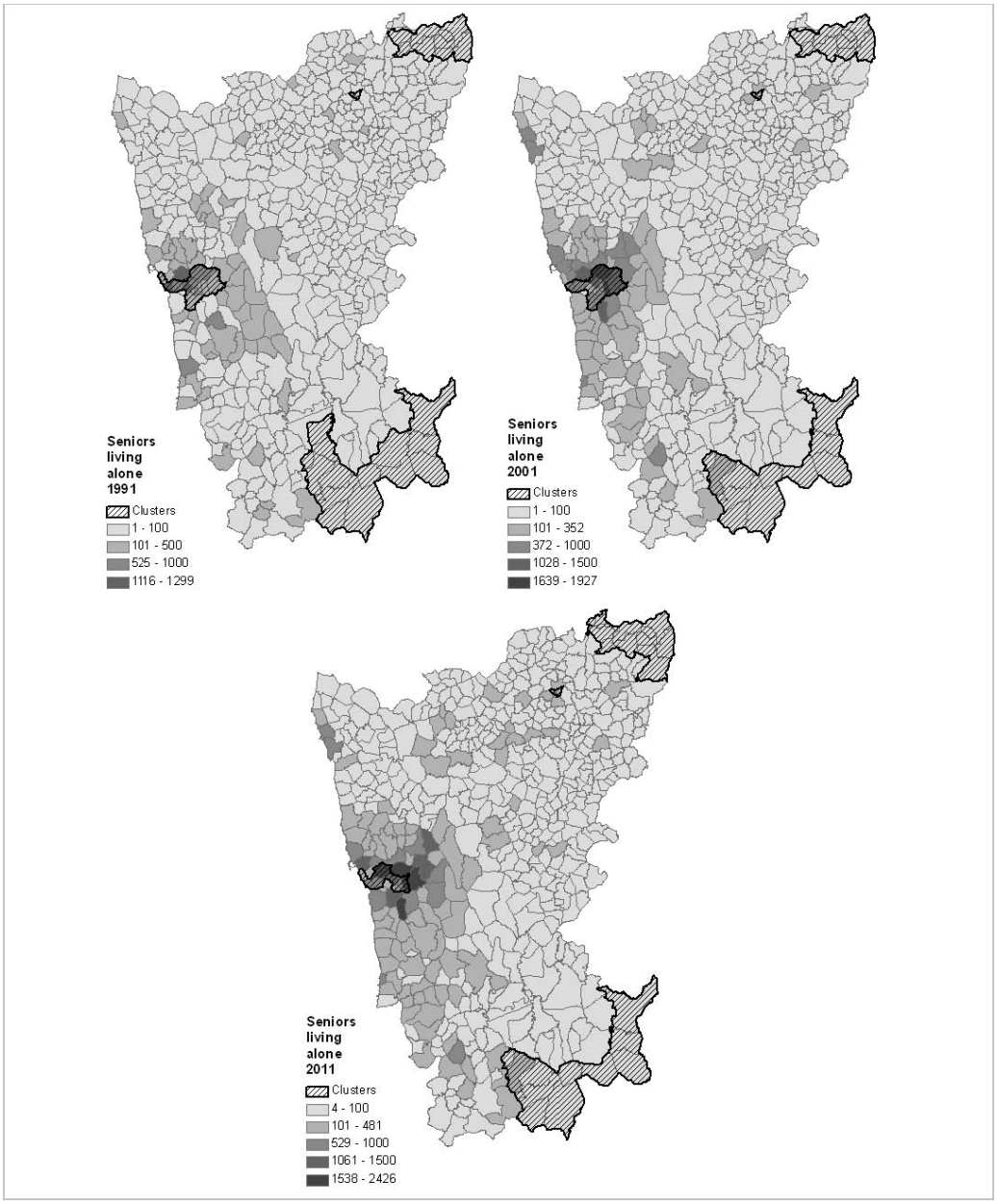

Figure 7. Seniors living alone and ageing clusters.

In contrast with the demographic ageing, the average age of the building stock[4] has seen little

[3] Data from 1991 was estimated at parish level from municipality data and in proportion to senior population.
[4] According to the *Instituto Nacional de Estatístic*a, buildings constructed before 1919 are estimated at 100 years old in 2001; therefore, they were given 90 years old in 1991 and 110 in 2011, for the purposes of the calculation of the average age of the building stock.

change over the last two decades (Table 7). Nevertheless, the spatial patterns of the average age of the building stock are comparable with the ageing clusters (Figure 8). Particularly, the ageing clusters of Porto and Guimarães have relatively older buildings, which are to be expected from their consolidated urban fabric.

Table 7. Average age of the building stock, in years, by ageing cluster.

	HH1	HH2	HH3	HH4	Region
1991	42.4	46.9	63.5	64.3	35.2
2001	37.4	31.7	61.2	54.9	31.1
2011	41.6	35.7	65.3	72.3	36.1

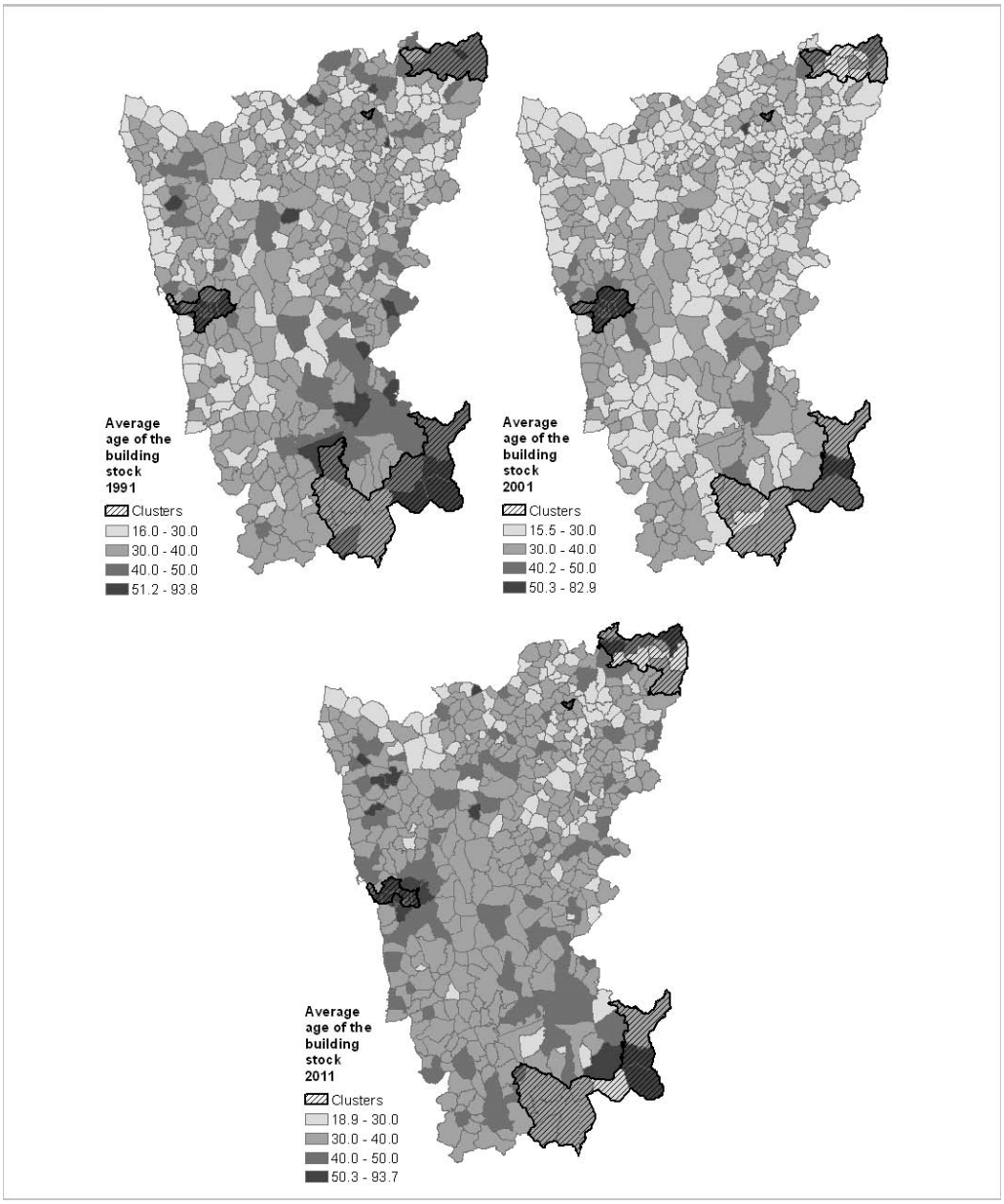

Figure 8. Average age of the building stock, in years, and ageing clusters.

4 Discussion

Following urban planners' concerns worldwide, demographic ageing is an important challenge in Oporto's metropolitan region today. On a general perspective, the senior population has already surpassed the number of children, questioning demographic sustainability for the near future. A closer look reveals relatively fixed ageing spatial patterns, where highly aged populations persistently cluster together. These territories, making for 10% of the whole region and steadily losing population, are on a seemingly unstoppable path to become either old-age residential communities or demographic black holes.

Clustering is measured by spatial autocorrelation analysis by comparison of the ageing index of each parish to the average of its three nearest neighbours and permits rejecting the hypothesis of a random spatial distribution with 99% certainty. This is also true for other conceptualisations of neighbourhood relationships, conferring robustness to the analysis. Moreover, the Moran's index reflects a more subdued clustering after 2001, attested by the picture of pulverization of ageing seen in 2011. By inspection of the spatial evolution of the ageing index between 1991 and 2011, Moran's index suggests that the increases on ageing are first felt on already ageing parishes and, secondly, generalized to the metropolitan region.

Local spatial autocorrelation delineates four main high ageing clusters were the process of ageing is stronger, relatively to its surroundings. Other small and intermittent low clusters and outliers were also detected. Two of the main ageing clusters correspond to traditionally rural municipalities of Fafe and Arouca and the other two high ageing clusters coincide with the municipalities of Porto and Guimarães, which are two historical urban settings of Oporto's metropolitan region. Alike other European countries, old inner-city areas are the epicentre of the second demographic transition (Buzar, Ogden, Hall, Haase, Kabisch and Steinfuhrer, 2007) – counter-urbanization and suburbanization trends of the last decades, along with declining fertility, marriages and household numbers, have accentuated ageing in historical urban centres. On the other hand, peripheral and traditionally rural areas are unable to rival with urban lifestyles and continue to lose younger, active and fertile populations. Additionally, some of these areas suffer from the 'retirement effect', which comprises the arrival of newly retirees, looking for a place far from the city. With both young people leaving and old people arriving, it is no wonder that peripheral spaces keep ageing and losing population (Kinsella, 2001) and such is the case with the clusters of Fafe and Arouca.

The ageing index is solely one variable of the equation. As we have seen by comparing it with four additional age-related attributes, the ageing clusters do not contain or include all aspects of the problem. For one thing, the ageing territories are divided among high and low populated areas, including parishes both central and peripheral to senior population density. Ageing clusters such as Porto and Guimarães are problematic by the large number of seniors they include, whereas the clusters of Fafe and Arouca present a problem of scarcity and abandonment. However, it is not clear that seniors prefer to live in the city. In particular, cities are seen as hostile to older residents – demographic changes that disrupt the sense of community and belonging, physical changes that are made for younger and wealthier populations, perception of insecurity and inadequacy of public services to senior's needs are some of the reasons why a senior may feel unwelcome in an urban setting (Scharf and Gierveld, 2008). Nervetheless, despite cities not being age-friendly, seniors

express the need to be in proximity to services, particularly health care facilities, which peripheral areas do not supply (Smets, 2011).

In addition to the divide by numbers, there is also a divide by gender. While ageing in Arouca includes both sexes, ageing in Porto and Guimarães is predominantly female. The tendency for female seniors being more attracted to urban environments include a greater percentage of women widowers than men, thus explaining old women's necessity of being closer to other family members and denser populations. Additionally, women are more likely to suffer from chronicle illnesses, which require a greater proximity to care institutions – again more available in urban than in rural settings. These two factors are possible explanations for the spatial differences encountered respecting masculinity and ageing (Kinsella, 2001). Nevertheless, the divide between coast and interior on the distribution of male seniors was clearer in earlier years than it is today, indicating that we might see better territorial equality for male and female seniors in the future.

The issue of seniors living alone is more worrisome, though – single-people households with 65 years old and over is rapidly increasing in numbers and geographically. Once again, it is a matter of urban versus peripheral parishes. It is at the urban ageing clusters of Porto and Guimarães that the trends of the second demographic transition were felt more strongly, in particular the rise of individualism and fragmentation of traditional household structures (Buzar, et al., 2007). This issue gives a new dimension to the problem of ageing cities, challenging the urban planner to find innovative support networks able to prevent isolation and promote age-friendly environments. Moreover, not only poor seniors are more likely to suffer from loneliness (Scharf and Gierveld, 2008), but also vulnerability to poverty is significantly higher among seniors living alone – according to Costa, et al. (2008), 26.1% of this demographic is persistently poor, against 8% of the general Portuguese population. These two factors combined give way to a great number of urban senior residents who would like to leave for more rural locations, but cannot afford it (Fokkema, Gierveld and Nijkamp, 1996).

Lastly, demographic and building age showed similar spatial distributions, suggesting a socioeconomic connection between the two. Affordable housing in a consolidated urban fabric is often in bad condition and unfit for an older resident – lack of accessibility amenities like lifts and seldom at ground-level (Fokkema, et al., 1996). The alternatives are luxury apartments in gentrified areas of the city, which rarely provide the services and the community life seniors may enjoy (Smets, 2011). For these reasons, ageing of the building stock is unfortunately associated with degradation and poor housing conditions (Scharlach, 2009). As we have seen, the age of the building stock remained quite stable over the last two decades, while the construction sector enjoyed a period of great vitality; though, more recently, new construction has come to a halt. The correspondence of aged buildings and aged populations preludes a scenario of progressive degradation of old houses and poor quality of life. In their turn, younger populations will be further uninterested in populating these areas, thus accentuating the process of ageing.

5 Conclusion

This paper aimed at understanding the trends of regional ageing spatial patterns. We have found, firstly, that ageing is indeed at galloping pace in Oporto's metropolitan region; however, this is not a

homogeneous process. Accounting for the importance of geographical proximity, we delineated and classified four main clusters of parishes that present relatively higher levels of ageing. These clusters were persistent through 1991, 2001 and 2011. These results draw attention to local trajectories of ageing which should be taken into account by urban policies concerning demographic sustainability. Secondly, we showed that despite being persistently clustered, the process of ageing takes different forms in relation to different age-related attributes. This evidence suggests that ageing is not an isolated and faceless process, which may be summarized solely by one viewpoint. We found that the spatial distribution of ageing is uneven in terms of dimension, masculinity, household structure and building age. A broader attentive political agenda is needed if we ar to include not only ageing populations, but also their different forms and specificities.

Finally, on a methodological note, we have found spatial autocorrelation a useful technique for delineating and classifying clusters of ageing. It takes into account the influence of local context and geographical proximity, making it a valuable asset to any socioeconomic pattern analysis research (Brunow and Hirte, 2006; Orford, 2004; Rae, 2009; Ramos and Silva, 2007; Tovar, 2009). Apart from the contribution of the methodology to the study of ageing spatial patterns presented in this paper, we would like to develop the methodology further on future research to include multiple attributes simultaneously. We believe in its potential to map important differences in the spatial distribution of various socioeconomic problems. By doing so, we intend to contribute for a deeper understanding of some of the greater challenges urban policy faces today.

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Towards practical and meaningful food-related support systems for the elderly: initial findings from the FOOD project

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We present here research and user-studies on the elderly and their experiences of food: the access,experience and meaningfulness of food in their lives. The FOOD project aims to develop new foodrelated services and appliances that could support the elderly in keeping them self sufficient andindependent in their home for a longer periods of time, later into life. As is intended with a number of related projects, the goal is to forgo or delay more 'radical' and economically burdensome decisionsneeding to be made by families or institutions, such as moving the elderly to an old-age home, or healthcare institutions. Food and eating are, of course, a salient and fruitful application area for the detectionand extension of personal limits and stresses to social networks and families.
This working paper summarizes the process and results of the first stages of the project, where fieldresearch with 15 respondents (elderly individuals and couples) was undertaken. It will serve to shareour findings, the methods developed for the research, and a brief evaluation of these methods and theireffectiveness. Further we argue for dialogue and cross-pollination between user-experience and Interaction Design research and researchers towards human-geographical urban design at the city-scale.

Keywords: elderly; field work; interaction design; food; networks; user-driven; digital technology; cooking;

1 Introduction

The aim of the FOOD project is to develop new kitchen environments that support the autonomy and independence of elderly people in their own homes. Starting from an internet enabled kitchen, the project investigates new ways to provide elderly people with efficient and meaningful services around food, which allow them to access what is often termed the "self service" society enabled through technologies within the home (e.g.: digitally accessible commerce, information and services). We draw on other user-led design projects developing solutions in consultation and interaction with elderly users, towards creating more appropriate uses of technologies which not only address topological issues such as safety and security (Chan et al, 2008; Chan et al, 2009; Consolvo et al, 2004), but emphasise quality of life and felt experience (Oprwood, 2008; Wright, 2004). In 2012 the FOOD research team at the Copenhagen Institute of Interaction Design (CIID) undertook a period of field research with elderly people in their own homes, and an in-situ investigation of their support networks. The project now follows with a set of concept generation phases for the creation of new or re-designed products and services. These services and implementations are then certified and prototyped as functional installations later in 2012, and pilots are run in the homes of elderly people to test the services and the prototypes. Economic and systems-level research and market analysis of the solutions derived is being done in parallel, in order to develop the practical set of actants needed to enable real technology and services in the real world. This research is part of a pan-European Ambient Assisted Living (AAL) project with partners: Indesit Company, Consiglio Nazionale delle Ricerche CNR, Università degli Studi di Parma, Associazione Nazionale Mutilati ed Invalidi del Lavoro (Italy); Brainport Development (The Netherlands); Department Of Social Services, Local

Council Brasov (Romania); International Business School, Jönköping University (Sweden); Copenhagen Institute of Interaction Design (Denmark).

Interdisciplinary projects undertaking the research and development of technology designs for situated communities are often confronted with the problem of "knowing the user," on-site in their environments of practical life. A number of user-oriented design philosophies, methods and techniques through Design Research have been devised in order to formalise a way of representing individual users. The emerging methods of Interaction Design Research, which encompass interests in both humanities-derived and engineering-centric techniques and applied outcomes, have become a particularly suitable 'home' for dialogues about how design frames peoples lives through technology. As Blythe et al (2010) have put it, designed technologies and design methods give us "a focus on lived experience, forc[ing] us to reframe our approach to 'knowing the user' away from objectively and dispassionately observing them towards establishing relationships with them, relationships that can support the meaningful dialogue, empathy and shared learning that make change possible." This shift, a definitional one for Interaction Design Researchers, reflects a number similarly motivated shifts towards relationality, grass-roots and experiential in architecture, urban planning and human geography research areas (see, for example, Holloway, 2001). In a broad sense we might postulate that in addition to being supported by digital communications technologies, these same technologies have created the mindset and expectations to allow these research and public practice changes to take place.

The FOOD project began in October 2011. During the first 6 months of the project CIID carried extensive fieldwork, spending time with elderly people, individuals and couples, in Italy, The Netherlands, and Romania. The aim of this research was to meet the elderly in their own context (their home, neighbourhood, and city) and through direct observation and interaction gain insights on the process of ageing, and more specifically their perspectives on food, preparation, eating, shopping, cooking and social aspects of food. What motivates the elderly to cook and eat? What role does food play in relation to health and physical and mental activities? In parallel to this work, other groups in FOOD consortium are looking at enabling frameworks and demographic, social infrastructure, technology and social service research areas.

2 The role of Interaction Design Research on FOOD System Requirements: Keeping the User in Mind

A number of positive recent trends in systems, technology and infrastructure design point towards the importance of maintaining a direct link that keeps researchers' and designers' minds centered on the needs of the "user" (some researchers even objecting to this term, in favour of "people" or deferring to first names). As an Interaction Design Institute, CIID's first objective for FOOD project was providing the consortium with a common understanding and direct as possible experience of the people and contexts being addressed by the research. Further, these experience would form the basis of the discovery of opportunity areas to design for. CIID Interaction Design Researchers learn from their users, derive insights for design from the fieldwork done with them and attempt to infuse project outcomes with these resourceful encounters between interaction designers and users. We do this through: 1) synthesising actionable insights from the research and transferring them to the

consortium; 2) mapping out several opportunity areas in which to ground technology designs and service designs;

It is through engagement with users that we infer new opportunity areas to design for people's life and context, going beyond user needs and easier to define problems such as safety and security. Opportunity areas open up more and richer design solutions than the ones we would have envisioned thinking only in terms of "single" problems to solve. On the FOOD project, we translate these new opportunities to systems developers, software and service infrastructure designers and other stakeholders who are poised to successfully shepherd design research results into the real world. The learnings translated were derived from fieldwork; the people we encountered; their lifestyles; mental models; and national / local cultures. The translation takes place through sharing of learnings and insights during a number of workshops and brainstorm sessions, presentations, reports, and video material.

3 Fieldwork Methods

The fieldwork done in the FOOD project followed a qualitative research approach, supported by design research and design ethnography methods, such as interviews, observation techniques and cultural probes. The methodological approach of the project is inspired by Bourdieu's field interviews (1999) and participatory observations (Bourdieu, 2003; Kvale, 1996; Kaijser and Öhlander, 1999) as ways to collect data. Information was also gathered through the use of methods derived from the notion of "cultural probes," such as diaries, postcards, and photos taken by respondents (Gaver et al., 1999). Using situated interviews, we facilitated our respondents to self-report and use examples from their everyday lives, and in this way lessen the methodological skewing or designer influence on the data. The aim of the research is to meet elderly in their own context and gain insights on their life and their attitudes to food at different scales of their inhabited environment: kitchen, home, neighbourhood and city, and different scales of the perceived time: day, week, seasons and year. Through the research, we investigate what motivated elderly people to cook and how their food experience and kitchen environments were connected to external networks, starting from personal relations, then local neighbours and services offered in their neighbourhood to people and services located far away from them, along with existing digital networks.

3.1 Subjects

We visited a total of 15 elderly peoples in three different countries: Italy, The Netherlands and Romania. These are the same nations in which a set of prototype kitchen systems and services will be tested through the pilot phase of the project. Amongst these individuals, 5 of the elderly people were widowers, 2 were single and 8 were living in coupled households.

We recruited them based on the following criteria:

- They were living predominantly by themselves, not in a care home or under the responsibility of other family members or social workers.
- They were cooking or were capable of cooking their meals autonomously;
- They did not suffer of any disabling health conditions, even if related to ageing (such as alzheimer or dementia); but they might suffer from chronic diseases like high blood pressure or

diabetes;

- A diversity of living contexts. Users were selected among who lives in populated areas of the city, with public transports, shops and other services, and among who lives in a less dense area, with limited services.

3.2 Structure of the field work

Each elderly couple and individual was visited at their home over the course of one day. Researchers shadowed them in their daily activities in the house and in the neighbourhood and talked-through their daily activities and routines with them. Each field research session began with a semi-structured interview, with the aim of gaining a holistic overview of the everyday life of the elderly person(s) in question, and to build initial trust regarding the nature of the days' activities and the intentions of the researcher, research and media to be captured during the day. For each daily visit, a set of formatted itineraries were prepared, moving from general to specific questioning, allowing us to create an informal chat in a relaxing and comfortable atmosphere, but still gaining information about specific topics: biography of the interviewed elderly; the family; the neighbourhood; a day in the life; a week in the life; a year in the life; shopping; preparing meals and eating; and the kitchen environment.

Often field interviews are a starting point for elderly people to introduce themselves to the researcher and, based on improvised questions by the researcher, develop something of a narrative around events and experiences in his or her life that could affect that person attitude towards food and cooking. The interviewees had been told beforehand about the general nature of the project, and so had been primed to talk about food and food related issues. Moreover, the interview often leads to the respondents offering a tour of the home, in order for him/her to support their answers by showing spaces of the house and objects and by rehearsing actions and routes in front of the interviewer. Allowing the interview to be open, while still maintaining a schedule and itinerary of topics, respondents feel comfortable to enact their own ways of responding to questions and react to the topics proposed by the researchers (Wood, 1997): From digging pictures out of drawers to talk around, to cooking in real time with the interviewers, to inviting researchers to eat lunch with them.

Some respondents also took researchers shopping with them at their local grocery or super markets, allowing questions and situated conversations to occur around neighbourhoods and the informational and social networks embedded in these. These instances allowed observation of interactions with neighbours or shop keepers to take place (Figure 1).

Figure 1. An elderly couple from FOOD fieldwork shopping at a local supermarket in The Netherlands.

The value of shadowing a commonplace routine and participating in the enactment of common daily actions lays in the uncovering of behaviours, workarounds and self-derived solutions that are not apparent, obvious or discussed during interview processes. It also gives the chance to broaden Interaction Design research outside of the subject-technology relationship and into the neighbourhood and urban scale. This type of local context, social and informational interactions on-the-move and in-the-wild, are helpful in enable the design of appropriately situated technologies, as well as infusing design outcomes with service-oriented ethos, expanding beyond the "application."

3.3 Design tools for the field work

A set of tools, both for the researchers and the respondents, were developed in order to help thinking and framing of the interview process. The tools were developed in the studio, by Design Researchers at CIID well versed in standard tools for design research (e.g.: Identity maps and experiential timelines/graphs). The specificity of elderly respondents was considered, although at later stages of the researchers came to realise (as others have (Blythe, 2010)) that the attitudes of elderly people, and social dynamics of elderly lifestyles required further iterations for the tools developed to be highly effective. A critical reflection here would demonstrate that in this instance, the design tools created were largely of use *to the designers* not in the evocative or provocative elicitation of answers from respondents. This aspect is an interesting tension in the design of cultural and design tools for interview and design ethnography (see a brief discussion later in section 3.5 of this document: Design Tools and Improvisation). A listing of the design tools created follows, along with a discussion of each in their use.

Agenda of the Day

The Agenda of the Day is a visual illustration of the topics design researchers wished to cover through the interview with the elderly person in the general form of a plot-graph, starting from the morning and ending in the afternoon. The aim of this tool is to facilitate very initial conversations with the elderly person, so in the morning of the interview day, they understand the intent and trajectory of the day's activities, topics and discussions. The empty lines in the layout of the board are meant for informal notes for both the researcher or the elderly person (Figure 2). The Agenda of the Day was presented to elderly respondents on a table-top, along with pens and pencils, so that they might make marks, insert wordings, or correct elements recorded by the interviewer.

During our very early preparatory research to the fieldwork (setting up interviews and respondents with local contacts in each country), we discovered that social workers working with the elderly have a tendency to develop and create custom diaries, schedules and lists for and with elderly people as a way of engaging them, keeping them focused and avoiding the stresses of memory loss. Social workers start out a care session in elderly centers by illustrating the diary or schedule, and use it to plot a course for the activities and discussions of the day. Our research team was inspired by these techniques, which would be familiar to elderly individuals, and we built our own version of this "Agenda of the Day" to use to encourage discussions.

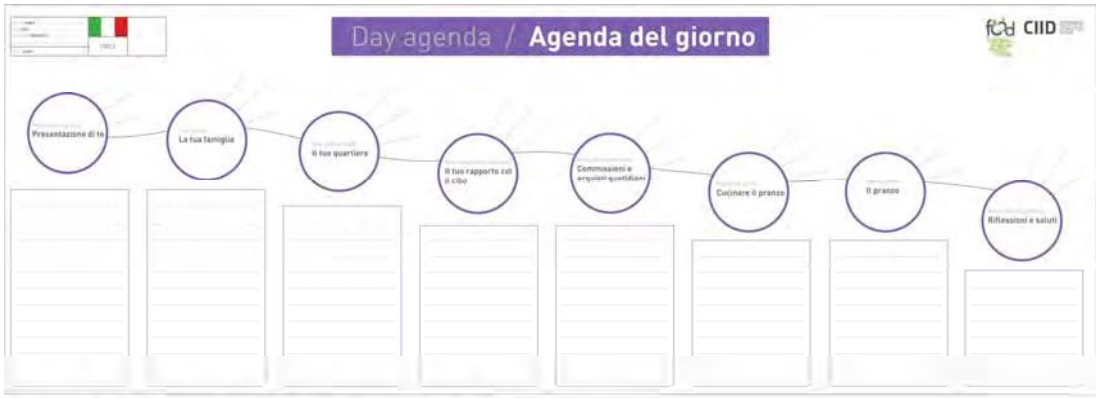


Figure 2. The Agenda of the Day layout for Italian respondents.

The Agenda of the Day was printed as a large format set of A3 print outs, laid down at the beginning of the conversation with the elderly person or couple (like a napkin or large table cloth), and helps creating a physically common space and point of concentration for sharing between the researcher and the elderly (Figure 3).

Figure 3 – Conversation with the elderly

The template is produced in the three native languages of the elderly interviewed : Italian, Dutch and Romanian, coupled with the English translation to facilitate the role of the researcher.

Picture Cards: Food and Social Situations Centring on Food

A set of cards were created to help to evoke food-related stories and relationships between elderly and their network by inspiring elderly people through images related to food, and the names of roles (family, son, daughter, friend) of people belonging to their family or neighbourhood networks (Figure 4).

The cards related to food were created to give a spread of relations and responses. The images shown on the cards were structured into the following groups:

- Food (a. food common in the specific country for daily life; b. one more food type common in the specific country for daily life; c. food linked to celebration like Christmas; d. a common local food

that does not need to be cooked);

- Buying food (a. supermarket; b. queueing; c. shopping charts; d. paying after buying; e. bringing back shopping bags by bus);
- Preparation (a. cutting; b. taking something out from the oven; c. drying pasta; d. spilling water on the floor or dirtiness in the kitchen; e. making a home made pasta or dumpling);
- Eating food (a. table prepared for one person; b. table prepared for more persons; c. celebration context such as Christmas dinner; d. getting invited to another house for lunch such as bringing flower or cake;e. restaurant; f. eating at the hospital).

The cards related to people and social relationships show descriptive roles like: daughter, son, wife, husband, nephew, relative, butcher, baker, fruit seller, friend.

Some cards are purposefully left blank, in order to allow the elderly to write on top of them the name of the protagonists of a food story that they might wish to share with a researcher. The cards have been produced in the three native languages of the elderly interviewed: Italian, Dutch and Romanian, coupled with the English translation to facilitate the discussion with researchers.

Figure 4. A respondent using the cards to remember anecdotes of food associate with social situations.

Seasons Calendar

The Seasonal calendar is a calendar composed by 4 pages only, each one related to a season of the year. Pictures of local context and seasonal food are associated with each season, depending of the country elderly belong to: Italy, The Netherlands and Romania (Figure 5).

A week-long timeline is shown on each page, to help prompt the elderly persons to reflect on the difference between regular days and holiday days. This design was intended to invoke the thought that a good deal of user-experience and user-interview based field research is conducted under the assumption that all days are effective the same as the day of a researcher's visit. Particularly when it comes to seasonal food habits, this may not be the case. The Season Calendar was developed to help researchers understand the cyclical, weekly, monthly or seasonal behavioural and alimentary changes which take place outside of the day of the researchers' visits.

For each season, elderly are asked to answer to the question "How does your alimentation change in Winter/Spring/Summer/Autumn?" and to fill out some aspect of the calendar page with their answer. The calendars are produced in the three native languages of the elderly interviewed

Italian, Dutch and Romanian, coupled with an English translation to facilitate the role of the researcher.

Figure 5. A page of the Seasons Calendar for Romanian respondents.

Retracing-Your-Day Pictures

Retracing-Your-Day is the last activity planned for each fieldwork day with a given respondent household. After the morning discussions, house tours and shopping excursions, the elderly respondents were left alone for his/her afternoon rest. The researcher would then come back in the late afternoon, bringing with him/her a printed poster completed with 5 pictures taken that day -that is, photos of the events of the interview itself and of the time spent together with the researcher. During this afternoon break, researchers selected pictures to be shown back to the elderly respondents, to help get a deeper understanding of particular objects or activities that seemed evocative or definitional to the household, character or food habits of elderly respondents.

By leaving the elderly person and coming back later, the relationships among the elderly and

the researcher turns much more trusting and the elderly reviews his/her day in front of the interviewer with a deeper confidence. Moreover, by looking at their daily life through printed pictures, elderly get to another kind of awareness and understanding of the objects and situations shown in the photos, sharing with the researcher deeper and meaningful insights on their life (Figure 6).

Figure 6. An elderly couple retracing and commenting their day by watching at their pictures board.

The boards are produced in the three native languages of the elderly interviewed: Italian, Dutch and Romanian, coupled with the English translation to facilitate the role of the researcher.

3.4 Design Tools and Improvisation

As described above, the tools developed specifically for FOOD fieldwork were: an Agenda of the Day; Picture Cards; Seasonal Calendar; and Retracing Your Day. These tools were brought along to each visited household and were intended as tools for enabling a shared discuss with each set of respondents. In designing these tools, we researched the countries' general food and agricultural differences, the yearly and seasonal celebrations, traditions and habits, in order to populate these tools with images that were evocative of holidays and season aspects of that area's customs. These tools, prepared prior to the conducting of interviews, are derived from and motivated by thinking about design-probes (Gaver et al, 1999) and related techniques, (Halse et al, 2010) where an object, document or set of images is used to facilitate and concentrate around certain topics. The thinking here is that such elements help prompt the discussion and help to distract the eyes and hands, allowing for deeper investigations into emotional, social and personal experience (Wright P and McCarthy J, 2008).

For each session, we selected the tools to use while spending the day with a particular elderly person, according to the level of talkativeness and engagement of that particular respondent, in response to particular questions or the tools themselves. In the majority of cases, respondents, primed with small amounts of prior information on the topics at hand (food, cooking, domestic appliances) were anticipating topics they wanted to discuss, preemptively offering tours of kitchens and homes, and offering personal anecdotes and experiential stories. In this sense the design tools were something of a failure, in that they were not 'used' by respondents as designed. They did, however, give the interviewer/designers a topology of the problem space to be investigate with allows

for a more quickly improvised set of follow up questions and ideas for further research on-site. In this sense one might liken design-tools of this kind to a kind of practices "score," developed in the studio, which is then expanded upon and elaborated in-situ as an improvised and extemporised interplay with respondents. It is worth acknowledging that in this sense, design tools are often created by and for the designer, and not for others, as a form of preparation and confidence building prior to heading into fieldwork situations and personal contexts.

4 Documenting Fieldwork as Storytelling

Digital images and digital video were recorded by a non-speaking design researcher during each session (two researchers were present in the homes and locales visited at all times). These shadow partners were largely silent for the duration of the interviews, so as to not draw attention away from the interaction with the main interviewing researcher (who was also recording written fieldnotes in a notebook).

In order to convey an informed and engaging story to the rest of the interdisciplinary FOOD consortium, CIID researchers endeavoured to distill and edit a synthesised version of what was gathered and paid witness to. This interesting and often debated design research "coding" step is one place in the inspiration of design insights and new design ideas deviates from related ethnographic and sociological coding research methods.

For each fieldwork session, we created a slideshow with notes and pictures, retracing the topics investigated during the interview: biography of the interviewed elderly; the family; the neighbourhood; a day in the life; a week in the life; a year in the life; shopping; preparing meals and eating; and the kitchen environment. Also, for each fieldwork session, researchers edited and subtitled a short digital video of maximum 5 minutes length, showing the respondent talking during the interview, guiding the researchers along the house or the neighbourhood tour or cooking for them. Each of these videos was edited by individual researchers in the CIID team, and so each one frames particular insights or areas of importance explicitly or inadvertently emerging from the design team's particular, subjective interests in a design space, or novel and inspiring context for solutions. At this stage however, desired project outcomes were not taken into account (for example desires amongst project partners as a whole to make use of communications and networked technologies), in order to plainly reframe these events and people for the other research groups as reportage, not solution-driven information. The movie consists of something akin to a short documentary of a day in the life of each elderly person interviewed, and becomes particularly useful as a facilitation of emphatic connections with elderly respondents by the other of the FOOD partners, who were not present for or directly involved in the field work. In short, these edited videos, as well as providing "insight spaces" for the development of further design ideas, serve to "keep the user in mind" throughout the project, as evocative and provocative profiles of real people in real places (Raijmakers et al, 2007).

By building these biographical storytellings around each fieldwork session, through meaningful notes and anecdotes, pictures and videos, the aim was to bridge the gap between the intense personal experience of visiting a respondent in the home, and more institutional and technical (i.e.: framework paper-based) aspects of the FOOD research. As was hoped, once contextualised in this

way, the design and research focus undertaken by all FOOD partners has been effected by these user-stories. These broad-views of lives in practice have helped expand beyond technical and appliance feature specification into envisioning socio-technological scenarios for the opportunities arising from specific elderly stories and capacities. In follow-up meetings with the research partners, researchers have used specific, contextual moments and personages from the fieldwork to develop arguments and positions on their own research. Likewise, in project idea brainstorm sessions, these user-scenes have become evocative in the synthesis and evaluation of design concepts and appliance functionalities and how they might make sense in the everyday life of an elderly household.

CIID believes that conveying field work documentation as storytelling strongly contributes to engaging FOOD partners in coauthoring the design ideas, thus enriching the building of future FOOD scenarios for elderly from the perspective of as many research disciplines as the ones represented by the whole consortium: interaction design, human factors, engineering, computer sciences, economics and social sciences.

5 Insights from FOOD field work

From our field work in Italy, The Netherlands and Romania, we synthesised several insights about elderly people, their life and their relationship with food. In design research process, insights represent actionable intuitions that will identify opportunity areas for design challenges (Fulton Suri, 2008). Insights within the design methods of CIID are formulated as short sentences, accompanied by an image and, when possible, a quote from one of the respondents. We divided our insights in categories related to “Experience of ageing” (generally) and “Experience of ageing related to food”, as you can see from the Map of Insights (Table 1).

Among the insights captures from the “Experience of ageing”, we captured several aspects, such as elderly routines and elderly own perception on the process of getting older. The followings are insights extracted from the collection of “Experience of ageing”.

- The elderly want to be in charge of their life and they are constantly negotiating and evaluating the help they need from people/ services around them: “I used to have a carer at home. She was not able to take care of the house as I do and I was always running behind her to control if she was destroying the house.” (Giuseppina, elderly woman from Italy)
- The elderly reorganise their social network according to the help and support they need. That is how neighbours and shop keepers may become more crucial than relatives: “My neighbour is more than a brother to me. ” (Cesare, elderly man from Italy)

Regarding the “Experience of ageing related to food” insights, they have been clustered around food activities: planning meals, getting grocery, cooking, eating and storing food. The following are insights extracted from the collection of “Experience of ageing related to food”.

- Cooking is also a mind exercise: you need to decide what to eat, where to take ingredients, how to cook it: “It’s good for my 90 year old neighbour to cook for herself: it forces her thinking.” (Anne, elderly from The Netherlands)
- Being able to cook your own food is essential to the overall well-being and self-esteem of elderly: “I don’t mind that someone else takes care of my garden and helps me keep the house clean. But I want to cook my own food” (Mrs Martens, elderly woman from The Netherlands).

Table 1. Design Insight Map

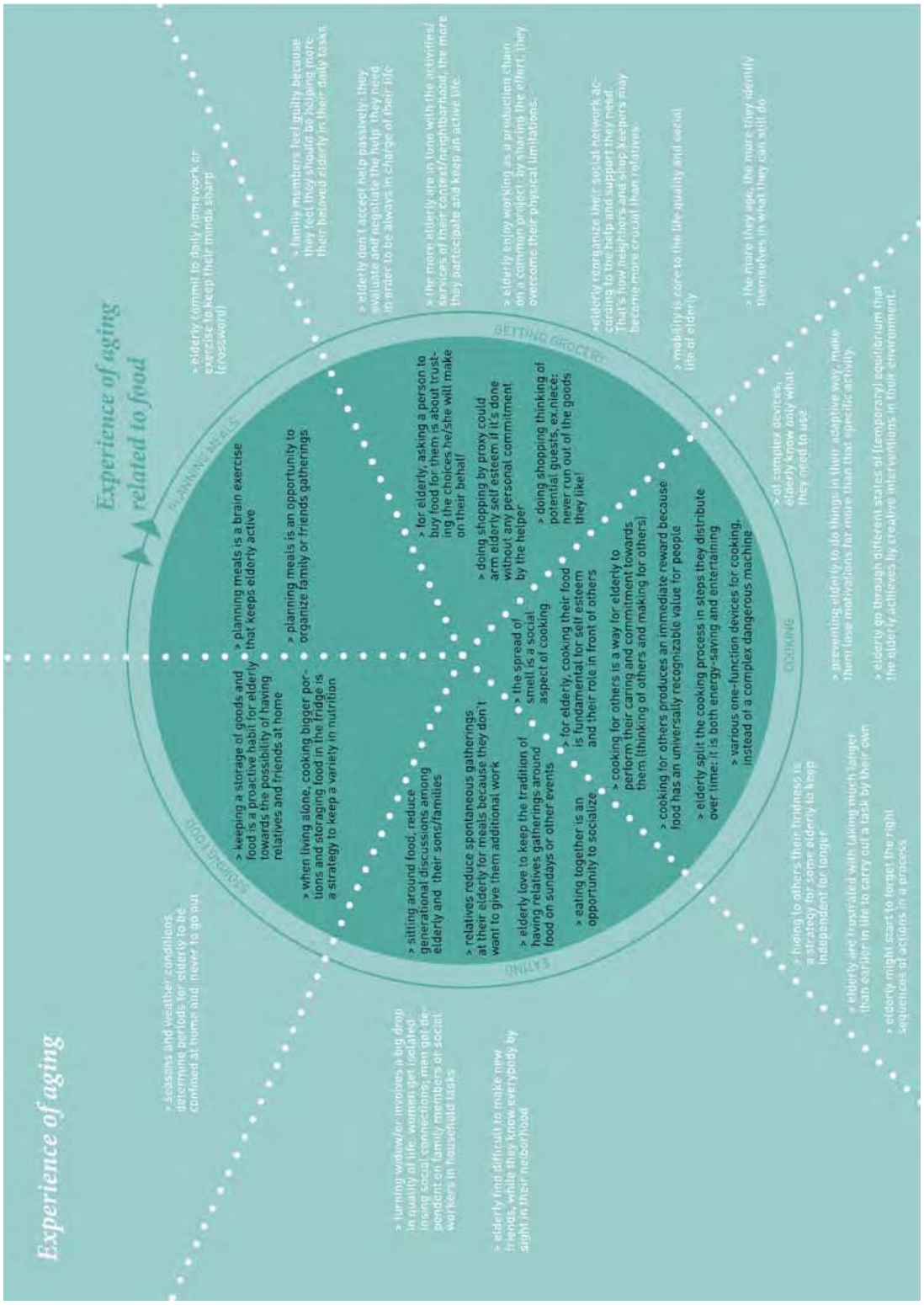
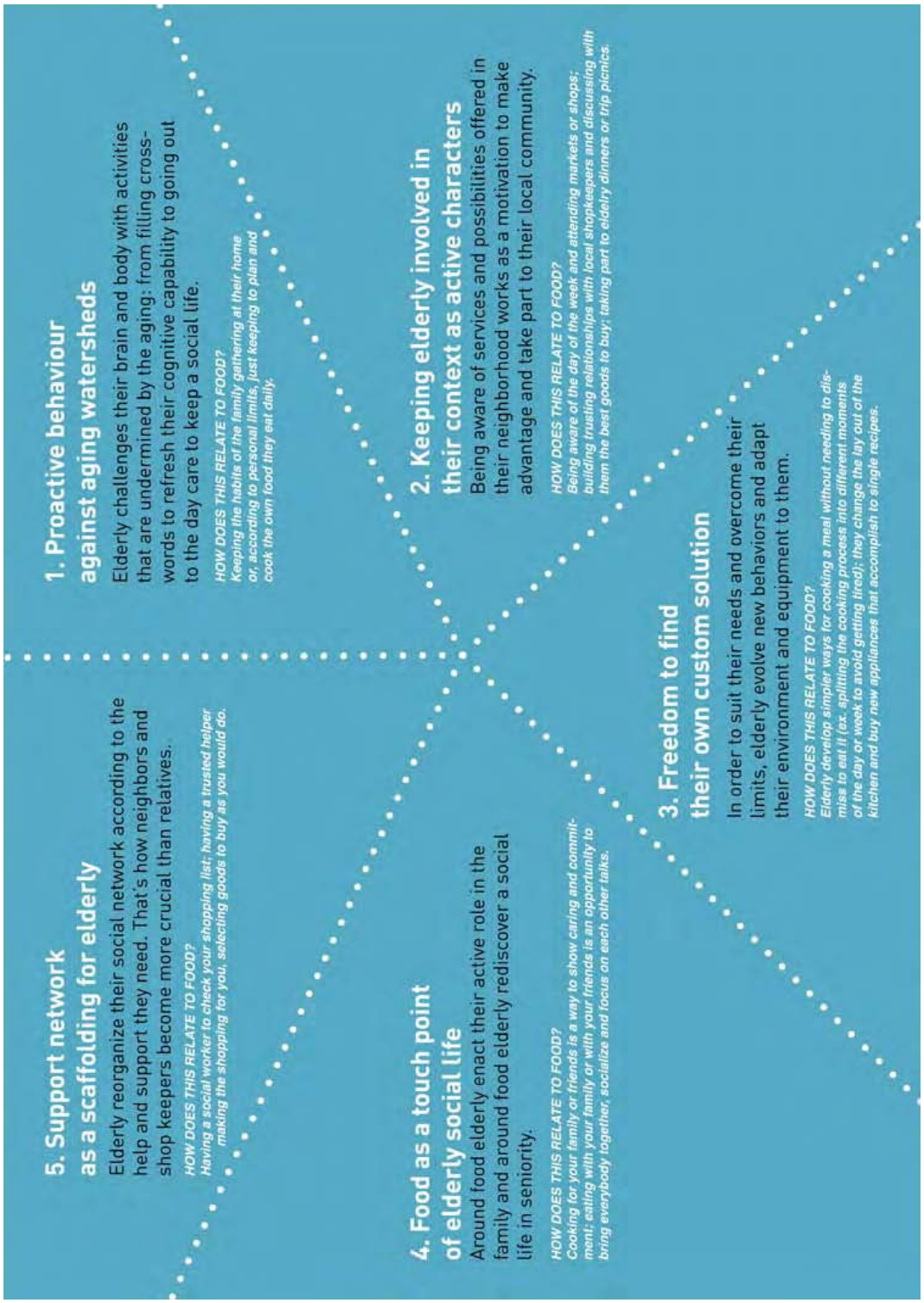


Table 2. Opportunity areas map



6 Opportunities areas from FOOD field work

From the Design Insights, we derived 5 opportunities areas and we visualised them into a map (Table 2). The opportunities discovered frame different situations and aspects where to ground design

challenges and start envisioning meaningful socio-technical scenario for the elderly. Our opportunities areas are the:

1 Proactive behaviour against ageing watersheds. The elderly challenge their brain and body with activities that are undermined by the ageing: from filling crosswords to refresh their cognitive capability to going out to the day care to keep a social life.

2 Keeping the elderly involved in their context as active characters. Being aware of services and possibilities offered in their neighbourhood works as a motivation to make advantage and take part to their local community.

3 Freedom to find their own custom solution. In order to suit their needs and overcome their limits, the elderly evolve new behaviours and adapt their environment and equipment to them.

4 Food as a touch point of elderly people social life. Around food elderly enact their active role in the family and around food elderly rediscover a social life in seniority.

5 Support network as a scaffolding for the elderly. Elderly reorganise their social network according to the help and support they need. That' s how neighbours and shop keepers become more crucial than relatives.

Soon after CIID compiled and shared the Design Insights and Opportunity areas maps with all the partners, the FOOD consortium gathered to run a series of brainstorming sessions to generate new concepts for services around food and the elderly. The maps were adopted as tools for the brainstorming because they facilitated the participants in the process of envisioning new socio-technical scenarios, by opening up and constraining at the same time meaningful social interactions and uses of technology.

7 Future steps of the FOOD project

The project will build prototypes of selected concepts (products and services), which will be tested in a number of pilots in Italy, The Netherlands, and Romania starting in September 2012.

8 Design Research Linking Scales of Personal Experience to Scales of Urbanism

We believe that our work, which has been produced and document in ways that make it easy to share and communicate with other researchers, rendering the real lives of elderly people more palpable and direct, can be a starting point for other projects around the elderly and their experience inside/outside home. While much quantitative research has been done within this and related fields (Chan et al, 2009), there is less qualitative research and an urgent need for a better understanding of the everyday life of elderly and what it "means" to get old. Moreover, researchers have been focusing on elderly and on the way they inhabit the domestic environment and give meanings to it (Leonardi et al, 2009), but it seems that a lack of a similar field work research has been conducted regarding elderly dwellers and their relationships with the urban environment.

We suggest that urbanism, being concerned with the way dwellers live within a city and merge their experience with the city flows and processes, could take advantage of the type of research summarised through FOOD fieldwork in at least two different ways: 1) Borrowing from Interaction Design Research methodologies to investigate elderly relationships in the urban environment, such as engaging with users in the own context, shadowing them and providing tools to prompt

discussions; 2) Transferring FOOD findings, in terms of Design Insights and Opportunity areas, to inform urbanism projects about cities and elderly.

8.1 Interaction Design Research Methodologies in Urbanism

WHO has already highlighted the need to engage with local elderly communities and initiate participatory design process to design elderly friendly city (WHO, 2009), by setting up the Network of Age-friendly Cities and Communities, aimed to promote and guide the integration of an ageing perspective in urban planning. The FOOD project is experimentation into how domestic and urban experiences of food processes, guided by elderly respondents through their homes and neighbourhoods, were informative for design processes and research. These methods are a starting point for revealing how the elderly make use and sense of their environment and, somewhat unexpectedly, how the elderly can creatively intervene in it in order to suit their needs and overcome their limits. We saw that more often the elderly succeed in this when the environment offers some degrees of freedom, allowing them to find their own custom solutions. We found that elderly people can be extremely resourceful because they can evolve their behaviours over time while adapting their environments to better make advantage of their physical and cognitive capabilities. Most of the time elderly people are entitled to shape no more than their home. What if the elderly were entitled to shape their neighbourhoods and the systems and infrastructure within them? Which dwelling behaviours could the elderly self-evolve in their communities?

8.2 Transferring FOOD findings to Urbanism

From FOOD fieldwork, we rediscovered the importance of the human-geography and hyper-local context in which elderly live. Physical proximity and geographies are heightened in importance for these communities, as their local food-related networks emerge from these local relations. Our findings so far inform Fischer's discourse about elderly dwelling (1982), when he suggests urbanists and architects should focus on the immediate community, instead of big urban planning, when designing for elderly. Small and local are the dimensions that elderly people inhabit due to physical and cognitive limits and it is preferable to scale the design effort to that dimensions in order to create environments and experiences that elderly can enjoy the most. Fischer also suggests to design urban spaces for intergenerational exchanges in the city. Cities have been experiencing the phenomenon of selective migration of the majority of young people to the city, making difficult to elderly to find community associates, usually of the same generation. From FOOD project, we discovered how local and situated events, such as those around meals, favour a mix of people of different generations and reduce generational discussions.

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Supportive care facilities and their neighbourhood environment: en exploratory study

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Purpose: Given the ageing phenomenon and age-related health constraints, the significance of the urban environment for social engagement and overall life satisfaction tend to increase in later life. This exploratory study seeks to examine how the neighbourhood environment of supportive facilities impacts older people's behaviour. By analysing experiences and perceptions of institutionalised seniors, the study provides some preliminary results for further research. Design and Methods: Data for the study was gathered from 11 facilities (namely, senior care homes and day care centres) of Aveiro District, Portugal, between 2008 and 2010, covering urban, suburban and rural areas. Semi-structured group interviews were conducted with 88 older persons with an average age of 75. Results: Overall, older people institutionalised are satisfied with the facilities' location with respect to their geographical proximity to other services, such as churches, GPs, coffee shops, restaurants and to some extent banks and post offices, most located within an 800/1000m walking distance. However, barriers concerning the urban design were largely mentioned, in part related to difficulties with crossing roads, the absence of public seats and the risk of falling due, for instance, to steep slopes and steps, the maintenance of pavements or the lack of clear signs. Implications: Policy makers are increasingly recognising that older citizens are more susceptible to the influence of their neighbourhood environment as they tend to travel outside less often, and that is why the urban design has such an impact on them. However, to enhance an active participation of older persons in local communities and improve their well-being, it is important to include more often in decision making processes information based on older people's experiences and perception of problems and motivations, namely those who use supportive care facilities.

Keywords: ageing | supportive care facilities | proximity | mobility

1 Introduction

Population in developed countries is rapidly ageing and an increased number of older people is expected to live longer. This phenomenon has triggered major debates concerning mainly the physical and psychological deterioration of the elderly and the need to provide a range of services capable of coping with such limitations. In this context, supportive care facilities represent, both literally and in terms of image, the traditional institutional response to deal with this circumstance. This stereotyping and narrow version of ageing, quite understandably, has led people to conceive these facilities as places of containment. And, although the idea of 'ageing in place' is gaining preponderance in the academic and political arenas and is the preferred option of many older people (Fisher et al, 2007; Oswald et al, 2011), to move to a supportive environment is still a valid and sometimes the only solution for a substantial number of persons.

One important path for research therefore is to study ageing in positive contexts (involving, for instance, walking, shopping or socially engaging) and consider its relationship to places. This implies looking at senior care homes, day care centres and other similar facilities, not as 'containers' for older people, but rather as places in which elder persons are still active and can enthusiastically use the outdoor environment beyond the boundaries of facilities. In fact, given the variety of changes that tend to accompany ageing, older people are especially sensitive to their physical surroundings, which in turn can act as enablers or obstacles to allow their on-going active engagement in society and maintain health till the last years of life.

In recent years, there has been an increasing interest around the idea of 'age-friendly communities', which generally refers to a place where elder persons are socially valued and supported with services and infrastructures that respond to their needs (Alley et al, 2007). Concepts of urban design and planning for disability and older people are usually pointed in this debate as key issues to promote such communities. However, these studies are generally focused on the idea of 'ageing in place' and do not take into account the idea of older persons moving to supportive facilities. Accordingly, issues involving the location of elderly care facilities and their relation with the surrounding environment have hardly been explored in this context. Likewise, despite the significant recognition that public participation must be actively taken into account in policy-making processes, studies regarding the older people's understandings of how the neighbourhood environment produces impacts in their daily lives are still scarce.

The overall purpose of this paper is to examine how the neighbourhood environment of supportive facilities produces impacts upon older people's behaviour through their experiences and perceptions. Based on an exploratory qualitative study conducted in the District of Aveiro, the analysis is mostly centred on the relationship between the facilities' location, in terms of their geographical proximity to other services and accessibility, and the older people's interaction with the environment outside facilities. Data for the study was gathered from 11 facilities (namely, senior care homes and day care centres), between 2008 and 2010, covering urban, suburban and rural areas. Semi-structured group interviews were conducted with 88 older persons with an average age of 75. Additional interviews were conducted to professionals working in those facilities (directors, health professionals or social workers) to have further insights on these issues and if, in their view, older people, with low limited mobility, report feeling 'trapped' within the confines of the facilities.

This article will address this subject as follows. Because the analysis is centred in listening to older people's voice that use day care centres or live in senior care homes, first it will be briefly addressed the issue of institutionalization, as it is commonly perceived that these seniors are usually confined within the 'institutional setting's walls'. Next, a brief discussion on location and accessibility issues will be held, underlining the importance of the community environment to older adults and proving a theoretical background for the case study analysis. Subsequently, the case study will be addressed: description, methodology and results are presented. Finally, it will conclude by discussing the main findings of the study and suggesting ways in which policy making might make a difference to institutionalised older people.

2 Ageing and institutionalisation

Supporting older adults to live in the community as equal citizens is an issue that has recently been warmly embraced by people of diverse backgrounds and political persuasions. Allowing residents to remain and grow old in their homes as their dependency increase is one of the main objectives of recent reforms supporting the notion of 'ageing in place'. The pressure on public resources and lack of spaces in institutional settings mean that it is in the government's interest to support people living in their own homes for as long as possible (Burton et al, 2011). Some authors even claim that, ideally, older people should not have to move to supportive environments, not only because institutional care tends to be of poor quality, but also for the reason that seniors are often segregated

in those settings (Mansell et al, 2007; Freitas and Scheicher, 2010). In this sense, the full integration of old people within their communities, closely followed by a deinstitutionalisation process, is seen as the best way to ensure senior's maximum fulfilment.

Over the past decades, several papers have focused on the effects of institutionalization in older adults, pointing to the depersonalising effects of such environments. Back in the 70's, Kahana (1973) mentioned that those accounts which look at the quality of life at institutions for the aged at close range tended to invoke images of 'Dante's Inferno'. Since then, the arguments are still in the same line of thought. For instance, according to Carp (1994) those who live in an institution are more vulnerable to depression and to functional decrements. In fact, other studies do confirm this idea, reporting that everyday experiences of institutionalised seniors differ from those living in other locales, contributing to an overall increase level of depressive symptoms (Ames, 1990; McDougall et al, 2007).

Despite these trends, institutional settings are a valid and sometimes the only solution for a substantial number of seniors. And not just for those who are increasingly becoming dependent, live alone or lack the support of family members, though indeed these are their traditional main users (Bowman et al, 2004; Freitas and Scheicher, 2010). Therefore, understanding the effects of environmental settings on older adults and searching for good conditions are of utmost importance to assure a better quality of life of those using (or that will use) such institutions.

Following Kahana et al (1980) argument, the optimal environment is that in which congruence between a person's needs and the environment's supplies is maximal. In this context, two complementary approaches are needed: to look at the micro (institution's environment) and macro scale (institution's neighbourhood environment). The extent to which the institution succeeds in understanding senior adult's requirements and providing an environment capable of addressing their needs, is a key issue to reduce stress and pace of decline caused by the institutionalisation process. An atmosphere providing respect for the aged person and which takes into account that the ageing process by itself produces physical and psychological impacts, which can be heightened by the institutionalisation experience due to a change in the person's environment, may at times be difficult to find within institutions (Kam, 2002). This means that the institution's personnel must make an effort to address this subject and look beyond issues like disability, diminished function and illness, and consider the elder person someone with desire to be more active and socially engaged. But if institutions are to meet the older people needs, they must make an effort to bridge the gap between the senior's past and present situation as well as between the previous personal and social experience and the new situation, supporting seniors in sustaining significant ties with people and places outside the institutional walls. In fact, evidence suggests that satisfaction with the surrounding environment is associated with the health and well-being of the elderly (Luz et al, 2011). The institution's neighbourhood environment, both with respect to urban design and social activities, is thus an issue to be considered, not only by the institution's personnel (where and how can senior adults go), but also by policy makers (where should these facilities be located)..

3 Institution's surrounding environment: accessibility issues

Geographical proximity, location and mobility issues have a long history in social science's literature and have been examined across a wide range of contexts in order to underline their tangible impact on people's lives. The overall idea is that distance between places is a key issue in the spatial organisation of activities and social interactions. This means that locational patterns of activity sites generate important preconditions for daily accessibility, defined as the ease with which people can reach certain potential destinations (Haugen et al, 2012).

A growing awareness of the ageing phenomenon has led policy makers and researchers to include in the debate this geographical notion of accessibility. In fact, to the idea of designing homes accessible to people with special needs, literature has add to discussion how features of the outdoor built environment can be planned and designed for the elderly (Burton and Mitchell, 2006). Prompted by arguments supporting the idea of 'ageing in place', initiatives such as elder-friendly communities (Alley et al, 2007), liveable communities (AARP, 2005), Liveable Neighbourhoods (Jones, 2001), age-friendly cities (WHO, 2007), sustainable communities (ODPM, 2003), walkable communities (Burden and Lagerwey, 1999) or even streets for life (Burton and Mitchell, 2006) emerge in this context. Though with different emphasis, all these initiatives highlight the fact that: i) the characteristics of the surrounding environment may buoy or restrain independent living of older people, ii) places with mixed services and good pedestrian access are related with increased walking amongst the elderly, iii) moderate/higher-density areas provide older adults with more opportunities for social interaction and interests iii) one needs to develop places where older people are socially valued, supported with services and infrastructures that respond to their needs.

By assuming that older people are maintained within the community for as long as possible, these studies tend to neglect the idea of older persons moving to supportive institutions. As such, discussions relating the elderly population with the surrounding environment disregard the expectations of institutionalised older citizens. Where should senior institutional settings locate? Should their location follow the same rationale of the above mentioned initiatives? Is geographical proximity to other services and facilities important for institutionalised seniors?

Though it is commonly acknowledged that accessibility is an important planning criterion concerning the location of social services (Fitzsimmons and Fitzsimmons, 2006), its operationalization may depend on issues such as the spatial characteristics (urban/rural) or even the type of institution. For instance, an institutional setting located in a rural area may require better transportation for service access, whereas an urban area may focus more on walkability. Similarly, institutions such as day care centres, which imply daily journeys from senior's residence to the institution, may focus more on providing all the means to reduce the time travel distance between the two places, while shelters such as senior care homes may have more concerns with providing their services in quieter environments with low road traffic problems. Still, a very short time travel distance to health services is desired in both cases.

A simple but practical way of operationalizing the notion of accessibility as a planning criterion concerning the location of social services is to use the concept of catchment area or 'ped-shed', defined as the maximum radius settlement for a certain service or facility (Newman and Kenworthy, 2006). This means that all persons within the catchment area have a reasonable access to those

services or facilities, measured in distance (metres) or time travel (minutes). From a policy making perspective, the use of this concept is useful for two reasons. First, it helps to determine the population that is within and outside that range and define the number of potential users of the service. Second, it shows the type and number of other services or facilities that are located within that range.

The following step comprises the definition of the catchment area range. This means understanding the maximum distance older adults may be willing to travel from outdoors to the institution or vice-versa. According to Carstens (1993) and Tolley (2003), seniors are willing to travel 400/500m to have access to primary/mandatory services (e.g. food store, drugstore and bus stop) and 800/1000m to secondary/desirable services (e.g. medical services, restaurant/coffee shop and post office). In terms of time travel spent, the elderly would take 5 minutes to perform the first radius settlement and 10 minutes to complete the second. More recently, the study developed by Burton and Mitchell (2006) raised some questions concerning these time travel distances. According to them, those calculations were based on the average fit male adult travel time and did not consider the specificities of older people, who would walk more slowly: 10 and 20 minutes' walking time for the 400/500m and 800/1000m radius, respectively.

Again, from a policy making viewpoint, this approach can be very useful both to analyse the location of existing institutions and to help planning the site of future institutional settings. Clearly, there may be restrictions to the type and number of services or facilities that could be confined within those radius settlements, especially in low-density areas. In this case, priority should be given to provide public transportation options within walking distance.

Still, the availability of services within a certain distance is not the only factor that may encourage or dampen seniors to walk around out of doors. The positioning of key services is also a key issue to consider. As observed in earlier literature, one motivation for seniors to walk is to undertake errands, like visiting shops or the post office, or to use services such as coffee shops and transports (Day, 2008). But evidence also suggests that if these services are not dispersed but rather mixed within the same area, older residents will travel to these destinations more often (Patterson and Chapman, 2004).

Finally, pedestrian mobility design may also affect the degree to which seniors feel safe and motivated to walk. Problems usually reported include, for instance (Southworth, 2005; Ewing and Handy, 2007): i) the presence of physical obstacles and the poorly maintenance of walking pavements, which can upset the balance and step stability of the elderly, ii) the lack of sidewalks or the existence of narrow sidewalks widths and the absence of pedestrian crossings, exposing seniors to dangerous due to traffic, iii) the lack of frequent places to sit and rest, iv) the lack of logic and coherence of the walking network, creating confusion amongst seniors and v) the absence of street lighting, visibility and signalling, creating an unsafe environment.

4 Location and accessibility through senior eyes: an exploratory approach

4.1 Case study description

Field studies were conducted at 11 institutional settings, involving 10 parishes of 4 municipalities of Aveiro district, Portugal, which are part of two different NUTS III regions: Entre Douro e Vouga and Baixo Vouga (figure 1).

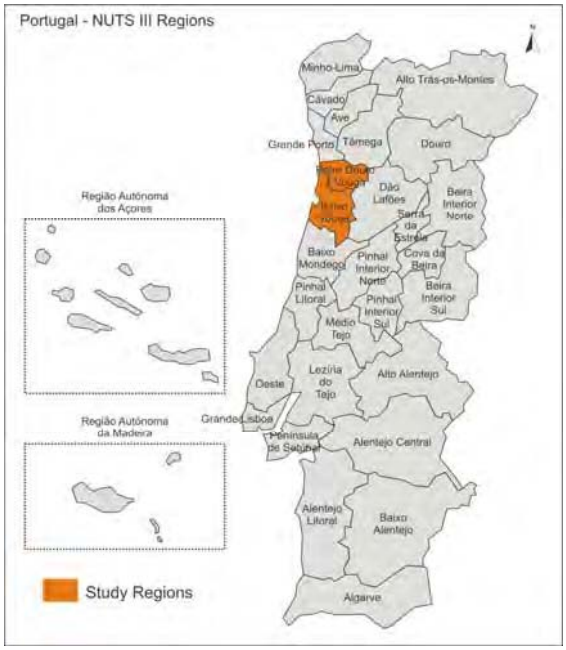

Figure 1. Location of Entre Douro e Vouga and Baixo Vouga NUTS III regions

Even though both regions are located on the west cost of Portugal, hence geographically being part of the most developed country area and with a higher population density when compared to inland regions, the differences found within the regions for the parishes studied are rather high (table 1). Following the Census 2011 delineation of urban areas criteria (urban parishes have a population density higher than 500 inhabitants/km2, suburban ones ensure a population density between 100 and 500 inhabitants/km2, and rural areas are those below 100 inhabitants/km2), it is possible to distinguish these three spatial typologies for the purpose of this study (figure 2).

Table 1. Population density (2011)

Country/Region/Parish	*Population density*
Portugal	115
Entre Douro e Vouga	319
Baixo Vouga	217
São João da Madeira	2734
Aguada de Baixo	374
Ribeira de Fráguas	64
Cacia	206
Glória	1329
Oliveirinha	399
São Bernardo	1260
Vera Cruz	251
Santa Joana	1385
Murtosa	254

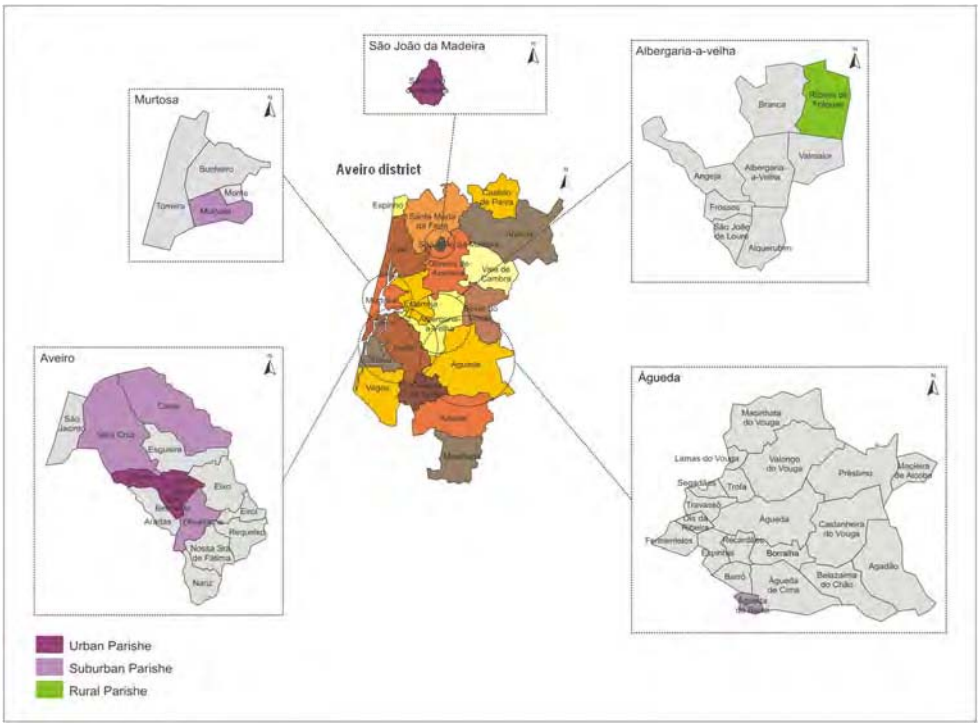

Figure 2. Location and spatial typologies of the field study

With respect to demographic trends, Portugal, like in many developed countries, has been witnessing a substantial increase of the proportion of the population at, or over, the retirement age (65) in the last decade. For instance, the ageing index has increased from 102 (in 2001) to 129 (in 2011). Following this general trend, all parishes analysed in this study have noticed a similar increase, though it is worth mentioning the rise in Ribeira de Fráguas and Aguada de Baixo (table 2).

Table 2. Ageing Index (2001-2011) per parish

Parish	*Ageing Index (2001)*	*Ageing Index (2011)*
São João da Madeira	70	115
Aguada de Baixo	82	215
Ribeira de Fráguas	93	227
Cacia	86	109
Glória	117	192
Oliveirinha	109	140
São Bernardo	86	95
Vera Cruz	112	132
Santa Joana	74	115
Murtosa	179	204

Figure 3 maps the location of the 11 institutions analysed in this study and table 3 provides information regarding their type: 1 senior care home, 3 day care centres and 7 with both functions. Glória is the only parish which covers two of the institutional settings.

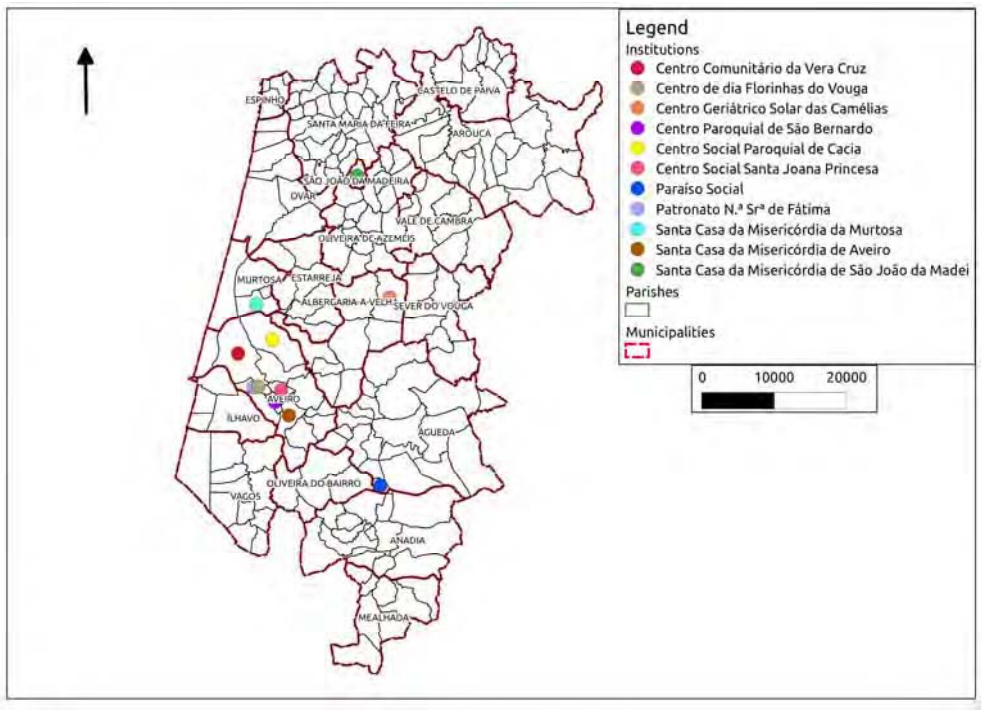

Figure 3. Location of the 11 institutions analysed in this study

Table 3. Institutional settings analysed in this study

Institution	*Function*	*Parish*	*Municipality*
Santa Casa da Misericórdia de Aveiro	Senior care home Day care centre	Oliveirinha	Aveiro
Santa Casa da Misericórdia da Murtosa	Senior care home Day care centre	Murtosa	Murtosa
Paraíso Social	Senior care home Day care centre	Aguada de Baixo	Águeda
Santa Casa da Misericórdia de São João da Madeira	Senior care home Day care centre	São João da Madeira	São João da Madeira
Centro Social Santa Joana Princesa	Senior care home Day care centre	Santa Joana	Aveiro
Centro Comunitário da Vera Cruz	Day care centre	Vera Cruz	Aveiro
Patronato N.ª Sr.ª de Fátima	Senior care home Day care centre	Glória	Aveiro
Centro Geriátrico Solar das Camélias	Senior care home	Ribeira de Fráguas	Albergaria-a-Velha
Centro Social e Paroquial de Santo André	Day care centre	Esgueira	Aveiro
Centro de Dia "Florinhas do Vouga"	Day care centre	Glória	Aveiro
Centro Paroquial de São Bernardo	Senior care home Day care centre	São Bernardo	Aveiro

4.2 Methods

Eleven institutional settings were chosen to represent a wide range of locational patterns. In each institution, data collection involved field observation and interviews between 2008 and 2010. Whilst analysing senior's experiences is a good way to understand certain environmental features such as safety, urban decline or social engagement/cohesion, relying merely on such perceptions can be

problematic as they may reflect certain characteristics of the individual rather than the environment (Beard and Petitot, 2010). Thus, a preliminary visit to each institution's neighbourhood environment allowed to map other facilities and services, as well as to detect potential barriers in terms of accessibility within an 800/1000m distance radius. This analysis turned out to be very useful during the interview process as it allowed reflecting upon the potential constraints that older people might face once they went out of the institution for a walk and later confront seniors with their observations.

Focus group discussions with 8 individuals were held in each institution. A total of 88 older people, mostly women, with an average age of 75 participated in the process. Excluded from the interviews were people with severe limited walking ability, as the study tried to understand people's perceptions and real constraints regarding their relation with the surrounding environment. Although the initial idea was to include a wide and proportional number of men and women, the sample was limited to the older people's willingness to participate and the available time of the institution's personnel to keep a close eye on the process. As most of those who participated in the process were women, no conclusions can be outlined concerning gender behaviours.

Interviews were semi-structured and designed to investigate how the neighbourhood environment of each institution impacts older people's behaviour through their experiences and perceptions. The relationship between the facilities' location, in terms of their geographical proximity and accessibility to other services and green spaces, and older people's interaction with the environment outside facilities were thus the main aim of the discussions. To create an interview guide, research literature that documented the issue at stake was reviewed, allowing the design of a list with overarching topics (see, for instance, Centeio et al, 2010). Examples of these topics include services and facilities available in the neighbourhood, activities undertaken in the neighbourhood, usual walking paths and positive or negative features of the surrounding environment. For each topic, some questions were designed to prompt people's accounts of their perceptions, experiences and usual activities and whether the environment created any constraints on the individual while engaging in those activities. However, in order to allow individuals to describe their experiences in their own words, questions were open-ended. This permitted a deeper understanding of some individual's actions concerning the urban environment, based on the field observation previously held (e.g. mentioning that they do not need or want to go to the coffee shop, when in reality the reason is related to a set of urban design constraints). Moreover, discussion was not limited to questions at hand and participants were invited to speak about the broader topic throughout the sessions.

The interviews were also conducted with the institutional setting's directors and personnel (social workers and health professionals) to discuss the topics mentioned above related to the elderly. In this case, attention was also paid to collective transports, in order to understand how institutions can overcome some potential barriers resulting either from the distance to services or from an urban design perspective. On average, two persons of each institution were interviewed.

In the next section, results concerning the two major issues that were discussed during the interview process are presented. They will be labelled as follows: *geographical proximity: structural needs and barriers* and *accessibility: structural needs and barriers*.

4.3 Results

Geographical proximity: structural needs and barriers

This issue is related to each institution's location regarding some fairly locational principles, such as being close to a bundle of services, facilities and other places that may attract and promote an active life and social engagement amongst seniors. Such principles may indeed support and encourage seniors to take quite frequent walks, even if the extent is limited. On the contrary, if a supportive facility is geographically isolated and no solution is provided by the institution to partly overcome such barriers arising from physical distance (e.g. transportation), these institutional settings can be seen as means to reinforce segregation between older people and community.

The first part of the analysis was based on mapping the services and facilities located in the surrounding environment of each institution within a 400/500m and 800/1000m distance. These walkable catchments or 'ped-sheds' follow the work developed by Burton and Mitchell (2006), which for older people represent a theoretical ten and twenty minute walking distance, respectively.

With respect to a 400/500m distance, churches, coffee shops, restaurants or grocery stores can be found in approximately 80% of the cases. Within this range, General Practitioners (GP) and leisure areas or parks were available for seven and five institutional settings, respectively. If one considers the 800/1000mdistance, the number and type of services available expands: services such as coffee shops, restaurants or grocery stores are available for all institutions, churches are nearby circa 80% of the cases, hairdressers, GP and leisure areas or parks can be found in 7 cases and bus stops, banks and post offices are existing in more than half of field studies. On the opposite side, public services like city or parish councils, police departments or even cemeteries are only in a few cases within the 20 minute walking distance. Figure 4 maps in a schematic way the main services and facilities that can be found within a 400/500m and 800/1000m walking distance for the majority of the institutional settings analysed.

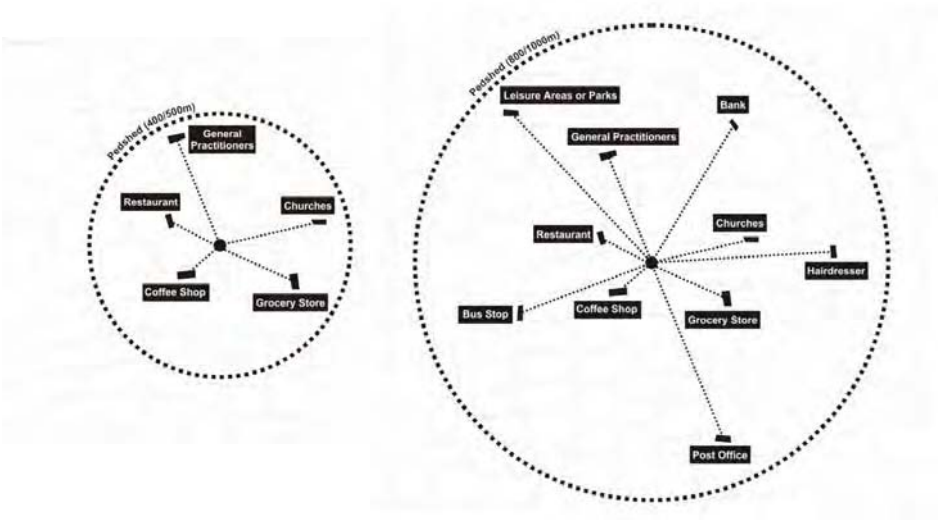

Figure 4. Services and facilities within a 400/500m and 800/1000m range of most institutions

A further issue of analysis concerns the relationship between the availability and positioning of key services in the institution's neighbourhood environment and the urban characteristics of the parish. It would be expected that the presence of a variety of destinations (mixed use) and amenities in the proximity of the institutional setting, which might provide more visual variety and interest for seniors to walk and visit, would be higher in urban parishes. In what regards the proximity of the services and facilities referred to above (churches, coffee shops, restaurants, grocery stores, hairdressers, GP and leisure areas or parks), no differences were found between the location of the institutional settings the environment typology. However, and keeping in mind that this is a small sample to take further and deeper conclusions, urban areas do tend to present a more varied number of services within the 800/1000m distance, namely libraries, internet access points, theatres (and related facilities) and collective transports, as expected.

Attention now will be directed to the interviews. Overall, the older people's opinion on the institution's location is highly positive, which can be related with the fact that most of the institutionalised seniors interviewed either used to live near the senior care home or do live in the day care centre's neighbourhood. This shows that the institutionalisation transition process was quite pacific in geographical terms as they were already familiarised with the local environment. This situation tends to induce seniors to walk outside the institutional setting, be it alone or with the help of the institution's personnel:

I usually go out every day! There is nothing that prevents me from doing so!

[Woman, Santa Casa da Misericórdia da Murtosa]

I like to go outside with the institution's personnel!

[Woman, Santa Casa da Misericórdia da Murtosa]

A similar opinion was transmitted by the personnel and directors, though in this case their worries were more centred in providing the transport means needed to take seniors to more distant places. Still, differences can be found if one distinguishes between utilitarian walking (primarily for transport or public services) and leisure walking (primarily for exercise, shopping or socializing). With respect to the former, participants mentioned that they do not use public transports, mainly for four reasons: i) especially in non-urban areas, bus stops tend to be distant of the institution and public transportation is scarce, hence a discouraging alternative travel mode, ii) many seniors have little experience of travelling by public transport and generally do not consider public transport as an option, iii) public transports are not adapted for the elderly, therefore creating an additional barrier and iv) citizens of all ages do not usually deal with older people with the respect they deserve and this can be observed in public transportation as well (e.g. the driver does not wait for the senior to sit, young people do not show the courtesy of letting the elderly sit). This means that when they want to travel to public services, which usually are not located in the surrounding area, they either call a family member to drive them to the facility or do ask the personnel's help to provide the adequate means of transport:

The hospital, the GP and the chapel are the facilities that seniors use more and to go there they use the institution's collective transport.

[Personnel, Centro Geriátrico Solar das Camélias]

Concerning leisure walking, it is important to understand the reasons that may motivate seniors to go outside: do they have a particular purpose or destination in mind? If activities are close enough together to make walking easier, do seniors tend to go out and walk more or simply the existence of a key destination makes a difference? Although some seniors do mention that, at least occasionally, do go out without having a specific destination in mind, the majority enjoys going to the coffee shop to socialise and talk with old friends. Going to the church and to a lesser extent to the park were also regular destinations. Herewith some extracts of the discussions held during the interview process:

I usually go to the park, the church and to the coffee shop to socialise!

[Woman, Centro Social Santa Joana Princesa]

I like to go to parties, the market, the coffee shop and the cemetery!

[Woman, Santa Casa da Misericórdia da Murtosa]

I usually go to the park, the church and to the coffee shop to socialise!

[Woman, Centro Social Santa Joana Princesa]

During the interviews, some participants of senior care homes mentioned that they did not feel the need to go outside the facility. In their opinion they did not see any reason to do it as everything they wanted the institutional setting provided:

The services provided by the institution are more than enough to satisfy our needs!

[Woman, Centro Geriátrico Solar das Camélias]

In order to understand this reaction, they were asked to talk about previous activities and places they used to go before moving to the shelter. It was then realised that part of the reason of their reaction was related to the absence those services and facilities nearby the institution. This means that if such places existed in the neighbourhood environment those seniors would most likely go out with those destinations in mind.

Though the services that exist nearby are sufficient, I would not mind to have in the neighbourhood more grocery stores, green parks and specialised physicians, such as in ophthalmology.

[Woman, Centro Geriátrico Solar das Camélias]

Seniors would certainly appreciate to have a greater supply of services and facilities nearby, such as a library, a theatre and a senior's park.

[Personnel, Centro Geriátrico Solar das Camélias]

For its singularity, it is worth mentioning the case of Santa Casa da Misericórdia de Aveiro. Albeit located in a suburban parish, Oliveirinha, this institutional setting is almost isolated from any other facility or service. For example, the nearest services are the GP, the post office and the pharmacy at approximately 2km and the nearest bus stop is 1km distant. Even if a senior decided to take a walk outside and reach those places, the path would turn out to be a difficult one, as almost no sidewalks from the institution to these services have been constructed. Partly due to its geographical

remoteness, this institutional setting provides medical and physical rehabilitation services, as well as a collective transport service for 30 individuals adapted for people with special needs. In addition, several health activities (there is a gymnasium and a swimming pool) and recreational programmes (such as cookery and cinema) are provided by the institution's personnel. According to the institution's director, the facility's isolation from other services or facilities is counterbalanced by the wide range of services provided inside, the existing parking lot (large enough to receive many visitors) and the fantastic environmental conditions. Still, the director acknowledges that the existence of nearby services like a coffee shop and a grocery store or even a chapel would be useful to provide older people an additional stimulus to go outside. Remarkably was the personnel's opinion, stressing that because the institution already provides a broad range of services and activities (some of which are even the result of senior's will) older people would not show any interest in using those services or facilities; in fact, if such kind of services were provided nearby, the benefit would certainly go to the personnel. This position somehow counteracts the senior's opinion, who clearly stated that, even though the institution provides a wide range of services and activities, they do miss shopping, going to the coffee shop with friends or just walking around. Accordingly, if such services did exist nearby, they would certainly use them.

Accessibility: structural needs and barriers

Participants were also asked to mention any problems they faced when they travelled outside the institution. Difficulties walking and fear of falling were by far the main concerns of older people, a position underlined by the personnel's viewpoint as well. This is clearly in line with several other studies, which show that falls and unstable balance are often a devastating problem among older adults, ranking high among serious clinical problems and causing a tremendous amount of morbidity, mortality and use of health care services (Rubenstein, 2006).

Difficulty walking was mainly associated with senior's decreased physical activity levels and the existence of steps and steep slopes in the surrounding environment. In fact, some seniors were reluctant in doing some routes because either the destinations were far away (and no resting or public seats in the path), the physical effort was too demanding due to topography or even because some services and facilities did not have adequate ramps or presented ramps with high gradient levels. Indeed, seniors who have difficulty in lifting their feet or with a visual impairment find ramps easier to use.

The risk of falling stems partly from certain personal impairments, but also from uneven or slippery pavements or even narrow sidewalks. Crossing roads were also another obstacle pointed out by participants, not only due to the road traffic but also because, in their perception, crosswalks were not in the right place. Street furniture was also an issue raised during interviews. The inexistence of resting or public seats, the presence of some urban features occupying most of the sidewalk width, the absence of signs and poor lighting were some of the subjects pointed out. Herewith some interesting remarks made by the participants:

I would like to go out more but I have problems with my vision!

[Woman, Santa casa da Misericórdia de São João da Madeira]

Sidewalks are uneven; I must look to the pavement all the time!

[Woman, Centro Social Santa Joana Princesa]
I cannot use some sidewalks because of tree roots!
[Woman, Centro Social Santa Joana Princesa]
Crossroads are distant!
[Woman, Santa casa da Misericórdia de São João da Madeira]

As most seniors were already familiarised with the local neighbourhood, by the time they moved from their residence to the institutional setting a sense of comfort had been created: they were more aware of existing obstacles for certain destinations. In this sense, when alternatives paths existed, they were able to choose in advance the best itinerary for some destinations, even if the chosen one took much longer than the direct connection would.

These results mean that, in some occasions, older adults are left with a limited choice of destinations both in the surrounding environment (within a close walking distance of the institutional setting) and in what concerns travelling to more distant places, as public transportation is not a viable alternative option. Nevertheless, for some participants this is no problem as they rarely want to travel further than the local environment or even diversify from their regular destinations. And when they do need to travel longer distances, they rely on the institutions transportation.

Because of its peculiarity, it is worth mentioning the case of Santa Casa da Misericórdia da Murtosa. At first sight, most streets in the local neighbourhood have wide sidewalks that allow older adults to easily use the nearby services, such as the church, banks, coffee shops, the market and the post office. The type, quality and colour of the pavement are also ‘friendly’ of those with visual impairments and the street layout provides a potential sense of comfort to the elderly. Peculiarly, thought, the answers from the participants were quite dissimilar: for some, these features provide *an excellent opportunity to go out and feel active and independent*, like one of the participants said; for others, however, sidewalks should be lower and are not that ‘friendly’ for those who use walking sticks. Personnel’s reaction tended to agree with this last argument, stressing that the street’s gradient was too high for older adults. Another issue that was raised during the interview process was the potential conflict with other younger citizens, with whom they felt somehow intimidated. Part of this reason is related with the use of bicycles by many citizens, especially the youngsters: the great geographical conditions and the mayor’s efforts in implementing bike lanes along most roads have contributed to boost a long lasting tradition. However, the use of bicycles on footpaths in same cases and the lack of caution by riders when passing in crossroads create avoidable conflicts and a sense of insecurity amongst some older people.

5 Discussion and conclusions

The aim of this paper was to explore how the neighbourhood environment of institutional settings impacts the behaviour and well-being of institutionalised older people. Working from the discussions with seniors and institution’s personnel and with additional indication from field work, it has been possible to add further evidence to emerging debates on the effect of the built environment in the elderly population. But unlike previous works focused on the idea of ‘ageing in place’ and therefore

centred on older people's residential environments, the major interest of this study consisted in observing the relation between institutionalised older adults and the outdoor environment.

Overall, findings suggest that institutionalised older people value mobility, active lives and social connections and do go out if the built environment of the institution's surrounding area provides appropriate conditions. This clearly contrasts with the idea that senior users of supportive facilities stay confined within the institution's boundaries and that the location of institutional settings is irrelevant concerning geographical proximity to services and sites that may attract the elderly population.

A strong theme emerging from this study is that geographical proximity to services within a 400/500m walking distance or even within an 800/1000m radius settlement can promote less segregated environments. In other words, Institutional settings located near other facilities and services favour senior users to walk around out of doors. Most of the seniors interviewed walked on a regular basis, primarily for exercise, shopping or socializing. And those who were usually confined to their institutional settings due to the lack of services and attractive sites in the surrounding neighbourhood were eager to walk outdoors if a bundle of key services was closely located. The fact that most of the institutionalised seniors interviewed were already familiarised with the place's environment (they either used to live near the senior care home or do live in the day care centre's neighbourhood) may partly contribute to their behaviour.

The positioning of services was also addressed in this study. It would be expected that the presence of a variety of destinations (mixed use) and amenities in the proximity of supportive facilities would be higher in urban parishes than in suburban and rural ones. Still, no major conclusions could be drawn regarding this subject, perhaps due to the sample size. It would also be expected that if services were mixed within the same area rather than dispersed, older people would travel to these destinations more often. However, unless they are just walking around to increase the physical activity level, travel is related to a specific destination, be it the coffee shop, the church or other key service. So, the provision of a bundle of services in the same place does not induce the elderly population to travel more or use more services during the same journey.

Availability of services in the surrounding environment were not, however, the only factor that could hearten or diminish the will of seniors to walk outside supportive facilities. In fact, the pedestrian mobility design was the major concern mentioned by the elderly interviewed. Walking constraints were mainly associated with senior's decreased physical activity levels and the risk of falling due to the existence of steps and steep slopes, uneven or slippery pavements, narrow sidewalks or even the bad positioning of street furniture in the neighbourhood environment.

It is also worth mentioning that, from the interviews, it looked like senior adults were confined to their local neighbourhood. The major reason is that, due to lack of public transport strategies in most places, older people generally do not use these means of transport.

But encouragements beyond the merely existence of services nearby or a good built environment design may well be needed. For instance, the personnel's approach is very important to cheer older people to walk out of doors, especially because some seniors are only able to do it with the staff's support. Clearly, it is difficult to find a correct balance between protection and autonomy, but ideally the aim is to move the elderly person towards maximum possible autonomy (Stevenson,

1996). However, in a couple of cases observed in this study, the personnel did not find any reason for the elderly to go outside the institution's boundaries as the supportive facilities provided all the services they might need. This is an issue that needs to be carefully thought by each institution's director and personnel in order to not undermine older people's desire to go outside the institution. Another issue pointed out during discussion was the existing negative stereotype of the elderly, which contributed to some kind of age discrimination by other citizens.

As described, there are at least four main issues that need to be addressed by policy makers in order to maximise the potential contribution (and minimise the negative impact) of the neighbourhood environment in institutionalised older people behaviour: availability of services within an 800/1000m walking distance, pedestrian mobility design to cheer seniors to walk outside the institution in a pleasant fashion, institution's personnel approach to encourage seniors to walk and society's attitude towards the elderly population (age discrimination). However, thinking about and deciding what is needed in local environments in order to improve the well-being of senior citizens implies including in decision making processes information based on older people's experiences and perception of problems and motivations (OMS, 2007), together with those who use supportive care facilities. Especially since the 90's, citizen's participation in decision making processes has been worldwide emphasised. However, despite opportunities for older people to take part in policy processes are expanding – with references being made to 'grey power' –, the obstacles to their doing so are still challenging (Barnes, 2005; Scourfield, 2007). Although the extent to which this will change is yet unclear, this study shows that institutionalised senior adults are still willing to be active community citizens and can provide important insights for public policy making.

Finally, it should be pointed out that there are some further important issues concerning the location of institutional settings that this study could not provide findings. In future research it would be meaningful exploring how the neighbourhood environment affects differently older people's behaviour according to the spatial location of the institutional setting (urban vs. rural areas). Results could be integrated in more global policy making strategies for urban and rural areas. Furthermore, it would be worthwhile investigating how results can differ according to the type of institution. As most interviewed seniors were from institutional settings that provided residential and day care services simultaneously, no conclusions could be drawn in this study concerning this matter.

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Mobility and Ageing: the Contribution of Simulation Approaches for Spatial Planning

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The ageing of the population is a reason of celebration for the increasing recognition of the "United Nations Principles for Older People"[1] and the general improvement of life quality achieved in many countries worldwide, including several less developed nations. The phenomenon, however, impacts on many aspects of today's society while presenting serious implications also for tomorrow's societies, as "if we do not adapt, it is likely to strain pension and social security systems, increase demand for acute and primary health care, require a larger and better trained health workforce and increase the need for long term care, particularly in dealing with dementia" (World Economic Forum, 2012, p.3). Within the wide debate that since several years is addressing the issue of how to deal with such phenomenon, its challenges and opportunities, this paper aims at focusing on the specific aspect of the main physical and perceptive traits and characteristics of older pedestrians' mobility within the larger issue of providing a sustainable mobility. In particular, the paper proposes the use of "simulation" approaches to assess the performance of urban environments, spaces and transport schemes taking in consideration elderly people's behaviour and needs.

Keywords: mobility, planning, ageing, simulation models

Introduction

One of the pillars of any strategy aiming at the inclusion in the society of elderly people is to foster an "Active Ageing", "a process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age. Active ageing applies to both individuals and groups. It allows people to realize their potential for physical, social, and mental well being throughout the life course and to participate in society according to their needs, desires and capacities, while providing them with adequate protection, security and care when they require assistance" (WHO, 2002, p.12).

Within the discussion on how to foster "Active Ageing", great attention is paid to the issue of age-friendly mobility as "being able to move about the city determines social and civic participation and access to community and health services" (WHO, 2007, p.20). In particular, one of the key questions related to mobility and ageing is how urban environments referring to public space can be designed for better access and more sustainable forms of mobility taking into consideration the elderly age group.

The use of simulation technologies for the support of spatial planning's processes that take into consideration also the elderly pedestrians mobility is one answer to this question. In fact, these technologies seem sufficiently expressive[2] and mature to shape and represent also mobility

[1] United Nations, United Nations Principles for Older People. United Nations General Assembly, 16 December 1991. Available from: http://www.seniorindian.com/united_nation_principles_for_old.htm (last accessed on 04/29/12).

2 With the adjective "expressive", referred to these technologies, we mean that they are, in our opinion, enough versatile to represent various and diversified characteristics of physical movement and perceptions of moving agents. In other words, they allow to model tools at fine a granularity that make possible to define and to capture also complex behaviors.

characteristics of elderly pedestrians, providing useful insights for the design of public spaces and services that match with the needs of the elderly.

Based on what has been explained above, the hypothesis proposed by this paper is that a valid support to define policies to foster mobility of the elderly can come from the simulation technologies. In order to discuss such hypothesis the paper is organized as follows. Paragraph 1 introduces the main aspects of spatial planning investigation and how the mobility problem is tackled, i.e., the adoption of the 'motility' point of view. Paragraph 2 hints at the general issue of an age-friendly mobility focusing on elderly pedestrians. Paragraph 3 introduces agent-based approach that could be applied to elderly mobility planning. Paragraph 4 summarizes some open issues in our knowledge of pedestrians' and driver's behaviour that constitute a limit for our capacity to model and study the problem. Conclusions summarize the considerations and suggest possible lines of research for future works.

1. Planning and Motility for an Ageing Environment

Moving from Albrechts's definition of strategic spatial planning (2004) and discussing the positions of Healey, this paper's first step is to explain the spatial aspects of planning that will be tackled herewith.

Albrechts proposes the following definition of strategic spatial planning:

"*Strategic spatial planning is a public-sector-led (Kunzmann, 2000) socio-spatial (see Healey, 1997 for the emphasis on the social) process through which a vision, actions, and means for implementation are produced that shape and frame what a place is and may become*" [3] (Albrechts, 2004, p.747).

As Healey underlines, a recurring theme is "the role of the spatial planning system in 'integrating' disparate agendas, activities and actors" (Healey, 2006, p.64). In her definition, an integrated approach is like a way of:

1. Linking diverse policy objectives (the search for a beneficial economic, social and environmental "balance")
2. Connecting issues as they play out spatially (for example housing and economic development or land use and transport)
3. Linking different types of government interventions (especially regulatory power and investment power)
4. Overcoming the fragmentation of area – and development – based policy initiatives and the competition between individual projects; or as a way of linking policy with "implementation"
5. Increasing the connections between levels of governments or linking multiple stakeholders in pursuit of an agreed framework or strategy.

[3] Our background in spatial planning considers the approaches of Geoff Vigar Patsy Healey, Angela Hull and Simin Davoudi (2000) Governance and Spatial Strategy in Britain. An Institutionalist Analysis, Palgrave Macmillan; Albrechts, L., Healey, P. & Kunzmann, K. (2003) "Strategic spatial planning and Regional governance in Europe" *Journal of the American Planning Association* 69 113–129; Coaffee J, Healey P. (2003) 'My voice: My place': Tracking transformations in urban governance *Urban Studies*, **40**(10), 1979-1999; Hillier, J. e Rooksby, E. (2005), *Habitus. A sense of place*, Ashgate, London. Balducci, A., Boelens, L., Hillier, J., Nyseth, T., and Wilkinson, C. (2011) "Strategic Spatial Planning in Uncertainty: theory and exploratory practice" *Town Planning Review* **82**(5):595-613.

Another relevant issue to be considered in these processes is “the emphasis on liveability and sustainability for the many and not for the few” (Healey, 2011, p.3). The attention to “many and not the few” means both stimulating involvement of local actors in open decision making processes and adopting what Sclavi (2003) calls active listening of future users’ knowledge and needs.

The capacity to trigger open and inclusive processes of spatial planning and to capture the real needs of future users (elderly pedestrians) is the rationale behind this article, which aims at identifying issues related to the planning processes for older pedestrians mobility, at sharpening the characteristics of elderly pedestrians’ and suggesting technologies respectful of elderly pedestrians’ needs.

The second step taken in the discussion about mobility planning[4] for pedestrians, particularly when related to the elderly, is to clarify the theoretical approach adopted to tackle the problem of mobility. In particular, as it is explained below the attention is on the concept of motility.

Motility can be defined as “how an individual or group takes possession of the realm of possibilities for mobility and builds on it to develop personal projects” (Flamm and Kaufmann, 2006, p.173). The concept comprises all the factors that define the potential to be mobile in space, whether these are physical capacities, aspirations to be sedentary or mobile, existing technical transportation and telecommunications systems and their accessibility, and also previously acquired knowledge (e.g., a driver’s license, learning English for traveling etc.) (Flamm and Kaufmann, 2006, p.170) [5].

Motility is therefore made up of factors relating to ‘access’ (the conditions under which available options can be used), to ‘skills’ (required in order to use these options) and to ‘cognitive appropriation’ (the evaluation of the available options vis-à-vis one’s projects). Kaufmann defined these three groups of factors as follows:

- ‘Access’ is related to the concept of service. This includes the range of conditions regulating price, schedules etc., under which available options may be used. Access depends on the spatial distribution of the population and infrastructure (e.g., towns and cities provide a different range of choices of goods and services), sedimentation of spatial policies (e.g., transportation and accessibility), and socio-economic position (e.g., purchasing power, position in a hierarchy or social network) (Flamm and Kaufmann, 2006).
- ‘Skills’ refer to: physical ability, (e.g., the ability to transfer an entity from one place to another within given constraints); acquired skills relating to rules and regulations of movement (e.g., driver’s licenses, permits, specific knowledge of the terrain or codes); and organizational skills (e.g., planning and synchronizing activities including the acquisition of information, abilities) (Flamm and Kaufmann, 2006, p.171). Motility skills are based upon “only a small degree on formal training or education, and for the most past are learned outside the classroom” (Kaufmann, 2011, p.43).

[4] The recent approaches concerning mobility planning, being sustainable oriented (as EU sustainable urban mobility plan shows), pay great attention to the problems concerning the involvement of stakeholders and citizens, the development of a common vision of mobility and beyond (http://www.mobilityplans.eu/docs/SUMP_guidelines_web.pdf).

[5] As Kaufmann (2006, p. 169) highlights, the “motility concept relates, in certain aspects, to notions developed in the 1970s in transportation science regarding accessibility. Ideally, accessibility is the measure of a place’s attractiveness in relation to its potential to offer opportunities and the resources necessary to obtain these potentials (Ben-Akiva & Lerman, 1985). In more sophisticated versions, accessibility indicators integrate the perception of accessible opportunities (Handy & Niemeyer, 1997)”.

- ‘Cognitive appropriation’ is what actors do with access and skills. It is therefore linked with strategies, values, representations and habits. This is formed especially by the assimilation of standards and values. Cognitive appropriation refers to how agents (including individuals, groups, networks, or institutions) interpret and act upon perceived or real access and skills. It is shaped by needs, plans, aspirations and understandings of agents (Flamm and Kaufmann, 2006; Kaufmann, 2011).

In sum, motility incorporates structural and cultural dimensions of movement, so that the actual or potential capacity for spatial-social mobility may be realized differently or has different consequences across varying socio-cultural contexts (Kaufmann, 2004, p.784). The reason why it is preferable to embrace the theoretical approach provided by the concept of motility lies then in its capacity to be strictly attuned to the adopted spatial planning point of view.

As mentioned above, mobility planning for the elderly is treated like an inclusive social process that to be community sustainable, sharing Albrechts’s, Healey’s and Kunzmann’s approaches has the objective to individualize the main features of potential users like elderly pedestrians. In other words, to rely on a concept of motility that incorporates structural and cultural dimensions of movements means to lay the foundations for open and inclusive planning processes for older pedestrians’ mobility.

To clarify the point of view here adopted, it is important to highlight that investigating *physical access* to spaces and services of public utility includes the evaluation, in terms of attractiveness and usability of services and environments, of the performance and efficiency of the processes that are expected to take place in specific facilities (i.e., the evaluation of transfer and waiting times, of the availability of services like ticket windows or machines, of sign-posting, of the presence of “Vertical Circulation Elements” like lifts or escalators for a fast and comfortable interchange etc.).

The design of public spaces and services should be oriented also to the comfort of the elderly and should take into consideration what elderly people consider preferable or determinant for their choice to use, or not, a specific environment or service. It is therefore important to undertake campaigns of data collection aimed at determining the forecasted demand coming from elderly people that will use an environment, but also their expectations and needs. These could be investigated not only by classic techniques like people counting and profiling (manual or based on video technology), but also employing sociological techniques like diaries of mobility or interviews focused on the identification of what are perceived, by seniors, as criticalities or value added elements that for them constitute a significant difference in terms of attractiveness of a service.

2. Age-friendly Mobility: Main Issues

The interest on elderly people’s ways of life and mobility styles has been growing since the end of the 80’s (eighties). The reasons for such rising interest, proved by the variety of publications related to the topic, are also exposed in many reports published by international institutions like World Health Organization (WHO), United Nations (UN), Organization for Economic Co-operation and Development (OECD), and World Economic Forum (WEF). These documents have shown the main aspects of demographic changes and their impacts on society, cities and economy.

With the aim to better understand causes of increasing concern in elderly people and quoting a document by the World Economic Forum (2012), traits and characteristics of demographic trends are here summarized in few points. “At the global level, the share of those 60-plus has risen from only 8% of world population (200 million people) in 1950 to around 11% (760 million) in 2011, with the dramatic increase still ahead as those 60-plus are expected to reach 22% (2 billion) by 2050. In the same time, the share of those 80-plus has edged up from 0.6% of world population in 1950 (15 million) to around 1.6% of world population (110 million) in 2011, and is expected to reach 4% (400 million) by 2050” (World Economic Forum, 2012, p.7). These trends are due to the maturation of the “baby boom” generation - those born between 1946 and 1964 – (OECD, 2001, p.21), combined with increased longevity and declining birth rates; and they will markedly transform the developed world’s demographics (OECD, 2001, p. 21; WEF, 2012, p. 4).

Strictly interconnected with these topics, a study of the Copenhagen Centre suggests a possible distinction between three groups of elderly: healthy and fresh people; elderly with reduced functions, but who take care of themselves; dependent elderly who are debilitated and require care (Copenhagen Centre, 2008, p.11).

Senior Groups	Characteristic	Most prevalent in the age group	Share healthy and fresh in the age group 2008 (estimate)	Share healthy and fresh in the age group 2020 (estimate)
“Free 2”	Healthy and fresh seniors	55-74	65%	75%
Elderly	Reduced functions, but take care of themselves	75-84	45%	55%
Dependent elderly	Weakened elderly who require care	85 +	25%	30%

Figure 1 - Senior groups classification (Source: Copenhagen Centre, 2008, p.11)

These new generations of elderly people, living longer and better than the previous, will influence the society and the cities in all their dimensions: transportation, mobility, communication, technology and civic participation. The “WHO Age-friendly cities” document investigates how within these fields life will be reshaped by demographic changes and drafts how cities should manage and plan the development of their territories in order to be age-friendly (WHO, 2007). Among the issues considered in the document on age-friendly cities, relevant are the suggestions on: how technology could be improved to be used by elderly people; how the involvement of older people in civic participation processes could be increased; and, how transportation and mobility system could be developed to be more age-friendly[6]. The latter is of interest to this paper, in which we would like to

[6]This is a list of some publications and studies concerning elderly mobility: Mathey, F. (1983) “Attitudes and behaviour of elderly pedestrians” *International Journal of Aging and Human Development* (**17**), 25-28; Sheppard, D., &Pattinson, M. (1988) “Interviews with elderly pedestrian involved in road accidents” *(Report RR98)*

investigate how to allow the elderly people's movements in public spaces more comfortable and smooth.

Introducing the discussion on how to design public spaces more accessible and usable by older persons we wish to clarify first that: 1. Although there are several "seniors groups", defined - as suggested by the Copenhagen Centre - accordingly to their degree of physical and mental independence, our focus is on elderly persons without disabilities; 2. Even though elderly persons without disabilities may be able of taking care of themselves, we should be aware that their ability to move around tends to be reduced and, in proportion to this, the risk to be insecure increases.

Notwithstanding these new elderly's generations are able to take care of themselves, many studies[7] have highlighted that older people tend to lose some skills, and, as a consequence, their safety is more at risk when they are moving around. It is possible to indicate some factors diminishing the elderly persons' ability to move around as: loss of vision and hearing; reduction of motor skills and walking speed; diminished attention and reaction time. The OECD underlines that "the gradual decline of the ability to discriminate fine detail (visual acuity) can lead to problems in viewing oncoming vehicles, traffic signals and signs. With increasing age, the field of view may also decrease and restrict perception of the traffic environment" (OECD, 2001, p.52). This decline reduces the safety and may be the cause of accidents.

Some researchers have also examined the relationship between age-related hearing loss and safe mobility: "hearing deficits may cause problems for older people to localize sounds and ascertain consequently from which direction a vehicle is approaching" (Oxley, Dewer, 2004, p.177). Moreover, Oxley and Dewer added, quoting Carthy (Carthy et al, 1995) that "if visual and auditory information is incongruent, confusion may result and lead older pedestrians to panic" (Oxley and Dewer, 2004, p.177). Panic is another issue to be considered for the safety of elderly people.

With regards to walking speed, it has been highlighted that as people get older, they walk more slowly. A study by the London Department of Transportation underlined that "illness leads to the largest reductions in walking speed, but loss of strength is likely to be a factor for normally ageing people. Changes in leg strength and, possibly, patterns of muscle activity also affect older people's ability to maintain balance and to cope with losing balance. The risk of fall becomes more common in late middle age and its consequences for the elderly can be quite serious, eventually fatal (London Department of Transportation, 2001, p.54).

In addition to the factors diminishing the physical abilities of elderly people to walk, there are issues related to, for example, the maintenance of a high-quality walking surface. In fact, the quality of footpath and pedestrian crossing surfaces and the avoidance of abrupt changes in level and steep

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Crowthorne, Transportation Road Research Laboratory; Safety for Seniors Working Group (1989) "Safety for Seniors: Final report on pedestrian safety" Western Australia, Department of Transport and Planning; Harrell,W. (1991) "Precautionary street crossing by elderly pedestrians" *International Journal of Aging and Human Development* **32** (1), 65-80. Job, R., Prabhakar, T., Lee, S., Haynes, J., & Quach, J. (1994) "Elderly pedestrian behaviour and driver attitudes and knowledge regarding pedestrians" *Volume 2: Driver attitude and knowledge survey and pedestrian behaviour at zebra crossing study*. Report to the Roads and Traffic Authority of NSW Department of Psychology and Soames Job & Associates University of Sydney; Carthy, T., Packham, D., Salter, D., & Silcock, D. (1995) "Risk and safety on the roads: The older pedestrian" *Report prepared for the AA Foundation for Road Safety Research*, University of Newcastle Upon Tyne; Oxley, J., &Fildes, B. (1999) "Safety of older pedestrians: Strategy for future research and action initiatives*" (Report 157) Accident Research Centre*, Monash University.

[7] It is suggested to read also OECD, (2001); WHO, (2007); London Department of Transportation (2001) and Whelam,(2006).

inclines may facilitate elderly pedestrians' mobility and increase their confidence. The OECD provided a list of the measures to be taken to facilitate elderly pedestrians walking: "kerb extensions to minimize exposure time on the roadway; bollards or other treatments to prevent parked vehicles from blocking pedestrian pavements; adequate footpath widths to accommodate all users safely; reliable pedestrian access to public transport, given the difficulties often posed by steps, the customary absence of handrails and access difficulties for wheelchairs and walking frames; adequate pedestrian access to shopping facilities which are often blocked by extensive parking lots or street furniture; pedestrian-only areas where possible" (OECD 2001, p.60).

All the aspects related to the mobility of elderly people, together with construction guidelines designed to provide a more comfortable environment for people that, due to ageing, are experiencing a decrease in mobility and perceptive characteristics, should be taken into consideration during the planning phases of mobility schemes. For this purpose, micro-simulations seem to offer a good opportunity to test, which would be, in specific areas of the environment, the performance of the schemes under consideration by policy makers.

3. Modelling for Urban Environment: the Example of Pedestrian Movement

In consideration to what has been highlighted in previous paragraphs we propose the utilization of *micro-simulation* tools to take into account moving, perceptive and cultural characteristics of elderly walkers in the planning and design phases of public and collective urban environments. We also propose to take into account the concept of motility with specific reference to accessibility and perceptions of aged actors. Simulation instruments nowadays are successfully employed in planning phases of pedestrian environments, yet they are not specifically used to assess schemes designed to take into consideration also requirements for senior mobility.

The study of pedestrian's flows in public and private environments during normal, extraordinary and emergency situations represent a great value for the activities of transport and urban planners, architects and designers. These studies are particularly relevant for the design of crowded environments (e.g., transit stations, arenas, airports etc.) to tackle issues related to the organization and management of large public events (ceremonies, races, carnivals, concerts, parties/social gatherings etc.), but also for the dimensioning and scheduling of specific services.

The investigation of Computational models for the simulation of crowds led to the development of commercial *off-the-shelf* simulators that have proved their effectiveness in supporting urban planners in taking decisions, by offering the possibility to visualize, analyse and quantify predicted crowd dynamics in existent environments or planned designs. These tools, moreover, allow elaborating *what-if* scenarios that cannot be directly observable in reality (i.e., dynamics in structures that don't already exist, service schedule variations not already in place, overpopulation of venues, disruptions or emergency situations, the effect of informative systems or sign-posting not implemented yet etc.). These tools also make it possible to evaluate the effect of alternative crowd management strategies with reference to quantifiable metrics and performance evaluation criteria.

Investigation efforts in this field have produced reliable modelling software that can provide valuable insights; nevertheless we are still far from a complete understanding of the dynamics of the phenomena under consideration. In fact, in relation to crowds, many are the aspects that are still

under consideration, for example the impact of the presence of groups (of different kinds and behaviours) in the overall population of pedestrians, the interaction between pedestrians and other moving entities (e.g., private or public vehicles or bicycles), the interaction with services like information systems, proxemics behaviours in different contexts, non-compliant behaviours to circulation rules and moving habits and characteristic of pedestrians of different age ranges.

3.1 Modelling Approaches

A possible classification of pedestrians modelling approaches could be:

- *flow based* (that rely on the analogy of pedestrian flows and fluid dynamics)
- *particles subjected to forces* (Helbing, 1995)
- specific states of cells of a lattice that constitute the *Cellular Automata* (CA) approach[8]; or
- Agent-Based[9], *autonomous agents* separated from the environment that act and interact with each other and with the environment they are immerged in[10]. In Agent-Based modelling each individual agent can represent a pedestrian or a vehicle, if the target system is a transport network, but it can also represent abstract entities, like services[11].

Generally, the Agent-Based approach can handle a smaller number of entities than other approaches, although it is far more expressive. In fact entities are clearly separated from the environment: heterogeneous agents with different characteristics and behaviour can be shaped, action at distance is possible and agents can represent different entities in the environment, like for example services[12]. Thanks to these expressive capabilities, in recent years Agent-Based modelling has been massively used to assess mobility schemes, particularly because several commercial platforms, based on this approach, have reached a very high level of usability, reliability and predictive capacity. For this reason we will focus, in this work, on this specific approach.

3.2 Commercially Available Simulation Platforms

In relation to the granularity of the description of the phenomenon under study modelling approaches can be distinguished into Micro and Macro. Simulation programs inherit the definition of the formal models they are based on.

Formal models, in fact, can be translated into programs that can run on a computer and that can calculate and predict, given specific input, what will be the result of specific assumptions when a

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[8] Examples of pure cellular automata approach is the work of Blue and Adler, 2000 and Schadschneider et al., (2002). Bandini et al. (2004) and Henein et al. (2005) instead propose and extension of cellular automata approach that includes the possibility to introduce more rules and expressiveness.

[9] For a clear and concise introduction of Agent-Based modelling applied to urban planning consider Batty M., (2001).

[10] For different examples of Agent-Based modeling of pedestrian dynamics, and activities, see Musse et al. (2001), Shao et al. (2007) and Paris and Donikian (2009).

[11] In agent based approaches formal computational models are traduced in software programs that can run on a computer. These programs constitute the simulation platforms (or tools) that can be used by the end users. In these software programs each agent is described by some lines of code and all the agents together can be defined as a Multi-Agent System (MAS). The peculiarity of MAS is that there is not a “central control” that says to each agent what to do, but each agent acts autonomously pursuing its targets. In the opinion of Wooldridge (2002) a software agent is a system emplaced in a specific environment that in order to reach its targets is autonomous and able to perform actions that will influence and modify the environment itself (for other definitions of agent see Ferber (1999).

[12] Zhou S. et al. (2009) propose a classification of the different modelling approaches that doesn’t differentiate between CA and Agent-Based modelling. Although we prefer to keep a line of demarcation between the two, we suggest that their work constitute a very good and synthetic introduction to the topic.

particular model is used to describe reality. These programs can therefore be used to simulate specific scenarios and they are defined “simulation programs”. Their outputs are defined "simulations" that can therefore be defined as Micro-Simulation or Macro-Simulation.

In Micro-simulation models for the study of pedestrian and traffic dynamics each single individual of the system under study, together with their specific characteristics, is represented in the model. This is opposite to Macro-Simulation approach that considers pedestrian’s or vehicular traffic flows as a whole.

Macro-Simulation deals with the analysis of flows (of pedestrians, passengers etc.) and with the provision of specific services (i.e., transports) over a large scale of time and space (i.e., days, months or years, analysed in relation to entire cities, provinces or regions). In Macro-Simulation single individuals, and their characteristics, are not represented because such approach is used for a planning on a higher level (i.e., transports between cities, when service schedule or capacity has to be analysed at an overall level). Micro-Simulation, instead, is used for the shaping of single individual’s characteristics (i.e., speed, size) and for the modelling of their interaction. Its focus is generally on smaller environments. In Micro-Simulation, also, simulation time corresponds to real time at a level of seconds or minutes because its aim is the prediction of the dynamics under study, or of the efficiency of specific operative elements, with the focus also on small portions of space and in specific times that can be analysed in terms of minutes or seconds (i.e., peak minutes performances or transaction times in seconds).

Micro-Simulation is then appropriate for the assessment of mobility when environments, flows and services have to be analysed in their fine details. Inside Micro-Simulation, Agent-Based approach is very expressive and it allows also shaping behaviours and skills of individuals, together with the representation of services’ and environments’ details (i.e., transactions times or physical constraints). For this reason in commercial simulation software often Micro-Simulation means Agent-Based although some definitions of what an agent is might still be controversial and, especially with hybrid approaches a classification is not always clear-cut.

Micro-Simulations based on the above mentioned Agent-Based approach employed in commercial simulation software has reached a sufficient predictive accuracy and its use in transport planning has become a consolidated practice, especially in Anglo-Saxon countries, for the assessment of schemes and the design and planning of urban areas, collective public and private spaces, facilities, services and traffic schemes. Its main contexts of application are:

- Transit stations
- Airports
- Sport venues
- Retails
- Private and public buildings
- Entertainment venues
- Street surfaces and Interchange areas
- Etc.

Micro-simulation based tools are used to assess the performance of proposed layouts of environments, or of different transport and mobility schemes. Pedestrian simulation platforms nowadays allow to:

- Estimate Level of Services (densities and flows, LOS, see Fruin, 1971) in specific areas of the environment
- Evaluate pedestrian dynamics and flows to identify criticalities (i.e., queues, waiting or transfer times, bottlenecks, transaction times, densities etc.)
- Dimension the number of operative components of the environment (i.e., automatic gates, escalators, lifts etc.)
- Evaluate operative procedures and crowd management strategies
- Compare the efficiency of different layouts or configurations of the environment
- Study *worst-case* and *what-if* scenarios that are not directly observable in reality (i.e., effect of delay propagation, crush load arrivals, evacuation times, closure of access or entry points etc.)
- Optimize the positioning of specific services (i.e., retails, toilettes etc.)
- Evaluate the efficiency of sign-posting.

In recent years, among the several pedestrian simulation software that have been developed and launched on the market, Legion[13], Vissim[14] (VisWalk) and STEPS[15] are the more commonly used.

In agent-based simulation of pedestrian dynamics each agent is endowed of:

- Physical characteristics (i.e., space occupation, preferred speed etc.)
- Targets (i.e., purchase a ticket, board a train, reach an exit etc.)
- Perception of the environment (physical obstacles, presence of other pedestrians etc.)
- A set of possible actions (i.e., collisions avoidance)
- A specific schedule
- Etc.

Generally the major part of these platforms allow to import the layout of the environment in a CAD drawing form and to import *Origin-Destination Matrices* of pedestrian flows to populate/inform the model with the observed demand. The demand is usually prepared on the basis of a data collection campaign performed onsite (i.e., people headcounts in a station). Simulation analysis tools allow extracting quantitative and qualitative data from simulation runs. Simulated dynamics can be visualized in 2D or 3D and quantitative outputs can be displayed in the form of charts or maps of various kinds (i.e., space utilization, density, occupancy times etc.). Yet, while the visualization of pedestrians and mobility's dynamics provided by some commercial platforms can be quite advanced it should be underlined that the accuracy of the reproduced dynamics, and the consequent prediction of the performance of the environment and of the services under consideration, relies on the *information* of the simulation model with reliable data and in the *validation* of the model.

[13] Legion software is produced by Legion Ltd. (cfr. http://www.legion.com).
[14] VisWalk is produced by the same company that produces Vissim, PTV AG. (cfr. http://www.english.ptv.de/software/transportation-planning-traffic-engineering/software-system-solutions/viswalk/).
[15] STEPS is a software produced by Mott McDonald (cfr. http://www.mottmac.com/skillsandservices/software/stepssoftware/).

In assessment studies, normally, several different conditions are tested, for the same scheme, and for each condition a new model is built (not always from scratch, but often on the basis of a previous one that is then modified to capture new conditions or modifications or it is simply informed with a different demand). The first model to be built is often the *Base Model*, which replicates the actual layout of the environment (and its components' operational characteristics) populated with the actual demand. Once the Base Model has been validated against real data collected on the field during data collection campaigns, variations of the Base Model (i.e., what-if scenarios that take into account different demand, a new layout or a different schedule) can also be considered reliable. If the simulated environment doesn't exist yet, simulation tools can still be used in the design process and for the comparison of predicted performances of alternative options (layout, services, demand etc.). In this case the demand has to be shaped by comparison with comparable existing environments and adopting demand forecast techniques.

By following these principles and applying modelling best practices[16] aimed at providing instruction for accurately reproducing realistic dynamics through modelling tools, simulation practice has become a consolidated procedure in transport planning to assess the feasibility of proposed designs, transport service schedule and feasibility of wide transport schemes.

3.3 Simulation and Mobility for Elderly Pedestrians

The instruments that we have listed in the paragraph above, nevertheless, have not been specifically used to assess mobility characteristics of aged people in urban environment although they have already been used to take into account movement characteristics and route choices of *PRMs* (People with Restricted Mobility, like wheel chair users, parents with pushchair or small children, impaired people etc.). The walking characteristics (i.e., speed distribution[17]) of different kinds of walkers (i.e., commuters, tourists, participants to sport events etc.) have been profiled through data collection campaigns undertaken in different contexts and have been embedded, for example, in Legion software, together with observed walking characteristics of different nationalities.

Some studies (Dunbar G. et al., 2004) offer a comprehensive review of literature of older pedestrians walking characteristics, while some data collection campaign and investigative studies have been performed to profile speed data of pedestrians belonging to different age ranges, including elderly people (for examples of works on data collection of human moving behaviour in public spaces Willies et al., 2004 and Schultz et al., 2010).

At our knowledge few studies have been proposed to represent elderly pedestrian's characteristic in a simulation environment. Galiza et al., 2011, for example, using the commercial simulation platform VISSIM proposed a simulation study to assess the impact on pedestrian densities of the presence of a specific percentage of senior walkers, characterizing them with a slower walking speed distribution. Simulation output indicated an increase in the LOS in relation to a population composed of adult pedestrians only.

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[16] See *Station modelling with Legion Best Practice Guide* Issued v2 on 3 July 2009 by London Underground Ltd, Transport for London, for an example.

[17] For example in Legion Studio 2011 UK commuter's preferred speed is profiled on a distribution that is "bell shaped" where the highest percentage of people (17%) walks at 1,3 m/s (4% of pedestrians). Lowest speed is 0,9 m/s and maximum speed is 1,7 m/s (6% of pedestrians).

Nevertheless we believe that Agent-Based approach would be sufficiently expressive to give account also of the walking and perceptive behaviour of elderly people (i.e., more frequent rests, longer decision making stops in front of information boards, preference of use of escalators or lifts, reaction times to specific signals or signs, compliance to rules etc.). Also some basic cultural habits could be included in the simulated scenarios. We believe that micro-simulation tools would constitute a strong support to the study and the design of spaces and services for mobility in environments oriented also to guarantee mobility and comfort of elderly people. Nevertheless, to reach this purpose, these instruments have to be used in combination with studies aimed at profiling ageing people mobility characteristics like habits (i.e., group sizes, reaction time to signals, walking speeds, tendency to show up earlier before the departure of a train etc.) and needs (i.e., comfort needs etc.). Moreover Agent-Based approach would constitute a valid tool to investigate and test actual qualitative assumptions on ageing people's walking and mobility behaviour to formulate more quantitative theories.

3.3.1 Traffic Simulation Models and Elderly Drivers

Often pedestrian flows interact with vehicular traffic, and elderly drivers have specific driving characteristics. It is not in the purpose of this paper to go into the details of vehicular traffic modelling, and into the issues related to driving and ageing, but we would like to give a very brief overview of the tools that could be used to investigate pedestrian and vehicular interaction. In fact models that have been developed in traffic modelling area can also be subdivided into categories similar to the ones we have proposed earlier for pedestrian simulation approaches[18] and Agent-based approaches are preferred because of their consideration of individual behavioural aspects of the drivers that may be influencing the overall system dynamics (see, e.g., Beuck et al., 2009). Vissim[19], Paramics[20] and Aimsun[21] are among the most commonly used software for such vehicular traffic micro-simulation as allow to analyse road networks and to evaluate different proposed schemes in terms of: number of stops; journey times; distance covered in each scheme; time spent by vehicles in the network; queue length; delays etc.

The driving behaviour of elderly people has not been fully codified yet; simulation instruments, however, are sufficiently expressive to give account of it. If parameters like reaction times of elderly people, steering behaviour, preferred driving speed, distance of perception of the signals, percentage of compliance to signals and percentages of presence of elderly drivers in the population were formalized and profiled, these information could be used to assess different schemes that would take into consideration the elderly's style of driving, analogously with software for pedestrian simulation. Also, the tendency is towards an increasing integration of the modelling of the two different systems.

[18] See Helbing (1995) for equation based approach. Most CA approaches instead are derived by the seminal Nagel and Schreckemberg model (Nagel and Schreckenberg, 1992).
[19]Vissim is a software produced by PTV- AG (cfr. http://www.ptvag.com).
[20]Paramics is a software produced by Sias and Quadstone (cfr. http://www.sias.com; http://www.paramics-online.com/).
[21]Aimsun is produced by Aimsun (cfr. http://www.aimsun.com/site/).

4. Issues Related to Pedestrian and Driving Behaviour

Plenty are the aspects of human mobility behaviour that require further investigation. Heterogeneous composition and behaviour of different road users (elderly people but also children, disabled, visually or listening impaired, families and groups) should be considered in the planning and design phases of new environments or schemes. For example, walkers and drivers behaviour at crossings has not been fully codified yet. Bennett et al. (2000), for example, in their study on walking speeds at signalized intersections, found that people walk at a slower speed in mid-block crossings. Some noted that pedestrians' behaviours in crossing situations are not easily quantifiable and generalizable: pedestrians, in fact, seem to be keen on taking risky behaviour when they are forced to wait long times at crossings (Dunn and Petty, 1984). Moreover, the probability of pedestrian *non-compliance* with signals seems to increase when signal timing is not in favour to them (Retzko and Androsch, 1974; Crompton, 1979).

On the drivers' side, the yielding behaviour in presence of pedestrians on the road in signalised or not signalised crossings appears to depend on several personal and contextual factors[22]. This kind of studies could be extended to include both elderly walkers and drivers.

Nonetheless, non-compliant behaviours, which in several nations is common habits, has a strong impact on traffic flows and should be considered when defining traffic management systems, to optimize both pedestrian and traffic flows. Although some commercial tools allow defining these kinds of dynamics, little knowledge is available about collision avoidance strategies between vehicles and pedestrians, and cycles, or factors that trigger non-compliant behaviours. Nor are statistics about the frequency of these habits in different cultures. To perform more accurate and predictive studies further data should be gathered in the attempt to formalise these dynamics. The aspects of pedestrians' and drivers' behaviours that have not been formalized yet are still several, and this is also due to the difficulty to collect data in crowded and intense traffic situations (a part from the mere counting). For this reason more investigation on methods for data collection on crowds and drivers (as separate and interacting systems) is needed to inform the models with realistic data and to define more accurate theories that can describe the rules that govern people's moving behaviour. Behaviour of ageing walkers and drivers is a sub-set of this major investigation task.

5. Conclusions

The founding hypothesis of this paper concerns how mobility could be investigated in more detail through the use of micro-simulation approaches in combination with socio-cultural surveys. Mobility in fact should be analysed considering not only the physical movements of pedestrians and drivers, but also the skills and cognitive appropriation of people in movement. This way of investigation could allow planners to better understand what elderly pedestrians want and which are their main needs and necessities, and, as a consequence, could help planning to be more inclusive and community oriented.

The use of Micro-Simulation tools to support the planning and design of urban mobility have nowadays become common practice; they have reached a sufficient degree of reliability to be used in combination with, and, in some studies, instead of, the consultation of designing and planning

[22] See for example the works of Ashmead et al.(2000); Harrell(1993); Guth et al.(2005); Schroeder(2008).

standards. Some of the theoretical models like Wiedemann's model of vehicular interaction (Wiedemann, 1974) or Helbing's social force model (Helbing et al., 1995) for pedestrian walking dynamics, have been codified in some simulation software that are widely adopted in assessment processes of traffic and pedestrian schemes.

The general characteristics of the software platforms described above, generally do not consider the explicit representation of pedestrian's aggregations (groups), proxemics behaviour, or different walking physical, behavioural and perceptive characteristics and habits related to ageing people. We suggest, instead, investigating the expressive capabilities of simulation tools together with the recommendation of attempting to formalize the existing knowledge of elderly people walking and perceptive characteristic into codified profiles. These profiles, in fact, could be imported in simulation environments to capture and analyse the impact on general mobility of the predicted percentages of the elderly, to identify their needs and to provide a design response, in terms of services and space organization, aimed at supporting their mobility necessities. As promising research lines to be considered we believe also: on the one side, on the possibility to enhance expressive capabilities of simulation models to embrace concepts like proxemics behaviours or the representation of groups, and group behaviours, inside the crowd (i.e., Bonomi et al. 2011 and Vizzari et al. 2012); on the other side, on the opportunity to assess also non-compliant pedestrian and driving behaviours, which might have a great impact on overall circulation.

Moreover, the simulation tools so far described have been generally applied only to specific modes at a time (vehicular traffic only or pedestrians only), although very recently a few solutions have been proposed to combine the different modes also inside commercial platforms[23]. It is then reasonable to expect that in the near future the development of commercial simulation software will go towards this direction notwithstanding as of today not all the platforms take into account all kinds of traffic modes (i.e., pedestrians, public transports, bicycles, motorbikes).

In conclusion we wish to underline that the simulation modelling approach could play a role in the decision making process for planning and designing of pedestrian areas, especially by predicting how and when public space becomes more usable by end-users. The final product of this approach, in fact, can provide useful insights to take decisions at local scale (for instance, to decide how planning pedestrians mobility in an interchange area and also contribute to define the guidelines for mobility policies at supra-local levels (for example at National, European levels etc.).

The topic is not new and the role of these instruments in supporting decision-making process has already been explored (Ronald, Sterling, Kirley, 2007). Moreover, some guidelines related to the use of simulation approach to develop spatial planning processes do exist. An interesting case study regards the massive use of pedestrian simulation tools (Legion and Pedroute) that were employed in studies related to the Victoria Station Upgrade (VSU) scheme aimed at the development of Victoria Underground Station and surface area in London, UK.[24]

Another case, although not yet implemented, was developed by CSAI (Complex Systems and Artificial Intelligence) research Centre of the University of Milano–Bicocca: a prototype simulation platform including notions of proxemics behaviour and the possibility to take in account group

[23]Vissim software.
[24]Cfr. http://www.tfl.gov.uk/assets/downloads/vsu-technical-Transport-Assessment-Main.pdf.

behaviour (Manentiet alt., 2011). The work was aimed at simulating pedestrian dynamics in the context of a station of the Mashaer line, in the area of Makkah, during the yearly pilgrimage of the Hajj that attracts over 2 million people from more than 150 countries[25].

Finally, we suggest that solutions to some of the issues concerning elderly pedestrians' mobility are tackled also by exploiting the potentialities offered by the simulation approaches above mentioned. The hypothesis is that the results of survey campaigns specifically aimed at quantifying elderly people's moving characteristics and behaviour could be used to inform models based on these technologies to support policy makers, to take appropriate decisions at local level and define the main aspects of supra-local policies.

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[25] The study of Vizzari et.al focused on the specific area of a newly constructed station, Arafat I. The study focused on the access ramps to the station that, having limited capacity, can't cope with surges of people. Therefore a system of "waiting boxes" was organized to progressively release pilgrims from the waiting boxes in relation to arrival order and train schedule. These studies have not been directed yet at elderly people, notwithstanding the high percentage of elderly people that was reported in those events (http://www.csai.disco.unimib.it/CSAI/CRYSTALS/).

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Beyond an “age-friendly” city: the participation of elders in the social production of space through urban agriculture

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Starting from a working experience in an informal settlement of Cova da Moura (Lisbon) and theoretical approach, this paper aims to question the role of elder community (as defined by WHO) and tends to understand how it is possible to include it in the processes of construction of nowadays urban reality: we observe that elders are often excluded, the existing infrastructures (physical and social) are not adequate to expand their range of action.

Considering the basic concept of “production of space” by Henri Lefebvre, we try to understand how urban agriculture (Cabannes) can be considered as a practice to concretize it, taking in account that the “production of works” should depend from the subject, intended here, elders as urban farmers.

In this sense, we consider like a basic aim the relationship between the individual dimension and the surrounding space, in an ethnographic approach. Thus, the paper focuses on the question of the biological time (Tiezzi, 2005), it means the capacity of a person to adapt his environment (economic-social-physic) and to have real possibilities to develop individual capabilities (Sen).

From urban time to human time, strongly linked through urban agriculture practices by the figure of the elder, we reflect on how top-down and bottom-up dynamics can improve the inclusion of elders in social production of space. We emphasize the necessity of public participation of this population in social processes and dynamics, according with the issues of participatory planning and activism, in order to reduce the distance between public institution and inhabitants. In this aim, the multidimensional characteristic of urban agriculture practices should be taken into account through transversal policies.

Finally, this article tends to contribute to create debate, prospective and critical point of view. It's not about interpreting the world, we should transform it (Marx, these about Feuerbach).

Keywords: biological time, flabby tool, community development, capabilities, social infrastructure

1. Introduction

Since 2008, the percentage of urban population exceeds rural population (UN-Habitat, 2010). The passage from rural to urban, as studied by Henri Lefebvre, makes progressively disappear the whole rural values, know-hows and habits carried by the elders. In cities, mainly in suburbs, we see the practice of urban agriculture, physical witness of this transition as high potential of elders inclusion in the urban community.

The globalization of urban society led by exchange value (Lefebvre, 1968) generates a phenomenon of exclusion of elders at different levels, from community to individual dimension. First, in this system ruled by economy, a typology of “active life” is defined, excluding elders from their productive abilities. At the level of the community and family, often fragmented, the figure of the elder tends to constitute a formal group of “inactive people” in society. This is concretized notably through physical structures of support for elders or in their isolation in terms of social proximity in urban ocean: different than virtual relations. The predominance of “health” measures for this social group contributes to the discrediting of the body, until the own perception of the individual, pushed down to be an “aided people”. These identifications don not consider elders as available to be stakeholders in the social production of the territory.

In the era of globalization (maybe of post-globalization), the analysis of different historic aspects leads to understand that the configuration of contemporary urban geography, underlying the ancient social structure (modern and post-modern era, for example), was changed by institutional level. This dynamic often leads to different forms of unbalance into the action sphere of each urban actor involved (who are the stakeholders in this case?), reflected many times in a *"revolution of practices of citizenship and politic activism from informal origin"* (Sassen, 1996). Sovereignty is changing, in other words, there is a decline in the quality of the relationship between state or municipality (as in Cova da Moura) and territory, the "urban" as understood by Henri Lefebvre: *"The double meaning of the term stems from that 'men' in society produce things (products), now works (everything else). Things are listed, numbered, assessed in money exchanged. And the works? Hardly. Produce, in a broad sense, is to produce science, art, relationships between humans, space and time, events, history, institutions, society itself, the city, the state, in a word: everything. The production of products is impersonal, the production of works is not understood if it does not depend on subjects."*

In this sense, the subjects are glaringly the elders, rather such as farmers (urban). In front of them the government and the local municipality must guarantee their right to be included in a social participation and for this, to exercise really their right to the city (Lefebvre, 1968). We're talking, thus, about the duty from the public institutions to create the basic conditions for this scope -as they're supposed to do for physical and social infrastructure. *"In some areas, a variety of options exist only for people with adequate incomes, and recreation and leisure activities are only available to the rich"* (WHO).

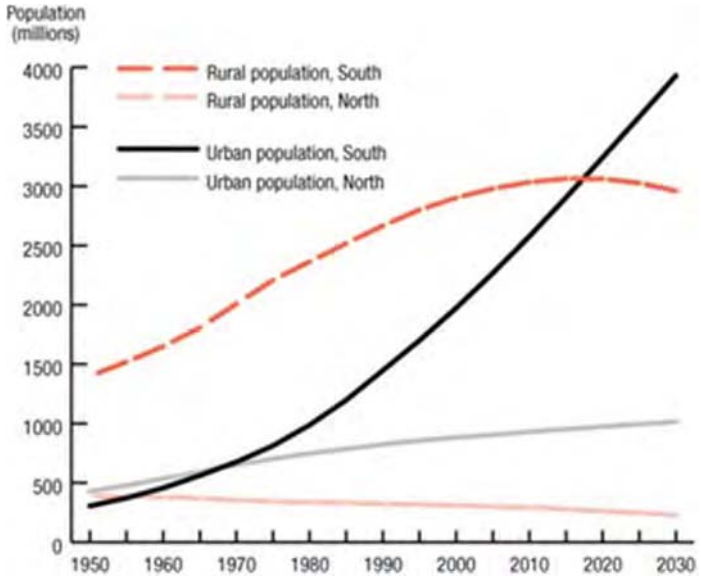

Figure 1 – Graph: Rural an urban populations in North and South, 1950 to 2030 (projected) (Source: UN (2004))

Since two decades, urban agriculture has been widely recognized as an instrument for sustainable planning, mainly in the south countries, where it is linked with the question of urban poverty and food security. In north, it focuses more on the reduction of the ecological footprint while considered as a landscape infrastructure (RUAF). Focusing and crossing anthropological and

demographic approach, the progressive disappearance of urban elders, emigrating from rural world (Figure 1), underlines the emergency of the inversion of this phenomenon. The practice of urban agriculture (Cabannes), activity and product for this population is a potential to acquire the right to the city (Lefebvre), taking in account the will to substitute *exchange value* by *use value*, as a condition to create inclusive urban communities.

2 The concept of Biological Time and its relationship with Urban Agriculture: can it be a "Flabby Tool"?

The passage from rural to urban, as sums up Henri Lefebvre: *"ce qui définit la « société urbaine » s'accompagne d'une lente dégradation et disparition de la campagne, des paysans, du village, ainsi que d'un éclatement, d'une dispersion, d'une prolifération démesurée de ce qui fut jadis la Ville".* What we call nowadays *countryside* is in many cases an image of ancient rural world, what we see as the *city* has been fragmented, exploded and both are today subject to generalization of urban society and industrialization.

Some practices, as urban agriculture, through gests and customs repeated day after day by today's elders, insure partly the transfer of values, know-hows and habits of rural life. Even the process was continuous, practices from rural world have adapted urban reality, making part of it. Replicated by individuals in their new urban landscape – still rural, on the edge of the agglomeration for some of them, already peri-urban for others-, the peripheral environment of cities has been subject to infilling, modifying profoundly its spatial structure.

We should consider the notion of time, such as "biological time" (Tiezzi, 2005) in reference to the dynamic process of the urban context, reflecting on the activity of human (also of elders), for different reasons. First, when we talk about this concept, it means that we assist, in the major part of the industrial, post-industrial (and now in emerging economies) cities, to a sensible and differential gap between the time of human like an individual element and the time of human like and collective element, e.g. through new technology and information systems.

*" So, not only economic theory ignores these concepts, but it introduces another that could be summarized by the phrase" time is money ". Progress is measured by the speed with which you produce, you get even thinking about it as quickly as you seek the resources of nature, the more forward progress. In other words, the faster it transforms nature, the more you save time. But that technological or economic concept of time is exactly the opposite of the entropic time. The reality obeys natural laws other than economic ones, recognizes the entropic time: the faster you consume resources and energy available in the world, the less time remains available to our survival. The technological time is inversely proportional to the entropic time; the time loss is inversely proportional to the biological time" (*Tiezzi, 2005).

If we want to build a form of urbanity as equity, and more like a nowadays structure able to ensure *"the justice like equity"* (Rawls), we have to understand how it is possible to have even less distance between institution (public, that leads the power) and inhabitants of the urban context. If Rawls believes in the essential of the public institution like an "equal structure", it's previously due to consider the individual dimension of each people, to realize and concretize their real objective and ambitions. Clearly this is possible just if the public power, as we already mentioned, guarantee the

second generation rights, namely those that concern the welfare state in a broader approach, to take as a basic, primordial assumption of world (for each people) welfare, first of the concept of customary law.

Therefore, there are two lines of observation and action (top-down and bottom-up), between which we have to give importance to a third line that of temporal line, such as biological time. We're talking about the real time, the time of today in which the energy of everyone in the urban system is considered for its quality (of live) regarding concept like right to society (and to the city, such as intended from Harvey).

In an era of "surmodernité" (Augé), we're continuously affected by the situation of excess, where *"time overhead of events that cover the present and recent past, each of us has or thinks owning the use"*. With this expression, he aims to say that the city of today, such as full of economic and social strong processes, is raised to individuate and create isolation zones, like shopping mall, that turns difficult the subsistence of citizens themselves, especially in the elderly population. And so, they cannot find in the urban context real possibility to exercise their rights to the city, and to produce the different part composing it.

The distance between the speed of actual processes (historical time) and the time of each inhabitant, can be redoubt adopting a different vision, an alternative paradigm of intervention, where the main flywheel of the process can be represented by the "arts de faire" (Certeau) of every people.
The suburbs densification (spatially concretized by buildings, car infrastructures and public spaces construction) never took in account agriculture practices as a part of the planned future, with the idea that image of modernity (the functional city) would replace « archaic » rural world. Agriculture had not its place in the modern city models – expect maybe the « culturalist models » described by Françoise Choay, e.g. gardens cities or workers neighborhood. Beyond urbanism models, intervention paradigms (Athen's Chart) didn't take in account the human/social aspect of the existing situation – in which practice of urban agriculture made part of.

From this concept, there is another consideration that we have to annotate: person has a particular relationship with the space around him and the time that characterizes it. For example, urban agriculture cyclic practice (seasons and years) linked with territory (soil and water). We can say that a kind of appropriation to the space depending, clearly, from the possibility that he has in a originally position in terms of capabilities (Sen) and more, it's possible to using this space in above-mentioned mean.

Basically, building and infrastructure densification caused the decrease of free spaces and reduction of the size of cultivable land, while population density was augmenting: due to these spatial impacts, the cultivable lands typology change little by little, e.g. fields became gardens. Lisbon's peripheric urban agriculture gives a clear example of this process of densification of suburbs, linked in this case with massive immigration of post-revolution context. Pushed by urban densification and survival needs, farmers invented strategies to continue to cultivate where they could. The culture spaces were little by little self-relocated to not urbanized spaces, interstitial spaces (along highways or railways) or private lands.

This already points out one of the particularities of urban agriculture practices: it invents a way to return planned spaces in which these practices are previously not included. In other hand, it results

also a lacks of integration of the activity, for example for the accessibility: when the distance between home and garden (before, field) doesn't augment because of densification, in some cases the way house-garden is troubled by infrastructure or build limits, which can difficult the access to water, central problematic for lot of informal gardens. Years after years, the natural waterways have disappeared in underground networks or have been canalized in open air sewers. While waterlines and groundwater have been polluted by the use of chemicals in surrounding industries or for domestic use, the infrastructures for distribution water had become a norm and the only way to have access to clean water. To sum up, access to water has been privatized, deleting one more link between the urban reality and its natural context, structure and cycles.

The urban agriculture practices has evolved in continuity because being insured day after day, year after year, by the same individuals who observed the progressive urbanization of their environment – which they contributed by transforming it, participating in shaping its identity. To sum up, this technical approach outlined two central problematic of urban agriculture: evolution of land and water access has been followed and underwent by the farmers, human memory of these processes. Two points are so characterizing the elder's experience: agriculture practice knowledge and sensitive knowledge of the territory and its evolutions.

"Social participation and social support are strongly connected to good health and well-being throughout life. Participating in leisure, social, cultural and spiritual activities in the community, as well as with the family, allows older people to continue to exercise their competence, to enjoy respect and esteem, and to maintain or establish supportive and caring relationships." (WHO)

Urban agriculture, seen in the sense of social production of space, participates to a multi-dimensional inclusion:

- as an integrated activity supporting multifunctional land use at the scale of the neighborhood (housing, shops, leisure, ...) which improves the inclusion at the scale of community;
- as an inter-generational activity which improves the inclusion at the scale of the group, the family. This underlines the necessity to take in account urban agriculture as a transversal area and not only spatial (not as simple green spaces, which is subject of a specific division in the administration of the local power). Believing that we must have this objective, the strategies can be many, but the principal line can't consider the practice of planning like this:

"Classic and rational planning, until the mid-1970's (Falaudi, 1978) were supported on the conviction that planning was a technical activity and therefore, ought to be carried out following a logical and deterministic approach." (Carvaco) This aim mustn't be followed in the actual era, in front of multiplicity of lights that composed the city and the urban structure. Re-construct the *"urban form: mentally: the simultaneity. Socially: the reunion (which brings together the products and activities adjoining), which condenses the landscape updating and desanctifying, piece of work, so the nature imposed on a territory"* (Lefebvre).

Reducing the distance between institutional power and people which are living and using the city, rethinking how to embrace the cause of urbanity, outside the different kind of strategies that we can use, should be the principal thought.

This paper tends to demonstrate how the practice of urban agriculture can represent a new form to live the city, especially where there is low income (or very poor, such as subsistence

economy), regarding the elder, and a context like informality, where *"we need to move beyond formality and informality to make progress in understanding the realities of economic activities* [...] *and to design policies to benefit the poor."* (Khasnobis, Kanbur, Ostrom). The importance of urban agriculture aim, in this sense, was demonstrated from a lot of case study and literature. Before, we have to consider it like an invariant structure which may be included in the range of technical instruments municipality policies.

In this sense, it's possible to see urban agriculture like a "flabby tool", as well from physical as from social point of view. This metaphor means that the distance between biological time and urban time (growing city) may be reduced through activities that will dynamize people, such as agriculture in economic crisis context. Flabby, because this tool is distant from traditional (rational) instruments of urban planning, especially regarding the side of economic and temporal sustainability (Figure 2).

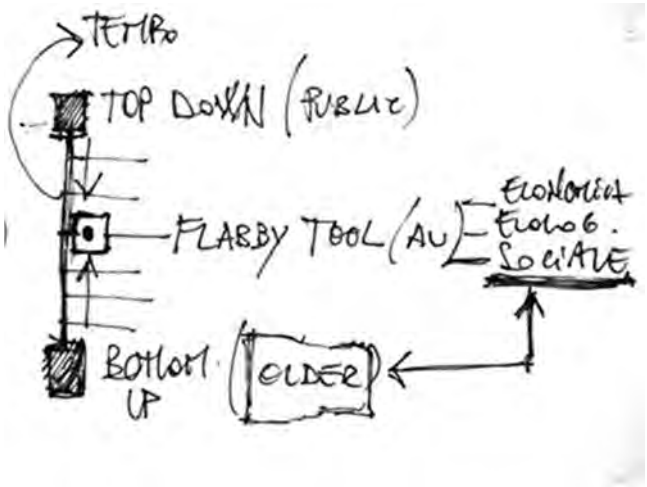

Figure 2 – Scheme : urban agriculture as a flabby tool regarding to top-down and bottom-up temporal approaches. (Source: Alessandro Colombo, Ugo Lorenzi)

3 How to develop urban agriculture as tool for inclusion?

With a holistic vision, urban agriculture may be considered, in this case, from the social side, as an inclusive tool (Figure 3). De-structuring the role of public institution doesn't mean not to consider their responsibility. The structure, like public domain, that represents the inhabitants (in the actual conception) must improve infrastructure for this scope, or better, the people must to follow the idea of participatory democracy. The elders, wrapped in an inclusive vision, must be equipped by flexible tool like urban agriculture, and much, they must to be accepted like its potential stakeholder.

We want to introduce here the concept of land tenure: *"Safety designate land rights (land tenure) that a person or a community have on earth, each of the subjects may have a specific right with respect to a particular use."* (Durand-Lesserve, in Citta Inclusiva).

Translated in the social dimension of urban agriculture seen in a holistic way, it has a similar structure: for example, a community garden, beyond offering an access to the land, to the production of food, gives also access to the city (society).

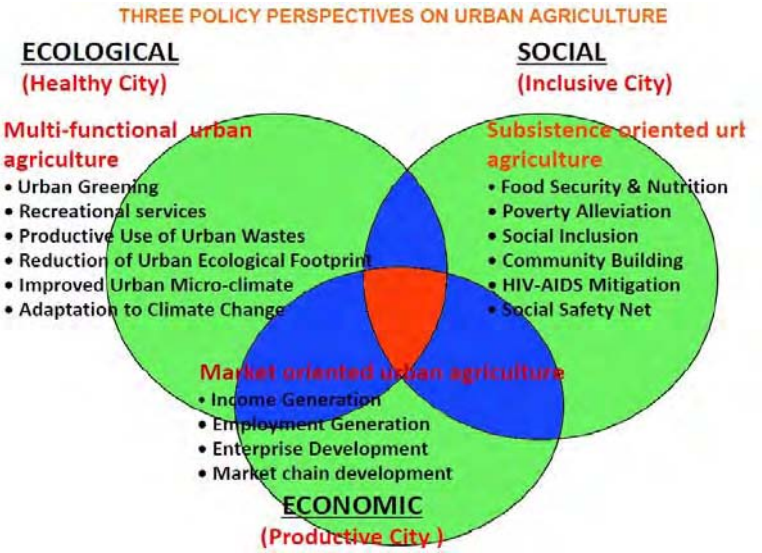

Figure 3 -Scheme: Three policy perspectives on urban agriculture (Source: René Vanhuizen, RUAF, 2006)

If the concept of land tenure wants to consider a methodology such as rigid, it's possible to look at urban agriculture, from the social aim as like as inclusive tool (for older people), in front of other side of economic, intended like productive instrument. Here, we're thinking from the side of a more open society, to go out of the idea that older people would need specific structures, as health center.

Considering this theme, we have to talk about the relationship between the space and the time, referring to each single person and its mode to react to events of the actual urban context, as like as each individual entropy. Today, the people are shifted in front of themselves; they try to be equipped of instruments that bring them closer to the urban dynamics. *"If older people are unable to participate in activities outside of their homes, watching television remains their only source of leisure and connection with society."* (WHO)

This dynamic, happening every day especially in those places which are generated because of gentrification phenomenon (Sennet), seen in this sense from the ideology of globalism without frontiers. These places assume specific characteristics in front of the element of time, because they are less capable of being anthropological in the sense enunciated by Augé: *"each space in which can be read in the inscriptions of the social bond (e.g., when strict rules of residence are dictated) and the collective history (for example, places of worship)"*. This often causes a lack of steady state (probably biologic) that is created and occurs when a place has the spatial-temporal characteristics just mentioned above.

The topic of biological time, therefore, has to be analyzed by various aspects and scales. Beginning from the more actual concept of resilient city, intended such as a system (therefore a community, society) *"exposed to the hazards to resist, absorb, adapt and recover quickly and efficiently, including through the protection and recovery of its structures and functions of urban base. The resilience is defined as a set of adaptive capacity of an urban system in front of stress factors. A resilient city, so, is defined as a city capable of absorbing shocks and / or disturbances without*

suffering any significant deterioration in its functional organization, its structure and its characteristic identity." (ISDR, 2009).

Due to this aim, reflecting to the scale of elder's community, we should see the fundamental and basic structure that has its own internal entropy, the characteristics of intrinsically have a steady state, but today threatened by external events. This "steady state", according to the above concept of resilience, must resist and absorb the external stress factors (such as the progress of urbanization and the emergence of new non-places) not to lose its functional capacity.

To contrast the actual cyclic urban process, like as "creative destruction", we have to take part and support policies that call for emancipation living processes (utopianism alive) such as Harvey says, to downsize the space-time of uneven development that leaves less and less physical space and psychological interactions between people, and hits the weak communities as elders; using *"the practices of ordinary citizens and constituency pressure groups in response to a wide range of challenges in the making of environmentally just and resilient urban transitions"* (Development Planning Unit).

How are the actors of these complementary urbanities related to each other and with the surrounding space? It often joins the same necessity. For example, in the informal settlement of Cova da Moura (Lisbon), Mr.Fernando, farmer from Portuguese origin, declares that he lost his job three years ago and his already advanced age makes his integration in the job market difficult. The appropriation of land for cultivation is due to the primary need of satisfaction of subsistence (six children, eight persons in the household). Similarly, but for reasons of daily living related to leisure, Mr. Damasio (Cabo-Verdean elder) sees his garden as an invariant factor of the last part of his life. The formal properties are the shape of an element or of a relationship, regardless of its content. So it is possible to identify and consider the complex structure of relationship looking it as points, lines and surfaces (Wassily Kandinsky, 1926) and to understand the appropriate methodology to operate in the tensions of the interactions between the parties, understanding "points" as stakeholders on which to rely, lines as relationships and surfaces as the flabby tool which is urban agriculture.

The density of this psycho-physical (agriculture-individual relation) in rural society is a key element in the adaptation of the elderly in an urban community and the urbanity in its self-construction, production of space in the sense understood by Lefebvre. In sociology, the *"values may appear as such guidelines are derived from the ends of human action"* (Bagnasco).

As like as Manderblot Benoit, *"a square has one side in common with an isosceles right triangle, which in turn has the other two side in common with other two squares and so on. The sum of the areas of two smaller squares, the Pythagorean theorem, is equal to the area of the initial square and so are the areas of square that are formed in subsequent steps, added together give the area of the first square. We may have an asymmetric tree simply by constructing a triangle on any side of the first square."*

As like as Foucault ("Microphysics of Power"), everyday practices are used to appropriate the space organized by techniques of social-cultural production. The proliferation of almost microscopic operations (such as small urban gardens cared by the elderly, like in Cova da Moura) within technocratic structures, transformed daily operations through a variety of tactics based on daily details.

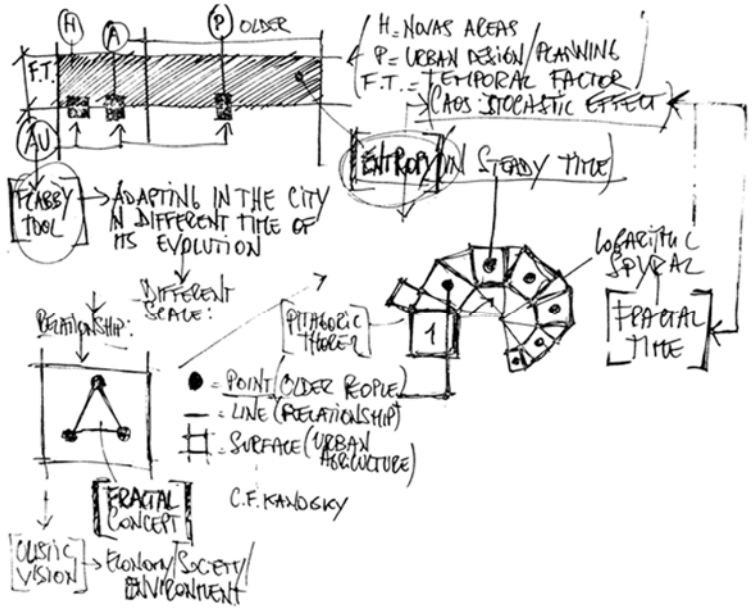

Figure 4 – Scheme: Links between the idea of entropy, fractals and steady time (Source: Alessandro Colombo, Ugo Lorenzi)

"We can see how fractals are influenced by a certain controlled randomness. Introducing some randomness in the construction it could be arranged to leave to chance the decision to create a spiral to the left or right depending on the arrangement of the sides of right triangles. This introduction of small disturbance in the construction of fractals makes them more similar to natural objects such as trees, plants", parallel that we can also apply for urban gardens.

In these terms, we're metaphorically talking about the idea of Michel de Certeau, when he says that *"the individual invents the habitual movement with the daily implementation* [time factor, individual entropy – Fig.4]*, is the space of non-thought, the place where the individual singularizes unconsciously. Through operations strategy and tactics, we define the mode of resistance* [such as urban agriculture] *through which the individual shapes the daily life"*.

Figure 5 – Photography: Informal urban garden abreast the highway, nearing Cova da Moura, Lisbon (Source: Alessandro Colombo)

4 Conclusions

- Could sharing the development of a study case with the "actors of the informal" (Fig.5) strengthen their capabilities and their evolvement in urban process?
- How could institutional powers integrate different though complementary approaches in their models of intervention (top-down/bottom-up)?
- In the context of a fast temporal changes and taking in acount the differences between the generations (rural-urban), could the issue of the urban agriculture be a contribution to increase social cooperation?

The issue of time is clearly linked with the field of urban planning and public policy. In this regard, it is too common to see these issues considering the appearance of "long term" as a primary aspect, with a view to implement certain public actions in time, though perhaps forgetting that we live "in time" (De Carlo) of a determined age. Improve public policies means taking into account yesterday reality to design tomorrow one (the concept of sustainability, as set out early from the conference in Johannesburg), and work in an inter-generational perspective:

"Inter-generational opportunities enrich the experience for all ages. Older people pass on traditional practices and knowledge and experiences, while younger people offer information about newer practices and help older people navigate in a rapidly changing society." (WHO)

Joining the image of the elder with the image of urban agriculture (« the elder with a garden ») can be associated to a forgotten rural past in common representations of urban society. One principal problem in the modern society is not to make the difference between the dialectic city/countryside which existed before, from which subsists the image of the city (build areas) opposed to the image of the countryside (nature, green), whereas nowadays the urban society tends to be generalized, the city as the countryside have disappeared – letting us the freedom and task to invent another «urban». Furthermore, it seems that the nature in the city should be at its image, it means, measured, esthetic, controlled: that's how are conceived the parks, representation and leisure places (not productive spaces done to support the alienating urban economic world) - including leisure spaces in health centers for elders.

We should go beyond these representations and take in account other paradigms including these two dimensions (urban agriculture and elders as potential). Focusing on the elders inclusion, we shown two complementary aspects to develop:

1. Urban agriculture can be a factor to improve inclusion of the elders by their everyday practices; short term policies should support community and household-scaled urban agriculture practices in its multidimensional impacts.
2. In a chapter called *"the participation to the social production of the territory"*, Alberto Magnaghi refers to the inability of inhabitant, reduced to a *"resident"*, to have access to *"producing means of his own neighborhood, city or territory: he ignores the origin of electricity which lights him and the one of his food, the place of evacuation of his trashes until the reasons of his job localization: often, he even doesn't know for who he's working. [ ] For the consumer to be able to participate in the production of the urban milieu, he should own the control of some knowledge and production means"*. Looking at the elders sensitive knowledge of the territory, this definition reinforces arguments to develop elder's active participation through urban agriculture practices for long term

planning and policies; thus promoting the development of elders' capabilities through the mobilization of their environmental wisdom, crossed with innovative sustainable technical tools and approaches.

Taking in account the concept of "origin position", enunciated by Rawls: *"a group of people, without any acknowledgment about its role in the society, talent, intellectual and cultural, psychological characteristics and its own values, must chose according with basic aim must to management a society where they are living. These people are in a position of ignorance. Upon this condition, even if they were totally disinterested regarding a fate of another, the parties must be forced to choose the circumstances for a society in accordance with just criterias"*. This is the base of thought, so, looking at the concept of capabilities (Sen) defined like a start point of a person to obtain his objective, as like as *"have a role in the life of a specific community"* (Sen, 1992).

Capabilities that can and should change during the life, until having a growing implementation of power, like empowerment (Freeman). It means to expand the possibility of a subject (as a person), for him to look at his own capacity to operate in his environment and make choices. From a more practical point of view, we have to analyze the relationship between the actors involving in the decision making and the means they can use. Referring to Cova da Moura, elders often use the practice of urban agriculture like a means to survive, as Sen says *"the relationship between resource and poverty, therefore, is variable and depending mainly from characteristics of subjects and from social and natural environment where they live"*. The importance of the concept of capacitation in the urban agriculture should be related with individual dynamism: we cannot believe in an entirely fair society (formal agreements, Rawls). It also bounds to believe just in the idea of social contract (Nozick, 1961), while the social choices and values of individuals will be concretized in a parallel way to institutional choices. The concretization of both (individual and institutional) is possible through participative processes, where urban agriculture could be the practical tool.

Figure 6 – Strategic map: London CPUL (Source: Boen&Viljoen architects)

From a technical point of view, urban agriculture can be a landscape infrastructure for sustainable cities. The examples of urban design as the Continuous Productive Urban Landscapes (CPULs – Figure 6), concept developed by the dutch architect Andre Viljoen proposes an infrastructure that could give to built landscape a possibility to strengthen partly its connection with the natural territory in which it takes place, integrating different scales: house, building, street, neighborhood, district, agglomeration, territory; thus involving the urban farmer in the whole, linking the elder and his garden to the urban society.

To link innovative urban design approaches with policies, we should look at the example of some southern countries, as Cuba (in a very particular social-political context): *"It is strongly supported by the government, and governmental institutions play an important role in the organization of urban farming. The Havana City Government passed a law prohibiting the use of chemical pesticides in agriculture within the city limits. Thus, the crops are grown almost entirely using active organic methods. In Havana, urban agriculture is a quickly developing sector in which a lot of new ideas and adaptations from producers as well as scientific institutions are tested [...].*

The majority of gardeners already have an official job and farm in their spare time. A large number of the gardeners are retired men and women. The role of women in gardening is remarkable since, in Cuba, agricultural work is traditionally considered to be a man's job. Many gardeners are organized into Grupos de Horticultores -voluntary organizations of gardeners working in the same neighborhood. Today, there are 908 gardeners' groups with a total of 17,900 affiliates. "

Therefore we understand that urban agriculture practice cannot be seen as an isolated tool or policy, it has to be develop in an integrated approach. To take the example of the transports, problematic which apparently doesn't have link with urban agriculture: if the way home-field is very long, transport facilities specifically done for this public should improve the access to the land, in complementarity to urbanistic approach (urban design) and even till architectural project. Other perspectives that could bring urban agriculture (as an integrated practice in society) should be highlighted and supported, because they can also increase the autonomy of elders group (and communities they make part of) from social assistance measures, thus valorizing the figure of the elder; for example, complementary health measures (culture of medicinal plants and development of local transformation sectors) or public spaces self-generating practices.

To go beyond the idea of age-friendly cities is to go beyond the idea of need (often artificially created), beyond the fact to increase elder's inclusion: it needs to put them in a situation where they have a role to play in the urban process, in building resilience for their own families and communities. In the mirror of the respect of simultaneity of natural cycles in agroforestry (regeneration of the soil at different depths), urban agriculture gives this temporal capacity to absorb gap between individuous and urban world (Figure 7), to recreate social time through biological time (e.g. as aim slow cities movements, (s)low technologies opposed to technological and economic time).

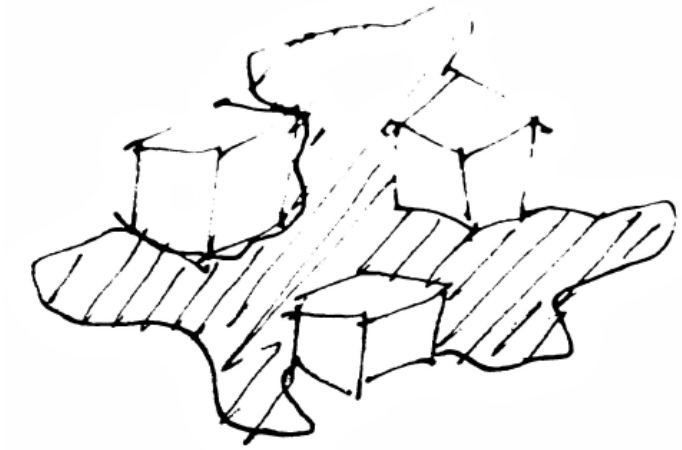

Figure 7 – Conceptual sketch: urban agriculture as a flabby tool (space, time and social levels)

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Age-friendly Cities Performance Index: a management tool

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Population ageing together with urban growth represent the main changing factors in the 21st century world scenario. United Nation Organization (UNO) forecasts show that by the year 2050 the world population for people over 60 years old will reach 2 billion of elderly. Furthermore 68% of the world population will inhabit cities (urban precincts). Aware of the population ageing phenomenon, UNO, held in the year 2002, in Madrid the Second World Assembly on Ageing, defining the guidelines that support the public policies concerning the elderly population in the 21st century. The proposals emerging from this event were based upon a new idea of old age, sustained in the concept of Active Ageing as "*the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age".* Under this scope, WHO conducted a worldwide survey aiming to develop a mobilization tool encouraging cities to become age-friendly cities. Following this initiative a "Global Guide of Age-friendly Cities" was published and launched the "Global Network of Age-friendly Cities" as an incentive to continuous improvement of aged-friendly policies and programs.

The present paper aims to present a brief reflection on the potential of the Age-Friendly Cities Performance Index as a management tool helping decision makers in the "Active Ageing" opportunities optimization of the population, at local level. Research methodology for the present review was mainly descriptive, presenting the modelling of indicators system as a decision-making support tool. From the obtained results, it is clear the importance of the proposed indicator system as a management tool helping public managers in the decision making process regarding the building of urban environments age-friendly.

Keywords: Active Ageing, Age-friendly City, Performance Index, Decision Support.

1 Introduction

Nowadays, the world witnesses two unprecedented demographic phenomena: urbanization and population ageing (Ribeiro & Paúl, 2011; ONU, 2003; WHO, 2007; Muenz, 2007; Kalache *et al.*, 1987). This reconfiguration of the age structure of populations implies the (re) scaling of social demands and therefore the provision of services to meet them. In the context of public services, it is necessary to provide decision-makers with the required information to respond effectively to the demands of such phenomena.

According to the World Health Organization (WHO), increasing urbanization and populations ageing represent the main factors of change on the world stage of the 21st century, representing the culmination of successful human development during the past century (WHO, 2007):

- In 2010, more than half the world's population lived in cities and in 2050 this value will be above 68% (WHO, 2007);
- Demographic projections indicate that by 2025, 82% of the population of developed countries will live in urban areas (ONU, 2003).

  Research shows that the main reasons for the ageing of populations are (Muenz, 2007; WHO, 2002; WHO, 2000):

- Improvements in sanitation, housing, nutrition, and medical innovations, including new vaccines and the discovery of antibiotics, all have contributed to the steep increase in the number of people reaching older ages;
- Adoption of healthy lifestyles and active participation in the care of their health at all stages of life;
- Fertility rates have fallen all over the world, in some cases below the average fertility of 2.1 children per woman, mainly due to the development of effective contraceptive methods and improvement in women's education.

Aware of the population ageing phenomenon, UNO, held in 2002 in Madrid, the Second World Assembly on Ageing, defining the guidelines that support the public policies concerning the elderly population in the 21st century. The proposals resulting from this event were based on a new idea of old age, built around the concept of Active Ageing (Fonte, 2002).

The term "Active Ageing" was adopted by WHO in the late 90s to designate *"the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age"* (WHO, 2002, p. 12).

Based upon the Second World Assembly on Ageing 2002 guidelines, a worldwide survey was conducted by WHO. The survey aimed to develop a mobilization tool to encourage cities to become "age-friendly cities". This initiative resulted in the "Global Guide of Age-friendly Cities" and on the launch of the "Global Network of Age-friendly Cities" as an incentive for continuous improvement of policies and programs. In this context, the "Age-Friendly Cities Performance Index [ACPI]" appears as a management tool to support the decision-makers in optimizing opportunities for health, safety and participation of older people in family and community.

1.1 Local Sustainable Development and Active Ageing

According to Jara (1998), the days of development driven by centralized and exclusionary states are coming to an end. New strategies of local sustainable development are introducing concepts of finite resources, whether natural or financial. Other concepts are social justice and promoting citizenship, democratic and participatory governance, strengthening of the scientific-technological and market competitiveness, self-government and local democracy, partnership and institutional responsibility.

Cities are centres of political, social and cultural activities, and in order to be sustainable, cities must provide the structures and the services that enhance the productivity and wellbeing of the inhabitants (WHO, 2007). In the case of the elderly inhabitants, there is a need to enable the respective means and resources to provide the required support, thus compensating the social and physical changes related to ageing. Making cities more age-friendly is a logical and needed solution, allowing the participation and wellbeing promotion of the elderly urban resident and thus keeping cities a prosperous environment (UNO, 2003).

It is necessary to clarify that, within the concept of intergenerational equity is not to propose that this model with an "Age-friendly City" that is, excluding the other users. Before and, according to WHO (2007), "an age-friendly city is that it is not simply a friend of older people, but everyone, especially the most vulnerable groups. An Age-Friendly City:

- benefits everyone: children, the young and the old

- recognizes the great diversity among older persons
- promotes their inclusion in all areas of community life
- respects their decisions and lifestyle choice,
- anticipates and responds flexibly to ageing-related needs and preferences.

Aiming to help cities to plan actions towards solutions related to Active-ageing demands and the growing pressure of the rapid urbanization process, WHO developed, based on a search with focus groups of elderly, caregivers and service providers in 35 cities around the world, the "Global Age-friendly Cities: A Guide", (WHO, 2007). The following questions were asked to the elderly: "What are the age-friendly characteristics of the city you live in?"; "What are the problems you are faced with?"; "What is lacking in your city to improve your health, participation and safety?".

The mentioned Guide gathers a comprehensive perspective of the essential features of age-friendly cities. In each city, eight topics were discussed in the focus groups. The topics included structures, environment, services and policies that reflect the Determinants of Active-Ageing (WHO, 2007).

According to Almeida (2007, p. 20) the concept of Active-Ageing emerges as a response to society concerns and objectives, namely the increase of social costs related to demographic ageing. This perspective highlights the approach to health as a resource and not a goal, i.e., promoting Active-Ageing should be an objective in itself or a mean to justify postponing older workers retirement age?

Other researchers (Quaresma, 2007, p. 39) view Active-Ageing as governance strategy for the social welfare systems, namely in Europe, aiming to delay or avoid early exits from the labour markets. Social welfare management systems, adapted to a life cycle re-structured and spanned, do welcome an Active-Ageing strategy, stating the right to a safe and dignified ageing.

Programmes and social policies should support Active-Ageing, allowing for (WHO, 2005):

- lesser premature fatalities in highly productive active-life stages;
- lesser disability related to chronic diseases in the "Third-Age";
- more people with better life quality as they grow older;
- more elderly people actively participating in social, cultural, economic and political aspects of society, in paid or volunteer activities and in family or community life;
- lesser costs related to medical treatments and assistance services.

Regarding the solutions to the social needs of population ageing, Almeida (2007) poses the question: "who will set the goals?"; politicians, experts or the elderly themselves? According to the researcher, there are no one-sided answers. But, when it comes to the question of who defines what desirable goals are, if experts or even political decision makers, as knowledgeable of a community best interests, WHO adopted the principle of senior citizens empowerment. As a guideline it is crucial in health promotion, strengthening the importance of the elderly participation in setting priority targets (OMS, 2005; WHO, 2007).

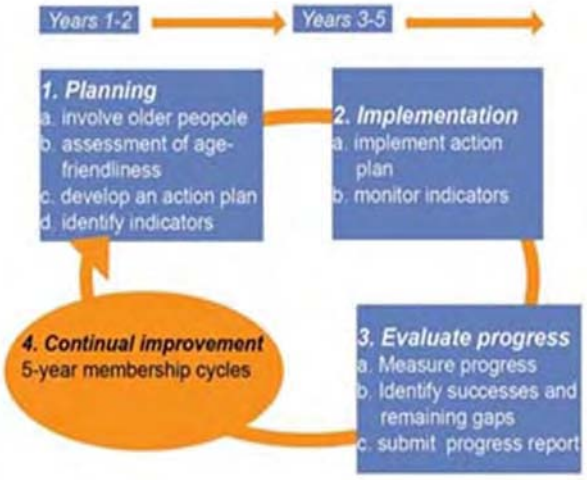
The various organizations working within this matter, strongly encourage senior citizens to organize themselves and thus achieve a "social force" capable to cause influence in the design and application of the policies concerning Active-Ageing (UN, 2007, p. 10).

1.2 The Global Network of Age-friendly Cities

The network is being developed by WHO and partners in several countries on five continents (WHO, 2011). To join the Network, cities and communities are required to commit to the following four steps, based on cycle of continual improvement (PDCA cycle), as follows (figure 1):

Stage 1:
Conduct a diagnosis of city's ability to be age-friendly, involving older people in all stages of the process in order to build a plan of action based on evaluation results. The action plan should be monitored by performance indicators

Stage 2:
Upon completion of stage 1, the WHO will examine the documentation submitted in order to confirm whether the proposed plan is relevant and viable



Stage 4:
If there is clear evidence of progress against the original action plan, the city should develop a new action plan and the city enter into implementation cycles, ensuring the continued participation in the network.

Stage 3:
If the action plan is accepted by the WHO, the city will have a period of three years of implementation during which their participation in the "Global Network of Age-friendly Cities" will be guaranteed.

Figure 1. Cycle of WHO Global Network of Ageing-friendly Cities (Source: WHO (2011, p.2))

1.3 Age-Friendly Cities Performance Index

Decision makers must support the planning of future actions upon reliable information. So, these actors need support tools, obtaining the required information in a fast manner, reliable and using them in an easy understandable way; indicators represent the main factor of such tools (Silva, 2008).

Using indicators as well as their aggregation in indexes has acquired a growing importance in the methodologies used to structure the technical-scientific information, in the original or non-analysed mode. It, thus, allow information to be transmitted in a concise manner, preserving the essential from the original data and using only the variables that best adjust to the purposes and not all the variables that can be measured or analysed. Thus, information is easier to be used by decision makers, managers, politicians, related groups or public in general (Marzall, 1999).

As explained, indicators must be selected in order to provide objective and concise information regarding the functioning of a particular system, to support the decision making process and the management stage and it must be presented according to the target audience as presented in Figure 2.

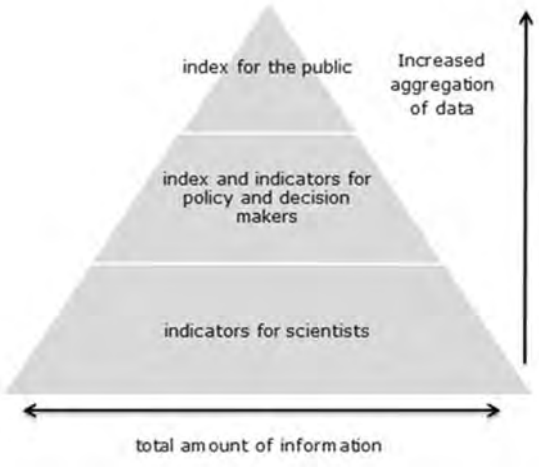


Figure 2. Aggregating data according to the audience (Source: Shields *et al.* (2002), Laura (2004, p. 128))

In other words, data aggregation will facilitate the decision making process through complexity reduction and the diversity of the available information.

The process to select indicators should follow a set of objective, feasible and verifiable criteria that justify the choice made. In general, the following criteria are considered valid: universality, reliability, measurability, consistency, availability, relevance and effectiveness. However, these criteria must be prioritized for every case, or as alternative, assign statistical weights to the indicators that match those different criteria (Silva, 2008)

Indicators are the visible part of the models or set of assumptions concerning the functioning of the phenomena represented. However, these models and assumptions result from the subjectivity of each individual (Meadows, 1998). Therefore, indicators selection should help to reduce the differences between the various ways of modelling reality. However, it should be noted that no indicator represents accurately the real system; they are mere partial reflexes of the reality they aim to represent.

Indicators systems used as information systems to support decision making fulfil many functions and report to short, medium and long period phenomena. They enable access to information already available on relevant issues, point out the need to create new information, used to identify variations, behaviours, processes and tendencies; to establish comparisons between countries and regions within a country; indicate needs and priorities in policy formulation, monitoring and evaluating and, due to their synthesis capacity, are able to facilitate comprehension to the growing public involved in the issue (Silva, 2008; Marzall, 1999).

The ACPI modelling proposal presented in Figure 3 is based on the concept of Active Ageing, whereas the “pillars” safety, health and participation were adopted as dimensions of system.

»»» Information »»»					
Researchers	**Decision makers**				**Public**
Input			**Processing**		**Output**
Parameters	**Indicators**	**Weight**	**Sub index**	**Weight**	**Index**
SAFETY					
$P_{S1}, P_{S2}, \ldots, P_{Sn-1}; P_{Sn}$	$\mathbf{I_S}$ $f(P_{S1}, P_{S2}, \ldots, P_{Sn-1}; P_{Sn})$	$\mathbf{WI_{Si}}$ $f(I_{Si})$	$\mathbf{D_S}$ $f[(I_{S1}, I_{S2}, \ldots, I_{Sn-1}; I_{Sn}); (WI_{Si})]$	$\mathbf{WD_S}$	**ACPI** = D_S*WD_S + D_H*WD_H + D_P*WD_P
HEALTH					
$P_{H1}, P_{H2}, \ldots, P_{Hn-1}; P_{Hn}$	$\mathbf{I_H}$ $f(P_{H1}, P_{H2}, \ldots, P_{Hn-1}; P_{Hn})$	$\mathbf{WI_{Hi}}$ $f(I_{Hi})$	$\mathbf{D_H}$ $f[(I_{H1}, I_{H2}, \ldots, I_{Hn-1}; I_{Hn}); (WI_{Hi})]$	$\mathbf{WD_H}$	
PARTICIPATION					
$P_{P1}, P_{P2}, \ldots, P_{Pn-1}; P_{Pn}$	$\mathbf{I_P}$ $f(P_{P1}, P_{P2}, \ldots, P_{Pn-1}; P_{Pn})$	$\mathbf{WI_{Pi}}$ $f(I_{Pi})$	$\mathbf{D_P}$ $f[(I_{P1}, I_{P2}, \ldots, I_{Pn-1}; I_{Pn}); (WI_{Pi})]$	$\mathbf{WD_P}$	
Conceptual Model			**Numerical Model**		
Indicators selection Researchers & Experts	**Ranking Social & Institutional Actors**		**Standard**		**Aggregation**

Figure 3. ACPI Modelling building

Note:

- ($\mathbf{P_{s1,s2, \ldots Sn-1, Sn}}$, $\mathbf{P_{H1,H2, \ldots Hn-1, Hn}}$, $\mathbf{P_{P1,P2, \ldots Pn-1, Pn}}$) are parameters used in the composition indicators;
- ($\mathbf{I_S, I_H, I_P}$) are indicators (uni-or multivariable);
- ($\mathbf{WI_{Si}, WI_{Hi}, WI_{Pi}}$) are weights for each dimension (**Security, Health e Participation**), attributed by social and institutional actors, representing the subjectivity in decision making;
- ($\mathbf{D_S, D_H, D_P}$) are sub index of standardization of indicators, according to the dimensions of Active Ageing;
- $\mathbf{WD_s, WD_H, WD_P}$ are the final weights for each dimension;
- **ACPI** – Age-Friendly Cities Performance Index.

Age-friendly Cities Performance Index as a tool for systematizing information has the following characteristics:

- The environment for the generation of information is the city;
- The phenomenon studied is the ability of cities to optimize opportunities of health, safety and participation of the elderly;
- The databases of indicators should primarily be available in national and international statistical websites;
- The indicators meet the criteria of: consistency with the local reality, relevance, clarity in communication, participatory construction, scientific consistency, accessibility of data, reliability of supply and capacity for synthesis;
- The hierarchy of indicators should be undertaken by social and institutional actors involved in the phenomenon.

1.4 Challenges for the Construction of "Age-friendly Cities"

Population ageing dynamics is launching a central challenge to modern societies in development policy. Increasingly represents a decisive question in the configuration of the cities that integrate the different realities and the interaction it has with its sustainability and humanization (Belo et al., 2009, p. 16). Table 1 provides examples of barriers and challenges to be faced by decision makers in building age-friendly communities.

Table 1. Challenges to building an age-friendly community (Source: Adapted from Global Age-Friendly Cities Project (District of Saanich, British Columbia, Canada, http://www.saanich.ca/parkrec/community/pdf/Saanich WHOAgeFriendlyCitiesReport.pdf))

Dimension	Challenges
Security	• Poor pedestrian safety and comfort; • Facilitating access for those with disabilities; • Lack of benches and washrooms on pedestrian routes; • Accessibility of public transportation services; • Distance between bus and home or destination.
	• In home mobility challenges impact an individual's ability to maintain independent living; • Lack of support to remain in home as long as possible; • Inadequate awareness of avenues for support for independent living; • The older a person gets, security awareness becomes more prevalent; • Desire for older persons to be invited and involved in community events.
Health	• Health services and community support affordable, appropriate and accessible; • Need to capitalize on partnership opportunities; • Need to consider non-traditional delivery of health services such as outreach services in areas with a high density of older residents;
Participation	• Accessibility is seen as a greater barrier than affordability to social participation by older persons/caregivers and service providers; • Desire for the promotion of social interaction in neighbourhoods and the physical assets to facilitate social participation; • Need for increased opportunities for education and self-improvement in lifelong learning; • Challenges exist related to complex and automated services, and telephone solicitation; • Permit and recognize a contribution of older people for community.

During these 10 years after The Second World Assembly on Ageing and 5 years after publishing the "Global Age-friendly Cities: A Guide", many are the cities around the world searching for initiatives to become age-friendly. Such initiatives may comprehend health promotion actions as well as safety provisions, in order to protect the elderly residents from environmental risks (table 2).

1.5 Final Remarks

The assumptions are presented:

- The phenomenon of population ageing is an indisputable reality;
- Demographic trends resulting in more and bigger cities;
- Concepts are identified, defined and tested in certain scenarios with encouraging results: "active ageing" & "age-friendly city";
- Tools are being designed and will be available: "age-friendly city performance index".

Thus the challenge presented to decision makers worldwide is: "Can cities/communities "grow" to be age-friendly?"

Table 2. Good Practices for Age-friendly Cities

Dimension	Country	Good Practices
Security	Edinburgh	• **National Entitlement Card for over 60s** - The National Entitlement Card, which give free travel on buses throughout Scotland to people over 60 years old. • **EdIndex** - is a partnership between the Council and 20 Housing Associations / Co-operatives in Edinburgh. You can apply to EdIndex by filling in one application form to access available social housing in Edinburgh, including sheltered and amenity housing. Available from: http://www.edinburgh.gov.uk/internet/council/council_publications/council_policies_and_plans/edinburghplanforolderpeople)
	Edmonton	• **Seniors Housing** - Affordable accommodations for low to moderate income seniors' age 65 years and older. • **Seniors on the Go Travel Training Program** - helps seniors feel confidant using Edmonton's transit system. • This two-sided card is to be used as a communication tool to assist the customer in making sure either the ramp is lowered or the bus kneels to assist them in boarding. Available from: http://www.edmonton.ca/transportation/ets/dats_accessibility/mobility-card.aspx)
	New York	• **Home-Delivered Meals** - funded by the Department for the Ageing (DFTA). Eligible seniors (over 60 years old) may choose to receive daily delivery of hot meals or twice-weekly delivery of fresh-frozen meals. Available from: http://www.nyc.gov/html/dfta/html/services/meals.shtml
Health	Edinburgh	• **Dementia Care** - Aims to increase choice and independence for people with dementia or memory problems. Available from: http://www.edinburgh.gov.uk/info/1453/home_care
	New York	• **Home Care Services (Medical Personal)** - Assistance performing activities of daily living in the home such as bathing, transferring, feeding, and/or housekeeping. The older may be eligible to receive DFTA-funded home care. Available from: http://www.nyc.gov/html/hra/html/directory/personal_care.shtml
Participation	Edinburgh	• **Get up and Go** - is an activities and opportunities programme aimed at people aged 50 years and over and living in Edinburgh. Available from: http://www.edinburgh.gov.uk/info/1444/activities_for_older_people/404/get_up_and_go/1
	Edmonton	**Drop-in Groups (Age +60)** - The group combines education and discussion to identify safe relationships and learn communication and limit-setting skills. Available from: http://www.edmonton.ca/for_residents/programs/support-groups-for-seniors.aspx
	New York	**Job Training Opportunities** - New York City wants to make it easier for older persons to work, if they so desire. If you want to find a new job or re-enter the job market, the City can help you with training and placement assistance. Available from: http://www.nyc.gov/html/dfta/html/volunteering/job_training_and_placement.shtml

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Part C. Designing Age-Friendly Environments

An evaluation of age-related outdoor thermal comfort — a contribution for bioclimatic urban design

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Age plays one of the most important roles in determining an individual's thermal comfort as it stands between the physiological and the psychological factors of thermal comfort. Different needs exist between different age groups. Though it is impossible to anticipate the needs of all users, it is possible to combine such differences and minimize the discomfort felt by individuals of each age group. The key is to provide adaptive opportunities. Bioclimatic urban design can provide quite an effective answer here. This paper presents a field survey undertaken in Porto, Portugal, aimed at characterizing two urban public spaces from a morphologic, functional and social perspective, bearing in mind the provision of adaptive opportunities. A questionnaire and observations have been undertaken. Data collected was further related to the paving materials and vegetation level in both spaces in order to understand the extent to which thermal comfort in all ages relates to these two morphologic parameters at site. The main user groups are defined. The way in which the thermal environment of both spaces is perceived by different age groups is considered. The final outcome was that though because of personal parameters such as age it may be difficult to predict accurately what the impact of a given improvement proposal will be on the local microclimate and on people's thermal sensation and comfort, a methodology of analysis encompassing all functional, morphologic, social, and microclimatic factors shaping a public space can help minimising the risks of an intervention to fail in its social dimension.

Keywords: urban heat island, bioclimatic urban design, urban rehabilitation, thermal comfort.

1 Background issues

Throughout the 20th century there was a permanent adaptation of cities to car transportation. However, a consensus is now being reached that in the light of its adverse consequences, rising demand for car travel must be curbed and that this should underlie the spatial rehabilitation of urban central areas (Marques-Clarke 1998, 26). This is the reason why presently urban rehabilitation programs in Europe mainly envision the promotion of more central pedestrian-focused public spaces. The pedestrianization of inner areas of a city means less pollution, less noise, and fewer accidents (Marcus and Francis 1998, 37).

Nevertheless, considering the urban heat island phenomenon and global warming, it may not be effective to conceive a pedestrian public space if it cannot be ensured that people will tolerate its thermal environment. The urban heat island is the direct result of changes in the heat balance of urban areas according to which «air temperatures in densely built urban areas are higher than the temperatures of the surrounding country» (Santamouris 2001, 7). Climate change brings with it an additional heat load, thus worsening the urban heat island.

Thermal comfort, «that condition of mind which expresses satisfaction with the thermal environment» (ISO 2005, 10), in outdoor public spaces cannot be parted from the practice of urban design as the degree and intensity of activities depend on the level of satisfaction or dissatisfaction under the prevailing climatic conditions» (Gaitani, Mihalakakou et al. 2007, 318). It is largely accepted

that thermal comfort is mainly a subjective personal parameter as it is affected by several physical and psychological parameters — different people perceive the thermal environment in different ways. Individual differences can be quite subtle but yet quite significant. Age plays an important role here. It is thus impossible «to specify a thermal environment that will satisfy everybody» (ISO 2005, 10).

The relationship public spaces establish with the elderly is twofold: public spaces can present major opportunities for engagement in activities, relaxation and social interaction, as well as demands for strength, agility, and stamina (required by many activities) which are qualities that the majority of the elderly are in the process of losing (Sugiyama and Thompson 2007, 1943). It follows that high quality urban environments can reinvigorate older adults self-efficacy and attenuate age-related disabilities both at a physical and mental level. A public space project concerned in delivering welfare to the elderly should involve the elimination of physical barriers, the prevention of falls, and the provision of pedestrian amenities. The key here is to attenuate the risks posed to older adults in process of disablement and disabled people in general. Such actions may deal with land-use diversity, street pattern, access to shops and other facilities, paving quality, aesthetics, and safety from traffic and crime (Sugiyama and Thompson 2007, 1950), allowing for older people with physical impairments to better engage in employment, recreation, social interaction, or daily tasks (Clarke, Ailshire et al. 2008, 512).

In the context of a changing climate, the provision of amenities bearing in mind the welfare of the elderly should carefully consider the way in which older individuals perceive a thermal environment. Thermal comfort research in the past few years has brought the notion of the impact of ageing on thermal sensation and health conditions of the elderly. The main impact of age on the perception of a thermal environment is related to the body's physiologic response to that environment: a reduced metabolic rate and a reduced sensitivity of the cutaneous thermal receptors that decreases the body's ability to 'perceive' thermal conditions and to trigger the physiological mechanisms to maintain the body's heat balance — with age, the ability of the body to activate its thermoregulatory mechanisms declines. Amongst the elderly, alternative ways of compensating for the lack of metabolic heat come forward to maintain comfort, such as increasing the clothing levels.

It is the progressive decline of the cutaneous sensory system, which allows the detection of thermal sensations, as a result of ageing that may explain why older people are more prone to thermal comfort and health issues such as hypo and hyperthermia (Novieto and Zhang 2010, 1). This is one of the main reasons for the increased death rates amongst the elderly during periods of extreme hot or cold. In these situations the problem goes beyond thermal discomfort, elderly people can be exposed to real hazardous thermal stress conditions. The less accurate perception of skin peripheral temperature changes in the elderly also explains why even when given control over their environment «the means of attaining preferred temperature by the elderly is less precise than by young people» (Collins, Exton-Smith et al. 1981, 177).

The higher vulnerability of the elderly to changing and extreme thermal conditions is also largely due to changes in body composition (e.g. fat content and distribution, muscle mass, total body fluid, and blood capacity), its thermoregulatory functions (e.g. vasoconstriction or dilation, shivering or sweating) and other physiological parameters (e.g. skeleton, basal metabolism, or cardiovascular

functions). Combined, all age-related changes may compromise the physiological responses of the body and, thus, originate eventually hazardous effects amongst the elderly.

Urban design can create the chances for a positive ageing process: maintenance of independence, social participation, growth, control over one's life, social role functioning, cognitive ability, adaptability, morale, wellbeing and quality of life (Walker 2005, 6, 8). In order to do so it is important that public space projects are sensitive to the needs of the elderly. Faced with the global warming challenge the fit between people's personal requirements with the surrounding thermal environment, and therefore the level of people's engagement in physical and social activities in public spaces, thermal comfort issues must be tackled.

This article highlights the importance of urban design projects to provide the conditions for adaptation. Adaptation is seen as a way of combining different needs amongst users of an urban outdoor public space. The bioclimatic perspective is argued to be an effective way of addressing such opportunities in urban public spaces. Age is focused as the elderly is one of the most sensitive and vulnerable groups to outdoor thermal conditions. This is particularly serious when considering the expected more frequent and extreme heat periods brought by climate change. The results of a field survey undertaken in Porto, Portugal, are presented and discussed.

2 Field survey — method and tools

Age was found to influence people's thermal sensation and, thus, appreciations of thermal comfort conditions in a field survey undertaken by the authors in Porto, Portugal. This study was aimed characterising two public spaces (Poveiros Square and São Lázaro Garden) on a morphologic, functional, social and microclimatic perspective.

Poveiros Square (Figure 1 and 2) is a compact, virtual levelled 2.150m^2 space with a slightly trapezoidal shape and an East-west orientation; it is bordered by a consolidated urban fabric of high density mainly composed of terraced buildings up to three to five storeys high, dating back from late 18th to early 20th century and fulfilling housing and commercial functions; soft-coloured ceramic tiles, renders painted in a wide range of colours and granite applications stand out as the more extensive facing materials of the surrounding facades; the paving materials are granite stone cubes, except in a raised flowerbed and a pool in the square's northern edge; vegetation is barely perceived because specimens are limited in quantity (ten medium specimens) and inadequately positioned in the eastern and northern edges; lighting is unpleasant and trivial; street furniture is limited to the essential (litter bins, lampposts, handrails and bollards); sitting elements are not only uncomfortable from the ergonomic point of view as units but are also positioned in inadequate places and in a limited number (three stone seats facing south and one stone seat facing west); urban art elements are inexistent; shading devices do not exist except for a few sunshades at the two existing cafe terraces.

São Lázaro Garden (Figure 1 and 2) is a 4.570m^2 space with a slightly trapezoidal shape and an East-west orientation and with a flat topography; it is equally surrounded by a consolidated urban fabric with practically the same characteristics as Poveiros Square; the paving materials are bare soil for footpaths, grass and seasonal flowers for flowerbeds; there is a pool with a fountain at its centre; there is a strong presence of deciduous and evergreen vegetation (sixty-four adult specimens), shrubs in a large number of adult specimens, grass, and different types of seasonal flowers; lighting

is unpleasant and trivial; street furniture is limited to the essential (litter bins, lampposts and benches), however sitting elements are adequate, sufficient and randomly disposed throughout the space and from the ergonomic point of view these are attractive for people to sit on; the garden possesses seven sculptures from the 19th and 20th century positioned in suitable (visual) locations; shading devices do not exist, however the density of greenery makes any man-made shading device unnecessary.

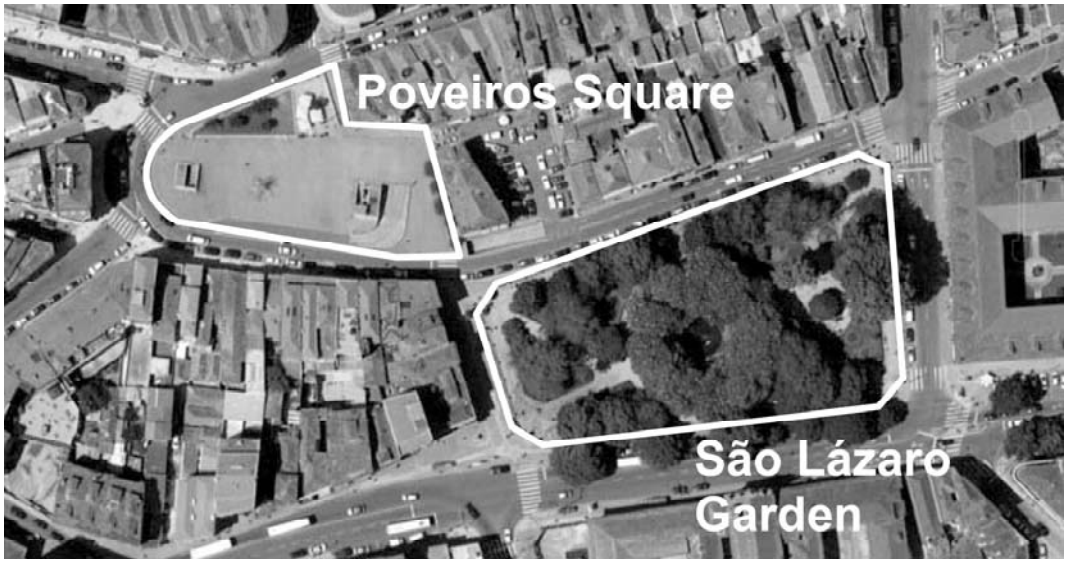

Figure 1. Aerial view of Poveiros Square and São Lázaro Garden. GoogleEarth (26.06.2007)

Figure 2. Poveiros Square (left) and São Lázaro Garden (right)

The field survey was undertaken during the first two weeks of July (the typically warmest month in Porto) 2011. The field survey covered a 15-day period though data collected refers to 10 days, 5 days per space. This is because only days of clear or predominantly clear skies ('typical summer days') were considered for collecting data. The field survey was undertaken between 11a.m. and 2p.m. This corresponds to the daily period when air temperature and solar radiation values are higher, and one of the periods when pedestrian activity outdoors is more significant. The used tools were a questionnaire, observations, and a microclimatic monitoring.

The morphologic and functional analysis of the spaces was performed through the observation exercise, which comprised the filling in of two analysis datasheets: one for functional and another for morphologic parameters. The social analysis, of which the evaluation of the thermal comfort conditions was part of, was carried out through observation and through the questionnaire. The observation exercise consisted of an analysis datasheet for personal parameters such as behaviour, clothing and activity level, position, movements and gender. The questionnaire followed a short-answer and closed questions format and was structured into seven interrelated sections: the ISO 10551 standard five judgement scales; specific questions facing materials and vegetation; and general personal parameters.

A total of 110 interviews, 55 per space, were carried out. It was intended to choose a somewhat heterogeneous sample of users, as this would give a broader and more realistic perspective of the spaces' users. Three clothing types for men and women (usually worn during summer in Porto) were considered from the ASHRAE Standard 55 (2010). People's thermal sensation votes were rated on the ASHRAE seven-point thermal sensation scale; thermal evaluation votes were rated on a scale proposed by the authors (Table 1); thermal preference was rated on the ISO 7730 scale; and the considered thermal acceptability and tolerance scales were those of ISO 10551.

Table 1. The proposed thermal evaluation scale

-3	-2	-1	0	+1	+2	+3
Very uncomfortable (cold)	Uncomfortable cool	Slightly uncomfortable cool	Comfortable	Slightly uncomfortable warm	Uncomfortable warm	Very uncomfortable (hot)

A portable mini-meteorological station was used for the microclimatic monitoring. The microclimatic monitoring, based on the ISO 7726 standard, was aimed at evaluating the microclimatic conditions influencing thermal comfort at the analysed spaces. Air temperature (Ta); relative humidity (RH); solar radiation (K↓); wind speed (W); mean radiant temperature (MRT); and surface temperature (Ts) were the monitored climatic variables. The measurements were made at a height of 1.1 meters above the ground level, i.e. the average height of the abdomen of a standing adult (Standardization 2001, 11). As the outdoor environment is quite heterogeneous, in conformity with the international standard ISO 7726, the microclimatic monitoring was performed at several locations (one different location per day) within each space. The definition of the positions for the meteorological station has been based on spots were people were found to be mostly concentrated, or on main crossing routes. The microclimatic monitoring and the questionnaires were undertaken simultaneously. This allowed associating people's votes (subjective data) to a specific microclimatic condition (objective data). The meteorological station was placed next to the interviewee irrespective of whether they were sitting, standing or passing by.

3 Field survey — results

The undertaken field survey has shown that Poveiros Square was considered to be very uncomfortable space during summer daytime heat-peak hours due to the excess of granite as paving material and the absence of shading trees. In turn, São Lázaro Garden was considered to be a very

pleasant space during summer daytime heat-peak hours. In the end, while the square is barely used the garden exhibits an expressive pattern of use all day long. More specifically:

- The functional analysis has shown that although these spaces do not possess significant functional differences (e.g. typology, access and equality, drainage, water and power supply, night environment, buses, taxis stands, bicycle facilities, pedestrian facilities, or public facilities and services), the garden is successful in promoting a strong usage pattern and sense of community whereas the square does not accomplish this goal at all.
- The morphologic analysis has shown that except for paving materials and vegetation there are no significant morphologic differences between one and the other space: the two spaces are in visual and physical continuity, presenting in common an East-west orientation, an approximate physical configuration though with different dimensions, same placement, same surrounding building density and morphologic characteristics, centrality (with regard to pedestrian circulation), and public services and facilities.
- The social analysis began by identifying the main types of users of each space. This identification does not constitute an exhaustive nor definite categorisation but rather a way of knowing the diversity of ways in which people interact with the Square and the Garden. The identified types of users are presented in Table 2. The characterisation of types of users presented in this table derives from the observation exercise and from questions addressing personal parameters integrating the questionnaire. Beyond types of users and age, other parameters were included and undertaken in the social analysis, such as activity level, clothing level, position, reasons to be at the place, and duration of stay.
- The microclimatic monitoring has shown how two public spaces can present significantly different microclimatic performances, even when side by side, depending on the quantity and quality of vegetation and on the nature of its paving materials.

Table 2. Types of users identified during the field survey

Group	General characteristics
A	Adolescents and young adults using the square as a sort of ‘theatre’ for their social relationships, such as meeting friends
B	Elderly, mainly women (both at the square and at the garden), who rarely come into contact with the outdoor space unless for performing essential daily tasks
C	Adults and elderly (both at the square and at the garden) who use the spaces to a large extent and that are likely to establish with the space such a strong emotional bond that feel somehow partially responsible for its preservation and maintenance; people showing a behaviour close to that of ‘natural surveillance’
D	Young adults, mainly students from the nearby Faculty of Fine Arts, much interested in exploring authentic and secluded places; people mainly found at the most secluded cafe terrace at the square
E	Adults working in firms and shops in the area surrounding the square that only use the square’s main cafe terrace during lunchtime for having a meal or coffee

Though conceived for the same function (accommodating pedestrian activities), the analysed spaces present a dramatically different effective function. The number of people on site is the clearest indicator of how each space provided rather different degrees of attractiveness for pedestrians — while in the square the large majority of people were found passing through the space, in the garden people were found sitting (alone or in groups) for hours. The field survey allowed understanding that this behaviour is related to the microclimatic amenities provided by each

of the spaces. The combined results of the morphologic analysis, the questionnaires, and the microclimatic monitoring have shown that the differences in the nature of the paving materials and level of vegetation directly influence the spaces' thermal performances and, thus, the significantly different patterns of use between the analysed spaces.

It was observed that the square has a higher degree of social variety than the garden. From the six types identified at site, all of them were found in the square whilst only three were found in the garden. Nevertheless, there are much fewer people using the square than the garden. Though the user types identified in the garden are restricted to groups B and C there are a much more significant number of people per group, especially from group C, than the total number of people present in the square. The difference is that in the square people did not stop for any reason at any time of the field survey (except under the cafe terrace sunshades, which however only provide a limited facility dependent upon drink/food consumption), whereas in the garden the large majority of people were found sitting for long periods of time.

Once identified the main types of users of the analysed spaces it was then important to understand the extent to which people were feeling satisfied or unsatisfied with the thermal performance of the spaces they were in — comfort evaluation. In the square the majority of votes on the thermal sensation scale were divided between 'hot' (53%) and 'warm' (40%), indicating discomfort in the thermal evaluation scale. 7% fell on the 'neutral' category. In turn, in the garden the great majority of votes (82%) fell in the 'neutral' category, indicating comfort in the thermal evaluation scale. 18% reported a 'slightly cool' sensation. Consequently, in terms of activities held in each space, 64% of interviewees were found walking moderately in the square whereas in the garden the same percentage was found quietly seated. The votes given on the thermal acceptability and tolerance scale further confirm the votes given for the thermal sensation and evaluation: from the thermal acceptability scale it stands out that 93% of users at the square considered it as a 'clearly unacceptable' thermal environment, and that 91% of people at the garden considered it 'clearly acceptable'. The votes given in the thermal tolerance scale were even more extreme in the square with 27% of people considering it an environment 'very difficult to tolerate' and 73% as 'intolerable', whereas in the garden 100% of interviewees considered it a perfectly tolerable space. 'Walking moderately' (9%) and 'walking slowly' (27%) activities at the garden correspond to older people strolling or older and younger adults crossing the garden while performing daily tasks.

The votes given on the thermal sensation, evaluation, preference, acceptability, and tolerance scales show that the large majority of interviewees considered Poveiros Square as a very uncomfortable space during summer due to the excess of granite as paving material and to the absence of tree shading, whereas São Lázaro Garden was considered a very pleasant space due to its soft permeable natural facing materials and intense vegetation.

While the square has hard impermeable paving materials and the near absence of vegetation, the garden presents soft permeable natural paving materials and intense vegetation. More precisely the hard paving of the square accounts for 95% of its area while the garden presents 96% of natural, soft surfaces; while the square has 5% of permeable and 95% of impermeable area, the garden presents 96% of permeable area and 4% impermeable area. With respect to vegetation, the square's discontinuous green coverage is 4% whereas the garden presents a continuous green coverage

occupying 76% of its area. Also the percentage of green surfaces assumes quite sharp values: 5% in the square and 39% in the garden. Moreover, the 61% of non-green surfaces of the garden relates to soft-paved (bare soil) areas whereas the 95% of non-green surfaces of the square relates to hard-paved (granite) areas.

These morphologic characteristics clearly relate to the data obtained for the microclimatic monitoring — although all climatic variables presented some differences between one and the other space, with the garden presenting lower values than the square, the most significant differences between the two spaces were found in solar radiation. Air temperature differences were not significant. Though the garden presented lower air temperature values, around 1-2°C less than the square, and though people can feel air temperature differences within that range, air temperature in one space and the other was basically the same. In turn, solar radiation presented dramatically different values. This is in compliance with previous studies such as that of Ali-Toudert and Mayer (2007), which confirms that air temperature alone is not appropriate for the assessment of outdoor thermal comfort. It can thus be said that people's thermal sensation and thermal evaluation votes were primarily related to solar radiation levels at each space. People's votes for the most unpleasant climatic variable at the moment of the interview at the square further supports this perspective as votes were largely made for solar radiation.

Because solar radiation is much higher in the square and because of the different nature of the paving materials of each space, the Mean Radiant Temperature (MRT) and pavement surface temperature were the two other (microclimatic) variables showing the highest differences between one space and the other. In turn, the higher MRT and surface temperature exacerbates the already thermally stressful effects of direct solar radiation on people in the square. As expected, vertical surfaces were found to have little or no influence on MRT and thus on people's thermal comfort due to the low H/W ratio of both spaces.

Considering the differences in solar radiation, MRT and surface temperatures of the ground between one space and the other, and that the only morphologic differences between them are the level of vegetation and the nature of the paving materials, it becomes clear that these two morphologic parameters are actually at the basis of the contrasting microclimatic performances established between the two spaces: vegetation provides shade which reduces the amount of solar radiation reaching ground level. Less solar radiation striking a space's surfaces together with soft paving materials keep the ground surface cooler and thus MRT lower. Such is the case of the São Lázaro Garden; such is the reverse at Poveiros Square. Such an assertion is substantiated, for instance, by the values recorded for the horizontal surface temperatures in sunlit and shaded areas at each space: in the square an average value of 37°C for sunlit areas contrasts with 16°C for shaded areas; in the garden while in areas exposed to sun 31°C was the average value, for shaded areas this values dropped to 17°C.

It should be emphasised that though the nature of the paving materials is clearly important for the microclimatic performance of the analysed spaces, it is also clear that the absence or presence of vegetation has played the most important role in defining the contrasting thermal environments of the square and the garden. This had mainly to do with the capacity of trees to restrict solar radiation reaching the ground surface (shading). The benefits of evapotranspiration in cooling down air

temperatures did not have the same role. This was shown by the fact that air temperatures in each space were not significantly different.

It has further been noted that the square presents no adaptive opportunity so people are not able to cope with its thermal performance. There is some shade provided in the square. Nevertheless, this shade is only provided in a narrow band at the eastern edge of the square and for few hours in the morning (till around 11.30a.m.), and occasionally (sunshades) at the cafe terraces. In turn, the garden presents adaptive opportunities to a greater extent. Indeed, vegetation provides an interesting balance between sunlit and shaded areas. Still, a significant number of interviewees at the garden considered it not absolutely comfortable. This percentage (18%) is accompanied by a significant number of people at the site above 55 years of age.

4 Discussion

The square is mainly used by people between 25-34 years of age (45%). The categories of 35-44, 45-54 and 55-64 years of age share relatively equal percentages of the total, between 14% and 16%, whereas people over 65 years of age only contributed 4%. Children, adolescents and people between 18-24 years of age together represented 8% of the sample on site. In the garden there is a clear predominance of people above 55 years of age. The categories 55-64 and those over 65 years of age together account for 45% of the sample at the site. The remaining 55% is somewhat evenly shared between the 18-24, 25-34 and 45-54 years of age categories, with the exception of the 35-44 class which only accounts for 4%. The people willing to use each space present basically the same characteristics. So it is not that the square has less potential older adults or the garden less youngsters willing to use it. The significant difference between the prevalence of users' age groups in one and the other space is rather due to the conditions for permanence offered to people by the space's physical layout. This means that there are more elderly people in the garden because its physical layout provides much more thermal amenities than the square. The 95% of long-term activities observed at the garden is a consequence of the microclimatic performance of that space with relation to the predominant age group: the elderly. Older people are not able to tolerate the square's thermal conditions in summer and tend therefore to use the garden as this space presents the necessary microclimatic amenities for thermal comfort to be experienced. In turn, the excessive exposure to direct solar radiation combined with the absence of any microclimatic amenity at the square impairs older people to use this space even if these are willing to use it. Consequently, during daytime heat-peak hours, people, especially the elderly, tend not to spend beyond 10 minutes at the square. Even younger groups were not found to remain at the square much beyond 10 minutes. Thus, low metabolism activities ('walking moderately', 'walking slowly' and 'standing relaxed') account for 96% of the activities held at this space.

The differences on the way youngsters and the elderly feel a thermal environment can lead to significantly different appreciations of a public space from a thermal comfort perspective. An experiment undertaken by Schellen, Lichtenbelt et al. (2010, 282) has shown that for the same constant temperature and clothing level, the elderly preferred a higher ambient temperature than youngsters, and that thermal sensation of the former was generally 0.5 scale units (on a 7-point thermal sensation scale) lower than that of younger adults. These differences entail different needs

and expectations for that space. In turn, this can determine to a large extent a space's usage pattern. Wherever the elderly is the dominant age group present in a space, this cannot be neglected. The analysed spaces illustrate this importance as its surrounding areas are mainly inhabited by people above 55 years of age.

Relating the answers given for each thermal comfort scale to people's age it was possible to associate the percentages of votes with specific age groups. The interesting fact here is that for the thermal sensation scale, although 82% of people voted for the 'neutral' category in the garden, 18% felt 'slightly cool'. This means that though the garden was considered by a large majority of users as a very comfortable space (82%), there were still some exceptions (18%) to this major trend of votes. The 82% of people referring a neutral thermal sensation corresponded to people within the range from the '18-24' to the 'over 65' years of age groups; and the 18% referring a 'slightly cool' category of the thermal sensation scale and preferring 'a little warmer' temperature fully corresponded to the 'over 65' years of age group. This is related to the fact that older individuals have a lower body temperature than younger age groups due to a reduction in basal metabolic rate, cardiac output, body weight, body surface area, and height (Novieto and Zhang 2010, 44). It is important to notice that in terms of thermal preference, within the 18% of interviewees feeling 'slightly cool' in the garden, half of these stated that such conditions were their preference and, as such, they were experiencing comfort.

The 18% of votes not falling in the 82% main trend of votes qualifying the garden as a comfortable space highlights the need for urban design to regard thermal comfort evaluations as dependent upon many personal factors, amongst which age is only one. Urban design should therefore come up with effective urban design solutions for integrating the largest number possible of needs and expectations; spaces meeting the conditions for thermal comfort for all age groups should be provided; people should be given the opportunity to adjust to their thermal environment. Thermal adaptation is the key here.

From a physiological point of view, thermal adaptation refers to the gradual decrease of an organism's response to a stimulus. From a physical/design perspective, thermal adaptation refers to the capacity of an outdoor public space to offer its users the opportunity to choose between different thermal conditions, e.g. more or less exposure to solar radiation or to wind. In the context of climate change adaptation can be defined as «the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with consequences» (Wilson, Nicol et al. 2008, 32).

Irrespective the variability of the climatic agents and personal evaluations and preferences, public spaces can offer significant adaptive opportunities when properly planned designed and maintained (Handley and Carter 2006, 64). Providing adaptive opportunities in a context of global warming can be effectively achieved through bioclimatic urban design.

Bioclimatic urban design broadly deals with adapting each plan to the unique local conditions of climate and territory providing protection from negative aspects and exposure to positive aspects of the climate (Nikolopoulou and Steemers 2003, 101; Higueras 2006). Bioclimatic urban design can thus represent an effective way of designing spaces adapted to global warming and integrating a large number of potential different users. It should be highlighted however that a universal fix model

for microclimatic improvements cannot be established: one same solution may or may not be desirable in two places with different climates (Cortesão, Alves et al. 2009, 107). Bioclimatic urban design does not specifically address the needs of the elderly. However, it has come up with important considerations that relate to the needs of older people in public spaces, namely the provision of thermal comfort and adaptive opportunities.

Urban designers can improve thermal performance of public spaces through topography, buildings, facing materials, trees, and water features (Tojo 2007, 207-210). However, in compact urban fabrics such as the area where the analysed spaces fit in, as the hard structure cannot (or can rarely) be changed (Environment 1996), changes to facing materials and vegetation are potentially the most likely to happen. The reason is that facing materials and vegetation can produce results through 'lighter' interventions, in comparison to the other parameters. The importance of a combined program of albedo modification and tree planting has actually already been acknowledged as an easy way of conserving energy, saving money and eventually reducing air pollution (Rosenfeld, Akbari et al. 1995, 260). The importance of facing materials and vegetation was confirmed by the undertaken microclimatic monitoring.

Increasing the albedo of urban surfaces and increasing vegetation density can create better conditions for thermal comfort by reducing the heat load placed upon people and the space's surfaces. This is the first step for ensuring that people, especially the elderly, will be able to use a space during summer. The second step is the provision of adaptive opportunities at a physical level, i.e. the possibility to alter the space in order to improve comfort conditions (e.g. opening a sunshade, or moving a chair).

It is interesting to note however that even the provision of adaptive opportunities in a space is not an absolute way of guaranteeing the thermal comfort conditions for all users. For instance, despite the fact that São Lázaro garden made possible for people to choose to sit in sunlit or shaded areas, there was a certain inertia for people to move from an 'uncomfortable' to a 'comfortable' position. This ended up impairing people from benefiting from the adaptive opportunities provided by the garden. The 18% of people indicating that their thermal condition was not entirely comfortable shared common natural ageing effects. In this case, these effects were of a behavioural nature, leading to a reduced precision of people to adjust to a thermal environment.

5 Conclusions

Whenever public spaces are conceived for hosting long-term pedestrian activities, the decision for staying in either space is the ultimate indicator of their success or failure. The quality of the microclimatic amenities provided cannot be underestimated here. People's actions and answers to the undertaken questionnaire confirm that the success of the garden and the failure of the square, on a thermal comfort perspective, are related to their physical layout, particularly to their paving materials and level of vegetation. The types of users, age groups, activity levels, clothing levels, positions, reasons to be at the place and times of permanence alongside other personal parameters: show that people give a much more expressive pedestrian meaning to the garden than to the square. São Lázaro Garden, however, constitutes an interesting example of how a space considered by the majority of users as very comfortable during summer can still have a number of users not feeling

entirely comfortable. ‘Exceptions to the rule’, which are introduced by age but also by gender, geographical origin, individual health conditions or any other personal parameter, determine that analysing and improving the thermal comfort conditions of a space will require a careful evaluation of the type of users.

The more balanced the thermal performance of public spaces and the more adaptive opportunities are provided by the space’s layout, the more pleasant the site will seem to users and the easier it will be to tolerate its thermal conditions. The more tolerable the thermal conditions of a space are the more that space will allow for people to be significantly engaged in outdoor activities. It should be pointed out that the adaptive opportunity is not exclusive to thermal comfort but rather transversal to all the parameters contributing to the overall quality of urban public spaces.

There is no optimum level of outdoor thermal comfort that can be identified as a goal to achieve because it is impossible to anticipate the exact factors that will be at stake in a given space, whether climatic, morphologic or social. It may be difficult to predict accurately what the impact of a given improvement proposal will be on the local microclimate and, to an even greater extent, on people’s thermal sensation and comfort. Such analysis can be better conducted after a scheme is completed and ‘matured’ with time, management and use. Evaluations of thermal comfort for an open public space can uncover several deviations from a main trend of votes or preferences. Many factors can underlie such deviations amongst which age is only one.

Though it may be difficult to predict accurately what the impact of a given improvement proposal will be on the local microclimate and on people’s thermal sensation and comfort, considering all functional, morphologic, social, and microclimatic factors shaping a public space can help minimising the risks of an intervention to fail in its social dimension. The tangible task of urban design in this context is to integrate the needs of as many potential users as possible — to help creating the conditions for people’s welfare in urban areas and to provide adaptive opportunities in a warming world.

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Outdoor thermal comfort study of urban areas in Madrid

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One of the indicators for assessing sustainability in neighbourhoods is the environmental quality of open space. This study reveals that the environmental condition of open space is directly related to its use and by improving the urban microclimate outdoor space use, cities will be revitalised. Modelling the energy balance of a space helps evaluate the effect that the physical environment and the presence of vegetal elements has on thermal comfort.

Unlike indoor studies, the steady state models of thermal comfort (Fanger) in outdoor space tend to overestimate the sensation of discomfort. Currently there is no single internationally recognized model that can describe thermal comfort conditions in outdoor spaces that is available for different types of applications, such as urban planning, climate therapy, warning systems, information for tourists, etc.

It was with this objective that the Universal Thermal Climate Index (UTCI) was developed from the COST 730 action research activities based on the Fiala physiological model. At the same time, Actual Sensation Vote (AVS) parameter for the evaluation of the thermal sensation in urban design was used in the RUROS research project.

The research work presented in this study consists in comparing the values obtained from the two comfort indices, the UTCI and AVS, as applied to a case study in Madrid.

The case study is located in the suburban residential neighbourhood of Moratalaz in the south-eastern part of the city, an expansion area urbanized in the 1970´s in accordance with principles of rationalist architecture. The climatic values were estimated using the ENVImet simulation program, software created for the three-dimensional modelling of urban microclimate. The project calculates comfort values in 2 separate space in two conditions: in winter (2010 December 21th) and in summer (2011 August 15th). The climatic parameters needed to calculate the comfort index are determined through the use of the 3D ENVImet simulation tool. Six different stations have been fixed in the study areas, and for each one, the thermal comfort values are chosen for a 12 hour period in summer and winter conditions, determining time lapses from 9:00 a.m. to 9:00 p.m.

The results obtained in summer, show that the mid-day hours produce a state of heat stress, and a comfort range is achieved only during early morning hours and in the late afternoon. This condition is not uniform over the whole study area. In fact, significant differences between areas with trees and the areas without any protection could be appreciated. Between the two parameters analysed, the results obtained by the AVS are homogeneous while the UTCI shows a wider response spectrum. The results obtained by the two indices in the winter analysis are similar with a condition of thermal comfort being maintained during most of the day.

The analysis of mean temperatures in the Madrid climate shows that the summer season produces greater discomfort. To check the model and compare the results, we then introduce the sweat rate physiologic index, adopted as a comfort parameter to validate the ambient conditioning of Seville Expo 92 in the summer condition. The sweat rate is a physiological parameter that expresses thermal stress as a function of temperature and relative humidity. This system is widely used in space design where heat stress is a primary factor.

The objective is to obtain comparable values and establish the most suitable applicable index for urban design in the climatic conditions of Madrid. The work is a preview of a doctoral study conducted by the authors, on microclimate and energy improvement of built spaces through urban regeneration projects.

Keywords: Outdoor comfort, Thermal urban design, Microclimate, urban comfort

1. Introduction

There is currently a wide range of interest in the environmental quality of open urban space and how it contributes to the quality of life in the city, or how it can be a negative influence; increasing the heat island effect or social exclusion phenomena by limiting the function of relations in the public space.

We are also living two simultaneous processes that will determine the future characteristics of the European urban population – the concentration of the population in cities and its increasing age.

There is an increasingly important urban population sector of elderly people that demand a series of equipments to which the urban open spaces have a clear functioning relationship.

If urban design intends to create useful and interesting open space that pay back on the public investment with an adequate use, we must know the environmental conditions therein and how they affect the public use of the space. In many cases we can observe how quality use, active walking space or resting spaces, are suppressed in favour of more aggressive functional uses like circulating traffic or parking lots. It is important to seek quality in the use of urban space, not only as an esthetical function. Therefore, one of the objectives for near future will be to enable our cities with open public space capable of satisfying users' needs, especially those of the elderly.

Public space with quality should offer a wide range of social activities: passive (seeing and hearing other people) or active (conversation, play, movement,). These human activities attract more people and generate other new activities. The segregation of different urban functions and the generalized use of the automobile have provoked a simplification of the urban system.

The design of comfortable space also presupposes knowledge of what is comfortable. Hence, there have been numerous studies on the thermal physiology of human beings and its relationships with sensations of thermal comfort and discomfort, both at rest and during work (Cena & Clark, 1981).

In recent years, many models of thermal comfort have been studied to find out a direct and indirect link between human relations and outdoor space use. Several research projects show the importance of weather in the perception of outdoor urban space, which could result in the economic, social and health benefits. In the field of outdoor thermal comfort more than 100 different indices have been developed, based on the heat exchange between a body and its surrounding environment.

The physiological models take into account the physiological process as well as heat transfer proprieties of a human body. The effectors response of metabolic heat production (basal + work) results in the certain heat loss or gain, which affect the passive system in the new body temperature. The environmental parameters and heat productions levels affect the relationship between that effectors and body temperature (Havenith, 2001).

The models to evaluate the thermal state of body, both in comfort and in the heat or cold stress, are based mainly on the analysis of heat thermal balance:

$$M - W = (C + R + Esk) + (Cres + Eres) + S \quad (W/m2) \qquad (A.1)$$

Where

S = heat storage in the body (in the skin and core compartment);
M = metabolic heat production,
W = external work;
C = heat loss by convection;
R = heat loss by radiation;
Esk = evaporative heat loss from the skin;
Cres = convective heat loss from respiration;
Eres = evaporative heat loss from respiration;
K = heat loss by conduction.

The factors influencing this heat balance are: air temperature (Ta), mean radiant temperature (Tmrt), activity level (met), thermal resistance of clothing (Iclo), evaporative resistance of clothing (Rclo), wind speed (w), partial water vapour pressure (Pa) (Olesen, 2005; Staiger, et al, 2012).

The inadequacies of two-parameter indexes have prompted hundreds of attempts to improve the psychological model based on human body balance (A.1). However, the heat fluxes are not easy to handle because, in addition to climatic parameters, other factors, such as the clothing (clo) and work activity (met), come into play. Furthermore, the relationship between global thermal sensation and the change of local conditions is not totally clear (Olesen, 2005; Candas, 2005). Some findings have recently indicated that the processes of weather assessment may be intertwined with psychological and cultural processes rather than fixed by general thermal indices as suggested by the physiological heat balance models.

Thus, we should understand our physical surroundings as a basic condition of the urban essence, and understand this as a group of activities that take place in these places. If we take into account the users of these spaces, we should be capable of creating pleasant environments for the elderly that invite them to sit, talk and relax. Places that have quiet meeting areas where people can talk, stroll and rest as well as spread-out space that will facilitate relationships and the development of play and activities within this group.

All of this will develop quality activities, like those described above, and create functional spaces that have an active relationship with urban public space and are not just empty spaces built to allow the mobility of the inhabitants. Until recently, in modern design of urban public space, environmental characteristics have not been taken into account, and aesthetic and economic conditions have prevailed.

The need to demine the comfort level of these spaces and how they can be improved will promote the study of a number of parameters that try to reflect the environmental conditions that a user may find in the space. We will also have to add the importance of the thermal comfort in the Mediterranean cities. The activities in a public space evolve during a 24-hour period and are often limited in the summer to the early morning hours or the late afternoon, due to the climatic condition of high levels of solar radiation and temperature. In fact, in mid-day and early afternoon we often observe that the use of public space is restricted to people passing through.

Therefore, we can determine that the problems of accessibility to these spaces are not so much physical as they are climatic. The limitation is not in its access; rather, it is in the fact that the space lacks the environmental conditions to develop an activity of relationship, sport or simply a pleasant stay.

The study reveals that the microclimatic conditions influence thermal sensations, but such an approach only accounts for around 50% of the variation from subjective and objective comfort evaluation. The rest could depend on other factors, such as physiological and psychological adaptation, that seemed to become increasingly important. Nikolopoulou and co-authors (Nikolopoulou & Steemers, 2003) suggested that the physical and physiological adaptation, naturalness, experience, time of exposure and perceived control, are very important parameters that influenced the thermal sensation. One of those variables, “experience”, is of particular significance for understanding the human parameters, involved not only thermal environmental parameters and psychological adaptation, but in environmental general assessment. The latter is explained by a psychological approach. In this sense, the Actual Sensation Vote (ASV) has been developed in the

RUROS research project, as a thermal comfort index involving the physical and psychological parameters (Nikolopoulou, 2002).

This article shows the results obtained by applying two different indexes, the UTCI and ASV, to a case study in Madrid. The final objective is the selection of an appropriate index to the climatic conditions of the city of Madrid and that will serve as a parameter defining the thermal comfort environment. This work forms part of a research work of a doctoral thesis on the definition of a series of counter measures to improve the microclimate of urban spaces in urban regeneration projects.

2. Materials

This research work consists in comparing the values obtained from the two comfort indexes, the UTCI and ASV, applying to a case study in Madrid. The case study is located in a suburban residential neighbourhood of Moratalaz in the Southeast of the city, in an expansion area of the seventies designed according to the principles of rationalist architecture. The population profile of this neighbourhood is aged and the open space needs to adapt to this consideration. The objective of this study is to give designers the tools to create urban space that is environmentally sound and interesting to this population.

The weather values were estimated using the simulation program ENVImet, software created for three-dimensional modelling of the urban microclimate. The area selected has been simulated for two conditions: winter (2010 December 21th) and summer (2011 August 15th); the comfort value in different points has been calculated.

2.1. The physiological model UTCI

The Universal Thermal Climate Index (UTCI) is the thermal comfort index that resulted from COST action 730 (I) promoted by International Society of Biometeorology and involving different research groups across European Countries. The index take into account the psychological variables involved in outdoor thermal perception, and expresses the physiological response of a reference person, as the actual environment has an equivalent temperature (°C).

This model is able to simulate the human body with a good degree of precision in both local and overall physiological response. The body heat losses are calculated taking into account the characteristic in homogeneities such as non-uniformity of skin temperatures, regulatory responses, clothing properties or environmental condition (Kántor et al., 2011).

The UTCI following the concept of Equivalent Temperature (ET), involve the reference environment with 50% of relative humidity (but vapour pressure capped at 20 hPa), calm air and radiant temperature equalling air temperature. The physiological response has been calculated for a person considering the clothing insulation, after 30 and 120 min of exposure, and assuming that person is walking at 4 km/h on the ground level (Kántor et al., 2011). Table 1 shows the assessment scale of the value of UTCI Equivalent Temperature.

The input parameters for UTCI are:

- Air temperature and dew point temperature observed at 2m above ground distance(Ta)
- Wind velocity at 10m above ground (W)
- Short wave radiation (SW) global and diffuse

- Long Wave (LW) upward and downward radiation. (Weihs, 2011)

Table 1. UTCI Assessment Scale: UTCI categorized in terms of thermal stress Ref.: Glossary of Terms for Thermal Physiology (2003). Journal of Thermal Biology 28, 75-106

UTCI (°C) range	Stress Category
above +46	extreme heat stress
+38 to +46	very strong heat stress
+32 to +38	strong heat stress
+26 to +32	moderate heat stress
+9 to +26	no thermal stress
+9 to 0	slight cold stress
0 to -13	moderate cold stress
-13 to -27	strong cold stress
-27 to -40	very strong cold stress
below -40	*extreme cold stress*

In recent years, several softwares have been developed with the aim of calculating the Tmrt through the simulation of the radioactive field with a 3D model. Moreover, the use of simulation tools allows testing the response in different micro-bioclimatic planning scenarios by modifying organization, dimension or radioactive properties of surface materials and vegetation (Kántor et al., 2011).

2.2. Actual Sensation Vote (ASV)

As mentioned in the introduction, the feeling of comfort depends on physical and physiological conditions, and is also influenced by a psychological component. This particular aspect has been studied in the research work RUROS, focused on improving the quality of urban space, touching the well-being of users in terms of thermal comfort, noise, microclimate and vision.

In the RUROS (II) Project, outdoor thermal comfort conditions have been evaluated through field surveys in 14 case study sites across Europe. The ASV has been defined as the people's thermal sensation, evaluated on a 5-point scale, varying from "very cold" to "very hot". The correlation between the ASV and microclimatic parameters has been obtained through the analysis of data collected in the cases studies.

The model consists of a simple linear equation, where the effects of physical and psychological adaptation are intrinsic to the models. Different models have been developed for each case study, applicable to the reference city, and one more generally, applicable in generic European cities.

The general equation for Europe is the equation A.3

$$ASV = 0.049\ Tair\_met + 0.001\ Sol\_met - 0.051\ V\_met - 0.014\ RH\_met - 2.079 \quad (r=0.78) \qquad (A.3.)$$

Where:

Tair_met = Air temperatura (ºC)
Sol_met = global solar radiation (W/m2)

V_met = wind speed (m/s)
RH_met = relative humidity (%)

The main objective of the AVS is the definition of one parameter easy to apply for designers for the characterization of outdoor space and during the urban design phase of urban planning projects (Nikolopoulou & Steemers, 2003; Nikolopoulou, 2002).

2.3. Case study

Madrid is the major Spanish metropolitan area, located in the central area of the Iberian Peninsula (40° 24' N and 3°42'W) on a plateau with an altitude of 655 m above sea level, making it the highest capital in Europe. In geographical terms, Madrid is in the Submeseta South; located 40 km southeast of Guadarrama Mountains and hydrographically it is found within the basin of the Tagus.

The case study was selected in the neighbourhood of Pavones in the district of Moratalaz. It is an area of expansion built in 1970 by public programs of the Ministry of Housing and other private developments, characterized by building blocks mainly five stories high. Urban development is based on the innovative idea for the time, to separate the car ways from large super-blocks, with house portals of the apartment blocks, and leaving the open spaces, green areas, and pedestrian walkways to the interior of the block.

The study area is configured as an established residential area, built according to the principles of rationalist architecture: tall buildings, ground floor on stilts, green areas in the free open space in-between the buildings. The study area proposed has been selected in order to test the effects produced by this type of urban morphology on micro-climatic conditions; and propose a refurbished project in order to improve the use of outdoor spaces and reduce the energy consumption of buildings.

Figure 1. Limits of study area.

Figure 2. Picture of Boulevard

The determination of the weather parameters needed to calculate the comfort index has been achieved through the use of the 3D simulation tool ENVImet. The program has been developed by Michael Bruse (Institute of Geography, Department of Geoinformatics, Environmental Modelling Group, University of Mainz) to simulate the interaction between surface-plant-air in an urban environment, based primarily on models of fluid dynamics and thermodynamics.

The evaluation of the thermal comfort index has been carried out for the winter and summer conditions, simulating the models in two days: December 21st 2010 and August 15th 2011. To calibrate the simulation software, we have introduced the following weather data obtained from the meteorological station of Madrid-Barajas (AEMET): Wind Speed and Direction, Initial Temperature Atmosphere and Relative Humidity. Input values are daily mean values and remain constant during the calculation process. The simulation has been carried out during a whole day with results every 3 hours.

The values for the selected parameters are obtained, through the use of the software LEONARDO, and can be displayed as thematic maps as in the example shown in Figure 3. Then, the controller points have been fixed in the area and the UTCI and ASV have been calculated. The period studied is in the range between 9:00 am and 9:00 pm, which is the time lapse when the open space has greater use and when it is necessary to ensure comfort conditions.

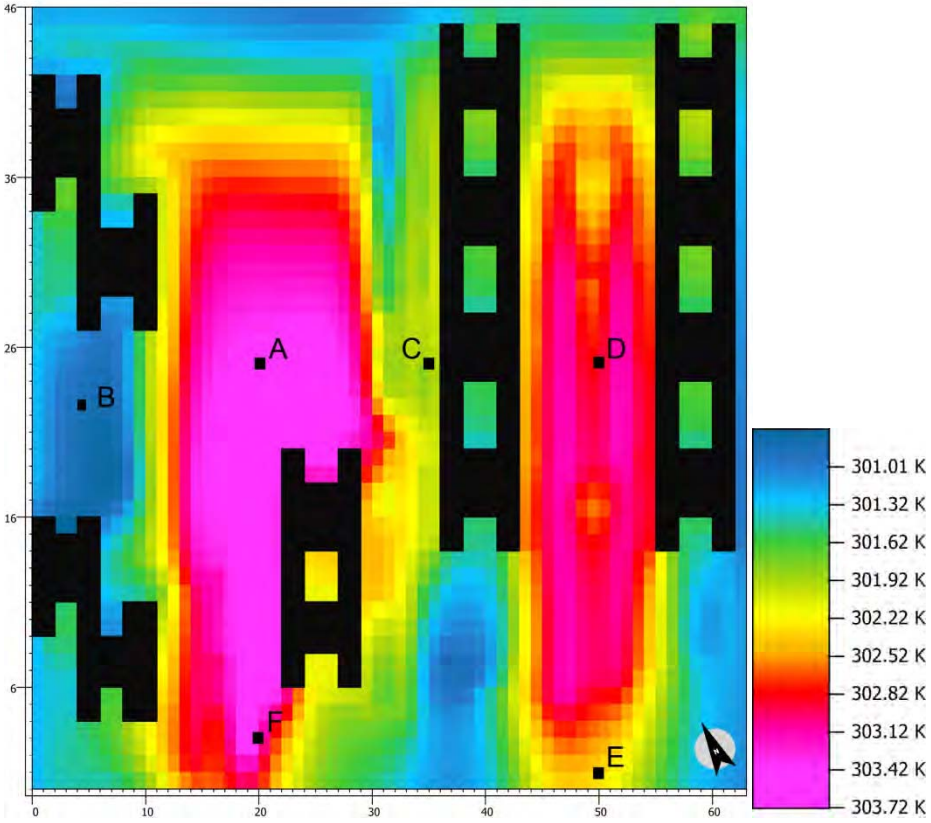

Figure 3. Result of Simulation obtained with ENVImet tool and indication of station

3. Methodology

The analysis was performed using weather data obtained by the simulation process with ENVImet. The software allowed that some thematic maps related the different climate parameters were obtained. Within the study area, there were 6 points where the weather data have been collected and comfort values calculated, according to the method UTCI and ASV. The 6 stations were chosen as explained below:

a) The centre of the parking area, open space without any kind of protection, surface soil in asphalt.

b) The northwest play area for children, protected by tall trees and sandy soil.

c) The northwest front of the central building, in contact with the area's tree-lined boulevard, the area's surface finish is made of concrete blocks.

d) Canyon between buildings, area reserved for the parking with isolated trees and shrubs, the pavement material is asphalt.

e) South-east limit area devoted to roads, there is no protection and the finishing material is asphalt.

f) Station located in the southwest into the garden area planted with grass and shrubs.

For each station the comfort parameters were calculated, for the condition of summer and winter, during a time lag from 9:00 am to 9:00 pm, in intervals of 3 hours. The calculation was made using values obtained from the simulation process.

For the calculation of UTCI the following climate parameters are required: air temperature (Ta), mean radiant temperature (Tmrt), relative humidity (RH) and wind speed (V). The values obtained by the simulation were introduced into the calculation program developed thanks to the action COST 370 and free access in the page. The value obtained for the UTCI, expressed in degrees Celsius, indicates the degree of comfort according to the assessment scale. For the calculation of ASV, the values of global radiation obtained as the sum of direct, indirect and reflected radiation, which have been also calculated.

The analysis of mean temperatures of the climate of Madrid shows that the summer season is the one that originate more discomfort. So, to check the model and to compare the results, we introduce the physiologic index of the sweating rate, adopted as a parameter for the comfort, to validate the ambient conditioning of Seville Expo 92 in the summer condition (Macho, et al., 1998).

4. Result

Through the simulation with ENVImet, the climate parameters for the calculation of the indexes of comfort have been obtained. Table 2 shows the climate values, the UTCI and the ASV calculated for the simulated two days (winter and summer conditions).

In regard to winter conditions, the UTCI is quite constant across the area. The comfort condition obtained is “slight cold stress” in the early hours of the morning and afternoon and "no thermal stress" for the middle of the day. Analysing the results obtained at each station, for the green area with trees, the condition is more homogeneous throughout the day, in clear contrast to the parking showing the lowest values in the early hours of the morning and afternoon-evening, and higher values at 12:00 am and 3:00 pm.

The values provided in the summer are more disparate, ranging from a state of "no thermal stress" in the early hours of the morning and in the evening, to a state of "very high heat stress" at 3:00 pm. The latter is a constant condition of the whole area, while in the rest of the day substantial differences between the various stations can be seen. In the stations a) and d), "no thermal stress" conditions are reached only at night, they show the condition of heat stress during the rest of the day.

In turn, in the green area with trees, the thermal sensation is less extreme than in the rest of the other case study areas. An intermediate condition between the two is found in the station c) and e).

With regard to the values of the ASV results, both regarding the hourly distribution as well as the spatial, the results obtained are more homogeneous. In the winter condition, the feeling of comfort is in the range between the minimum value of -0.45 to the maximum value of 0.54 so in a condition always close to the state of comfort (ASV =0). In summer conditions the values obtained do not exceed 1.27 and therefore remains in a state of heat during some hours in the middle of the day, and comfort in the other. Even the application of ASV shows the differences between the various stations. The station b) is the one that shows the minimum and d) the highest.

The value obtained was compared with the rate of sweat, by setting the rating scale as the following indications: 0 to 10 g/h no thermal stress, 10-30 g/h of moderate heat stress, upper 30 g /h heat stress.

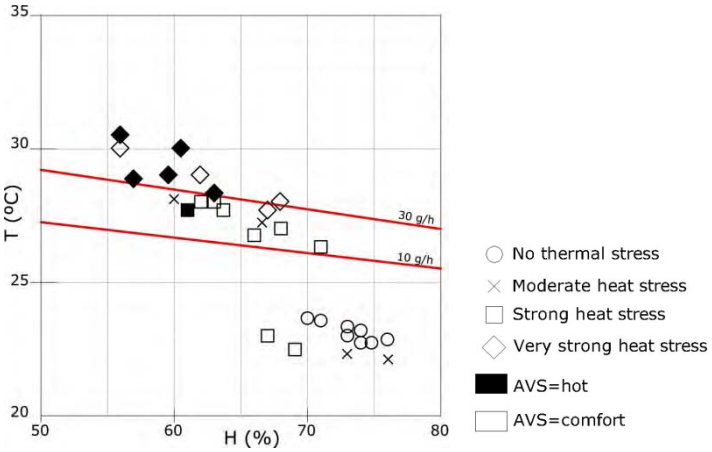

Figure 4. Comparison with UTCI, ASV and sweating rate

Through the analysis of the graphic, it is possible to see that, regarding the ASV, the majority of values that correspond to the condition of "comfort" are located below the sweating rate of 30 g/h, and those defined as a sensation of "hot" are above that limit. As regards the UTCI, the result is more varied: below the limit of 10 g/h encounter values corresponding to "no thermal stress", "moderate heat stress" and "strong heat stress". The values of "very strong heat stress" coincide with a sweat tax exceeding 30g/h; in the range between 10 and 30 prevail conditions of "moderate heat stress" and "strong heat stress".

5. Discussion

Using modelling, we can generate different scenarios where the environmental conditions that users experience change, by altering the placement or the nature of elements within the space. This serves to evaluate how the urban environment influences in the thermal comfort that is perceived within it.

These models are based in defining environmental conditions (temperature, wind velocity), characterizing the air movement as it influences the space and how it is distributed in its interior. The principal benefit is based on the capacity to model the response to changes in the urban scene and

measure its influence based on indices. In summer conditions in the chosen environment, we can observe how the UTCI indices adjust to the real values and how they can define the possible regenerative actions in these urban environments.

The comparison of results obtained with the two indices displays a significant difference in the summer condition. The results obtained with the ASV show a homogeneous evaluation on the whole area, in which the state of discomfort occurs only in some points for small time intervals. In sharp contrast is the result obtained applying the UTCI method that shows a significant variation between the various stations and a discomfort condition due to heat during the majority of the time period analysed. In winter conditions, significant differences between the results of the two indicators are not appreciable.

The analysis of the application of the ASV linear equation to the climatic conditions of Madrid, gives results with a downward trend to those obtained by applying the UTCI. This under estimation is most significant in summer conditions. We can also verify that the system is insensitive to the different conditions registered in the area. The UTCI shows more varied results than ASV, where it is possible to appreciate the different conditions between stations. Especially in summer conditions, the UTCI seems to provide a better representation of the thermal comfort experienced by the user outdoors. This is also confirmed by the analysis made with the sweating rate, where we see that ASV does not discriminate the thermal sensation below the discomfort threshold, making an underestimation of the user perception.

This investigation objective is to identify the variables on which it is easier to act and that improve the comfort conditions for the potential users of these urban open spaces, and to choose among the various existing comfort indices, the most suitable to be used as an element of judgment between the projects scenarios in the urban areas of Madrid. This index should be able to describe the wellbeing conditions of the user, easy to calculate using climatic parameters which can be obtained through the use of simulation tools and provide a wide range of results in order to distinguish between the various solutions. In view of that, the UTCI index is more suitable than ASV for the research objective. By choosing a neighbourhood with a high ratio of aged population and with highly defined strolling and sitting spaces and a concrete urban configuration, we can fix the variables for the improvement.

Future research developments will be directed towards the study of proposals for refurbished urban areas.

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Appendix A TABLES

Table 2.a

	Ta [ºC]	*Tmrt [K]*	*ΔTmrt*	*RH [%]*	*W [m/s]*	*Sol Dir*	*Sol Dif*	*Sol Ref*	*Sol Glo*	***UTCI***	***ASV***
					Hour 9:00						
a)	22,99	334,9	38,91	67	1,37	791	71,78	14,64	877,42	33,7	0,79
b)	21,83	292,43	-2,4	74,77	0,38	0	71,29	5,62	76,91	22,4	0,09
c)	21,94	294,86	-0,08	74	1	0	48,34	61,52	109,86	22,7	0,09
d)	22,14	323,08	27,94	76	1,09	0	66,9	24,41	91,31	30,9	0,11
e)	22,44	330,66	35,22	73	1,33	791	77,64	2,92	871,56	32,6	0,85
f)	22,51	298,26	2,75	69	0,69	791	72,27	13,67	876,94	24,2	0,83
					Hour 12:00						
a)	28,98	339,88	37,9	57	1,49	970,82	105,05	17,97	1093,84	38,8	1,16
b)	26,37	289,89	-9,48	71	0,39	0,14	104	19,17	123,31	25,3	0,31
c)	26,79	300,4	0,61	66	0,95	0	70,75	75,5	146,25	28	0,26
d)	28,17	345,75	44,58	63	1,29	970,82	97,9	29,96	1098,68	40,1	1,22
e)	27,64	333,07	32,43	61	1,32	970,82	113,62	3,59	1088,03	36,5	1,15
f)	28,17	309,18	8,01	59	0,73	338,74	105,76	16,77	461,27	31,1	0,55
					Hour 15:00						
a)	30,49	342,48	38,99	56,06	1,71	954,84	102,24	17,68	1074,76	40,5	1,19
b)	27,93	346,63	45,7	68	0,43	0,1	101	18,86	119,96	41	0,34
c)	28,97	335,36	33,39	62,23	1,02	672,37	68,85	74,26	815,48	38,5	0,98
d)	29,93	348,22	45,29	60,5	0,78	954,84	95,29	29,47	1079,6	40,4	1,27
e)	29,28	337,23	34,95	59,79	1,36	954,84	110,59	3,53	1068,96	38,7	1,19
f)	30,13	337,29	34,16	56	1,05	320,91	102,94	16,5	440,35	39,2	0,57
					Hour 18:00						
a)	27,95	335,56	34,61	63,29	1,81	689	59,54	12,75	761,29	36,9	0,85
b)	26,95	340,08	40,13	68,94	1,27	688	58,73	14,45	761,18	38,1	0,90
c)	27,28	299,37	-0,91	66,73	1,03	2,88	40,1	53,58	96,56	28,1	0,24
d)	27,87	340,95	40,08	66,68	1,43	689	55,49	21,26	765,75	38,8	0,91
e)	27,88	332,97	32,09	64,8	1,4	689	64,4	2,55	755,95	36,7	0,88
f)	27,98	332,87	31,89	62,56	1,06	689	62,78	5,95	757,73	37	0,87
					Hour 21:00						
a)	23,66	289,56	-7,1	71	1,78	0	0	0	0	21,6	-0,02
b)	22,87	287	-8,87	76	0,4	0	0	0	0	21,6	0,09
c)	23,2	289,63	-6,57	73	0,96	0	0	0	0	22,2	0,03
d)	23,23	289,97	-6,26	74	1,22	0	0	0	0	22,2	0,03
e)	23,37	286,79	-9,58	72	1,39	0	0	0	0	21	0,00
f)	23,66	287,27	-9,39	70	0,78	0	0	0	0	21,8	0,02

Climate parameter obtained from de simulation and the comfort result for summer conditions

Table 2.b

	Ta [ºC]	*Tmrt [K]*	*ΔTmrt*	*RH [%]*	*W [m/s]*	*Sol Dir*	*Sol Dif*	*Sol Ref*	*Sol Glo*	***UTCI***	***ASV***
					Hour 9:00						
a)	10	274,45	-8,55	91	2,81	0	0	0	0	3,1	-0,46
b)	10,64	274,68	-8,96	93	0,77	0	0	0	0	8,6	-0,29
c)	10,69	278,28	-5,41	92	1,69	0	0	0	0	8	-0,35
d)	10,7	275,73	-7,97	92	1,98	0	0	0	0	6,3	-0,37
e)	10,63	272,9	-10,73	92	2,55	0	0	0	0	3,8	-0,40
f)	10,68	274,21	-9,47	91	1,2	0	0	0	0	7,6	-0,34
					Hour 12:00						
a)	11,59	323,55	38,96	93	3,04	719,48	62,46	13,32	795,26	20,7	0,43
b)	11,36	281,27	-3,09	96	0,68	0	62,03	14,21	76,24	11,8	-0,14
c)	11,33	285,75	1,42	95	1,76	0	42,06	55,95	98,01	11,1	-0,19
d)	11,59	316,27	31,68	95	2,12	719	58,21	22,2	799,41	20,9	0,51
e)	11,51	319,78	35,27	94	2,58	719	67,56	2,66	789,22	20,7	0,46
f)	11,52	286,16	1,64	93	1,4	80,17	62,88	12,43	155,48	12,1	-0,13
					Hour 15:00						
a)	12,2	313,21	28,01	95	3	492	56,41	12,43	560,84	18	0,26
b)	11,9	281,25	-3,65	98	0,7	0	56	13,26	69,26	12,1	-0,09
c)	12	330,3	45,3	97	1,75	671	37,99	52,23	761,22	26,5	0,54
d)	12,42	328,63	43,21	96	2,16	671	52,57	20,72	744,29	25,2	0,51
e)	12,11	317,99	32,88	96	2,55	671	61	2,48	734,48	20,7	0,46
f)	12,18	299,47	14,29	94	1,43	335	56,8	11,6	403,4	17,3	0,16
					Hour 18:00						
a)	10,14	273,86	-9,28	99,00	3,09	0,00	0,00	0,00	0,00	2,50	-0,35
b)	10,18	274,24	-8,94	100,00	0,70	0,00	0,00	0,00	0,00	8,40	-0,22
c)	10,15	277,60	-5,55	99,00	1,73	0,00	0,00	0,00	0,00	7,40	-0,28
d)	10,23	275,09	-8,14	99,00	2,14	0,00	0,00	0,00	0,00	5,50	-0,30
e)	10,14	272,62	-10,52	99,00	2,51	0,00	0,00	0,00	0,00	3,60	-0,32
f)	10,14	273,83	-9,31	99,00	1,45	0,00	0,00	0,00	0,00	6,70	-0,27
					Hour 21:00						
a)	9,27	272,82	-9,45	100,00	3,06	0,00	0,00	0,00	0,00	1,40	-0,38
b)	9,36	273,40	-8,96	100,00	0,68	0,00	0,00	0,00	0,00	7,60	-0,26
c)	9,33	276,70	-5,63	100,00	1,71	0,00	0,00	0,00	0,00	6,50	-0,31
d)	9,33	273,99	-8,34	100,00	2,10	0,00	0,00	0,00	0,00	4,50	-0,33
e)	9,29	272,71	-9,58	100,00	2,46	0,00	0,00	0,00	0,00	3,00	-0,35
f)	9,28	272,71	-9,57	100,00	1,46	0,00	0,00	0,00	0,00	5,60	-0,30

Climate parameter obtained from de simulation and the comfort result for winter conditions

Ageing cities: redesigning the urban space.

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The existing city must be redesigned with the elderly population in mind. This paper aims at questioning the way urban designers, architects and landscapers are forced to rethink the existing city and all new public spaces to fit the needs of an active-ageing population.–In fact, if we want the elderly to remain living inside the city-centers, we must provide them with urban spaces designed and conceived for their physical and psychological constraints. Rethinking the transportation system will also be an important clue for a population who lives longer without a drivers' license, therefore depending on easy public transportation.–Lisbon is an example of this *grey revolution*: in 2001 it was already the European capital with the largest proportion of seniors among its residents. And for the first time in History, the elderly outnumbered the young in Portugal during the 1990's (Machado, 2007).
The paper is organized in four parts. The first one reviews demographic tendencies and identifies the main needs of the elderly in public spaces. The second one discusses the advantage of *active ageing neighbourhoods* vs. deserted public spaces in housing areas, the issue of intergenerational spaces and the new design solutions for inclusive urban spaces. The third part analyses six case studies in Lisbon.
Our conclusion is that if we adapt urban spaces (streets, squares, parks, buildings) to the needs of the elderly, they can more easily *"age in place"* remaining in their lifetime neighborhoods, close to friends, relatives and acquaintances — therefore contributing for a living city.

Keywords: active ageing; urban memories; neighbourhoods; accessibility; universal design.

1- Lisbon: Europe's fastest ageing city

Talking about an age-friendly city means talking about the future of cities in the western world — that's what statistics say: the elder population will increase and live longer (WHO, 2007), gaining a growing influence in society.

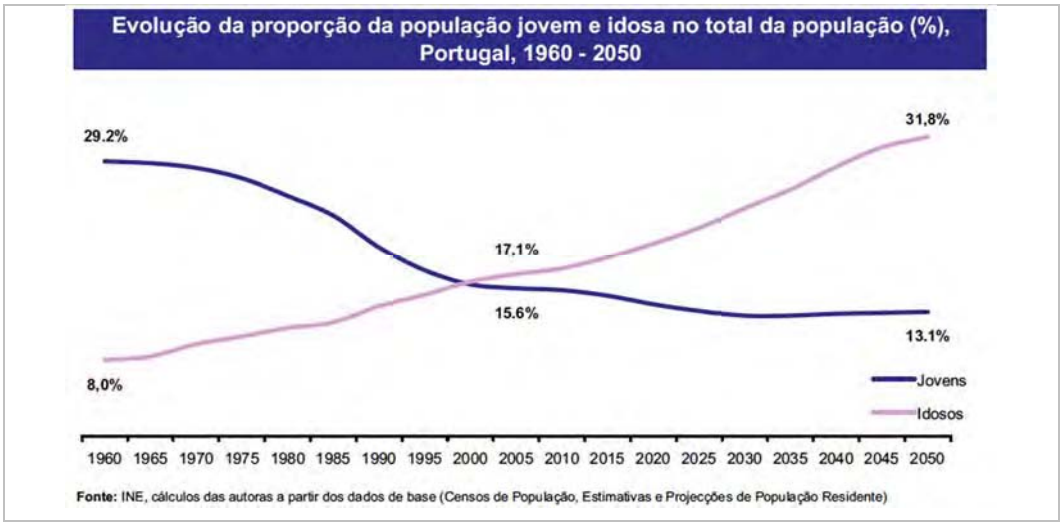


Figure 1. Evolution of young (*Jovens*) and old (*Idosos*) people in total population (%), Portugal, 1960-2050. (Source: INE – National Statistics Institute, Gonçalves C, Carrilho MJ, 2007).

Back in 2001, Lisbon was already the European capital with the largest percentage of elderly in its population (Machado, 2001), considering the 15 countries of European Union and still now, among the EU-27 members, its position remains. In fact, in the late 1990's, for the first time in Portugal, people above 65 years of age outnumbered the young (15 years old or less) in a steady tendency of a 0,3% decrease of population until 2050 when the elderly will represent 32% of the total population (Figure 1). Recently, a newspaper news (Expresso, 27/8/2011, p.2d), citing a United Nations report, even predicted the "total extinction" of Portuguese population at year 3000 in case the national fertility ratios are not corrected.

In terms of age pyramids, the population evolution corresponds to an evolution which starts from the perfect pyramid (1960) sustained by a young base assuring the generation renewal, ending up in a pot shape (2050), in a tendency for the inverted pyramid (Figure 2).

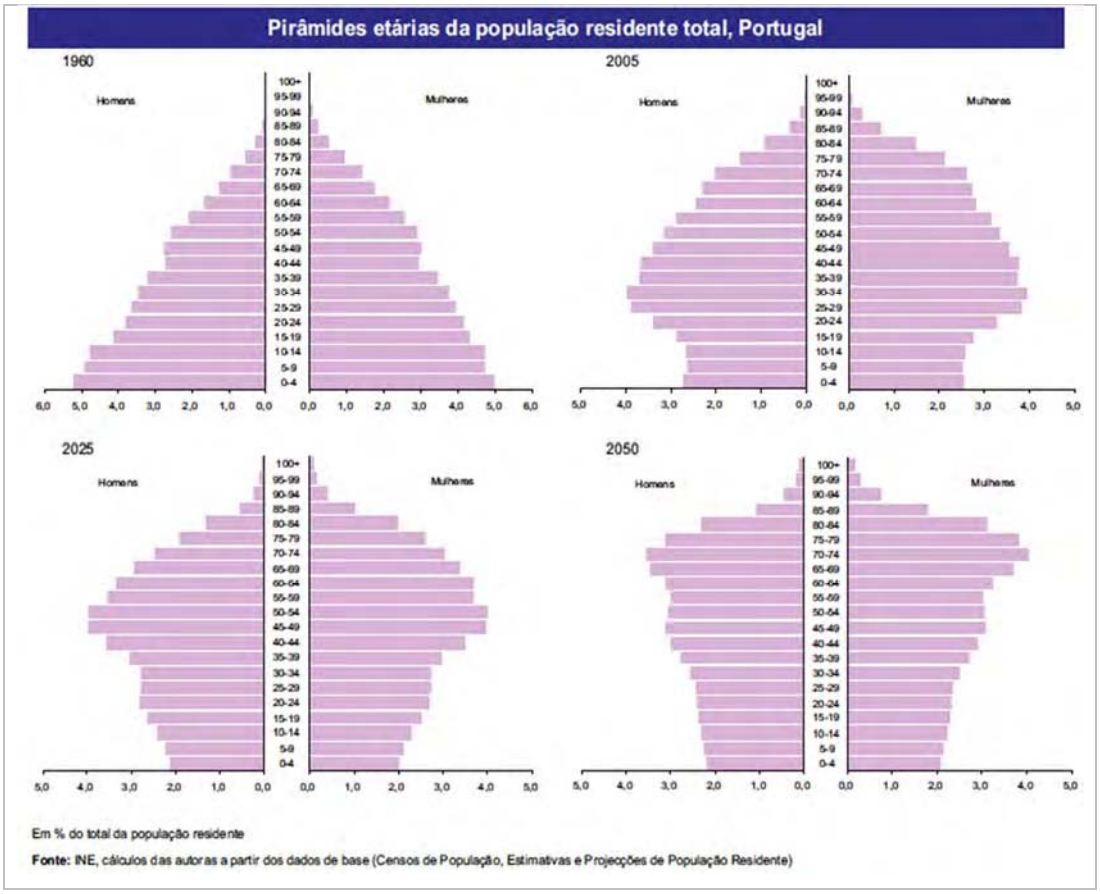


Figure 2. Age-group pyramids (Homens = Men, Mulheres = Women) in total population (%), Portugal, 1960-2050. (Source: INE – National Statistics Institute, Gonçalves C, Carrilho MJ, 2007).

According to the United Nations forecast (Figure 3), this is a worldwide tendency leading to the new reality of 2050: *"then and for the first time in history of mankind, the world population will have more elderly than children (age up to 14 years old). Developing countries are ageing at a much faster pace than the developed ones: within five decades, a bit more than 80% of the world elderly population will live in developing countries, while in 2005 that percentage was 60%"* (WHO, 2007, p.3).

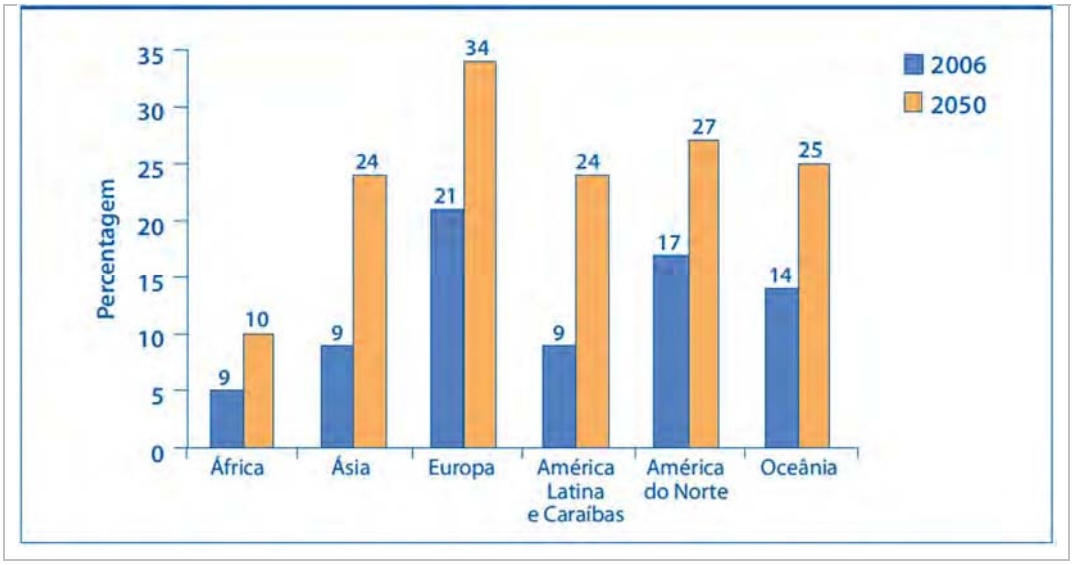


Figure 3. World population % distribution of people above 60 years of age, in 2006 and 2050. (Source: WHO, 2007 — United Nations Department for Economical and Social Affairs).

This ageing process and bigger longevity is a new and enormous challenge for 21st century as a result of the great improvements of public health and standards of living. That's why the "Brasilia Declaration on Ageing" (1997) established that "*healthy elderly are a resource for their families, communities and economy*". Nevertheless, this implies that cities become age-friendly in order to provide the necessary infrastructures and amenities for the wellbeing and productivity of its inhabitants, namely the erderly, allowing their contribution to society and economy. And taking into consideration Julienne Hanson's words, *"Older people enjoy a lifetime of accumulated experience, wisdom and memories. The 'grey vote' and the 'grey purse' are set to become increasingly powerful mechanisms for change as our society ages. This may enhance the power older people wield and the respect in which they are held. One important arena for the exercise of 'grey power' could be through greater advocacy for health-engendering, architecturally enabling and non-discriminatory environments"* (Hanson, 2001).

Looking in detail at Lisbon (metropolitan area) for the 2010/2050 time period, there is a prediction (Gonçalves and Carrilho, 2007) of an average decrease in the total population of -0,21% per year in every age group except the elderly, which will grow (Figure 4). Consequences for the labour market, national productivity and Social Security expenses seem quite preoccupying to us: the dependency index will double from 26 to 58 elderly for every 100 individuals in active age. In Lisbon, statistics predict a proportion of 29,2% elderly in the total population, meaning there will be 211 people above 65 years of age for every 100 young people (that is, for every young person there will be 2 elderly).

Taxa média anual de crescimento da população por grandes grupos etários, NUTS II e III, 2010/2050

NUTS II e III[1]	TOTAL	0-14 anos	15-24 anos	25-64 anos	65+ anos
Portugal	**-0,33**	**-0,74**	**-0,74**	**-0,83**	**1,14**
Norte	**-0,38**	**-0,91**	**-0,98**	**-0,95**	**1,48**
Minho Lima	-0,55	-0,84	-1,00	-1,02	0,63
Cávado	-0,21	-0,92	-0,98	-0,78	2,07
Ave	-0,28	-0,92	-1,03	-0,88	1,96
Grande Porto	-0,47	-0,97	-0,86	-1,14	1,45
Tâmega	-0,16	-0,92	-1,07	-0,65	2,07
Entre Douro e Vouga	-0,37	-0,93	-0,97	-0,98	1,66
Douro	-0,54	-0,79	-1,13	-0,97	0,61
Alto Trás os Montes	-0,73	-0,69	-1,18	-1,10	0,04
Centro	**-0,58**	**-1,01**	**-1,05**	**-1,11**	**0,73**
Baixo Vouga	-0,45	-1,06	-1,01	-1,04	1,28
Baixo Mondego	-0,64	-1,04	-0,87	-1,29	0,79
Pinhal Litoral	-0,48	-1,06	-1,03	-1,05	1,13
Pinhal Interior Norte	-0,67	-1,03	-1,13	-1,06	0,28
Dão-Lafões	-0,52	-0,94	-1,16	-0,96	0,70
Pinhal Interior Sul	-0,93	-0,84	-1,30	-1,18	-0,49
Serra da Estrela	-0,74	-0,84	-1,27	-1,14	0,15
Beira Interior Norte	-0,73	-0,88	-1,19	-1,12	0,13
Beira Interior Sul	-0,87	-0,97	-1,03	-1,31	-0,11
Cova da Beira	-0,70	-0,97	-1,13	-1,22	0,46
Lisboa e Vale do Tejo	**-0,20**	**-0,46**	**-0,33**	**-0,66**	**1,02**
Oeste	-0,17	-0,42	-0,45	-0,54	0,94
Grande Lisboa	-0,21	-0,47	-0,27	-0,69	1,07
Península de Setúbal	-0,17	-0,47	-0,32	-0,65	1,19
Médio Tejo	-0,25	-0,36	-0,51	-0,57	0,61
Leziria do Tejo	-0,28	-0,42	-0,39	-0,66	0,61
Alentejo	**-1,04**	**-1,59**	**-1,66**	**-1,63**	**0,23**
Alentejo Litoral	-1,10	-1,53	-1,69	-1,75	0,22
Alto Alentejo	-1,08	-1,58	-1,68	-1,59	0,02
Alentejo Central	-0,99	-1,64	-1,61	-1,59	0,39
Baixo Alentejo	-1,04	-1,58	-1,71	-1,61	0,20
Algarve	**0,26**	**-0,03**	**-0,01**	**-0,17**	**1,51**
R. A. Açores	**-0,02**	**-0,84**	**-1,05**	**-0,31**	**2,01**
R. A. Madeira	**-0,20**	**-0,84**	**-1,10**	**-0,64**	**1,77**

Fonte: INE, cálculos das autoras com base nas Projecções de População Residente NUTS II e III, 2000-2050

[1] Nomenclatura das Unidades Territoriais para Fins Estatísticos, geografia de 2001 (NUTS 2001)

Figure 4. Annual average growth in Portugal prediction for 2010-2050 by age groups (our highlights). (Source: INE – National Statistics Institute, Gonçalves C, Carrilho MJ, 2007).

Being optimistic, one could say that this will lead to an intergenerational solidarity since it will be easy to find living together under the same roof two or three family generations (Gonçalves and Carrilho, 2007, p.29). However, it is our opinion that in order for that to happen without social tension and confrontation, specially in today's climate of economical crisis, it will be crucial to find social support solutions less expensive for the Social Security system (namely in housing, health support and amenities for the elderly). It is quite evident from the statistics that in the future Portuguese active population will decline from 4 to 2 active citizens for every senior citizen between 2001 and 2050, which must necessarily lead to deep modifications in the financing model of our Social Security system: *"Expenses with retirement pensions have increased in recent years and will continue to do so in the future, due to the ageing of population and longer life expectancy. On the other hand, it is known that the short contributing careers explain, partly, the present low value of minimum pensions. Consequently, the system progressive maturation — that is, the increase of the average contributing career — will be an additional reason for future growth of these pension expenses. Thus, it seems easy to conclude that any financing model based, exclusively or mainly, on contributions from labour*

income, namely from employees, will find increasing difficulties and soon will prove the system to be unsustainable" (Bruto da Costa,1997 cited in Machado, 2007, p.321).

In the World Health Organization / Organização Mundial de Saúde (WHO/OMS) perspective, "active ageing" should be faced as *"the way of optimizing health conditions, participation and safety, in order to improve life quality as people age in life"* (OMS, 2009, p.5). Active ageing will then depend upon different factors (culture, gender, social and economical constraints, social and health services, behavioural constraints, individual constraints, physical environment), which should be dealt with "according to a life cycle perspective, acknowledging that the elderly are not a homogeneous group and individual diversity grows with age" (OMS, 2009, p.6). One should also consider that people's functional capacity (just like their muscular strength and heart rate) rises during childhood, gets its peak at early adulthood and after some time gets in decline (Figure 5).

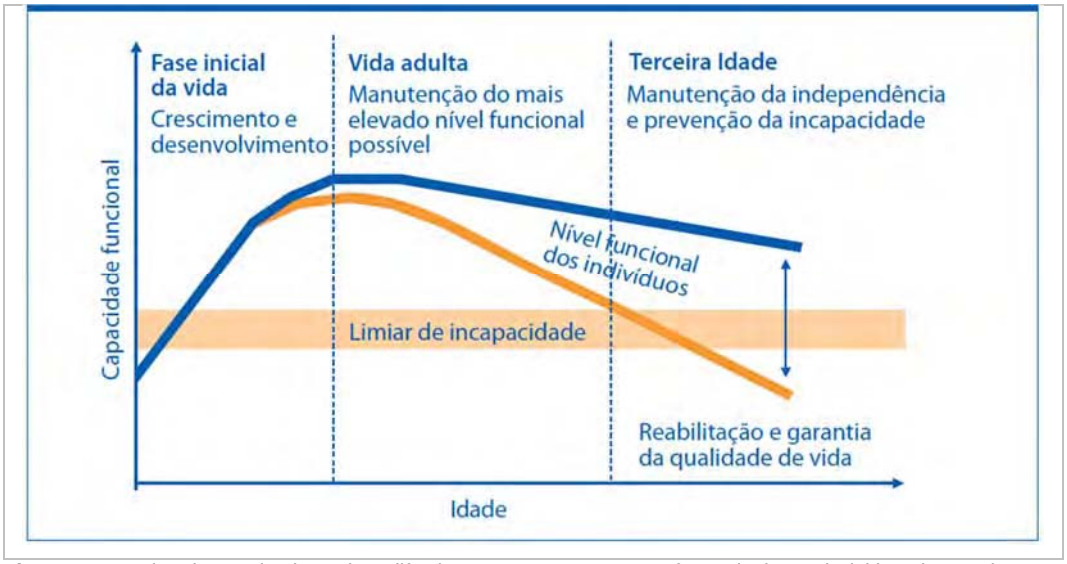


Figure 5. Functional capacity throughout life. (Source: OMS, 2009 — after Kalache and Kickbusch, 1997).

This natural decline varies from person to person and it is determined by personal factors such as lifestyle but also social, environmental and economical — therefore it can be influenced and reversed at any age, through individual or public measures, such as the promotion of an ageing-friendly environment (OMS, 2009, p.6).

We should nevertheless remember that being aged obviously does not imply being handicapped, even though quite often physical and mental disabilities (stable or progressive) might occur to senior citizens, which could compare to a handicap situation, therefore the importance of stating the difference.

In that sense, we could quote Sloane, Zimmerman and Ory when they write:

"Cognitive impairment is the broadest term, implying a reduction in brain performance in one or more domains, such as memory, abstraction, language, visuospatial ability, and attention (Emery & Oxman, 1994). It may or may not be reversible. Dementia is by far the most common cause of moderate or severe cognitive impairment. Dementia is a progressive, irreversible, organic brain condition (Weiner, 1996). A variety of diseases causes dementia, the most common of which are Alzheimer disease and cerebrovascular disease. Dementia involves a reduction in multiple categories

of cognitive ability, including memory, and the impairment is sufficient to interfere with self-maintenance, work and social relationships. Alzheimer disease is by far the most common cause of dementia, affecting between 2 and 4 million persons in the United States (US GAO, 1998). Its cause is unknown, but it appears to have a strong genetic component; the current thinking is that Alzheimer disease results from an abnormal build-up of certain substances in the brain, most likely as a result of genetic factors. It can be diagnosed with certainty only by brain biopsy or autopsy (...) Alzheimer disease affects primarily older persons, becoming increasingly common after age 80 (US GAO,1998). The disease begins insidiously and progresses gradually; the type and timing of disease manifestations vary from person to person.(...) It describes four stages of dementia: mild, moderate, severe and very severe." (Sloane, Zimmerman and Ory, 2001, pp.242-270).

Besides personal handicaps and architectonic barriers or constraints, the most determining factor for the elderly in terms of independent living is their real independence or autonomy in terms of decision-making and event control. In that sense, medical and psychological evaluation can identify, value, preserve and strengthen the elder citizens' high features, suggesting therapeutic or prosthetic interventions to help them overcome their difficulties. This evaluation will contribute to older people's self-esteem and it will enhance their autonomy, so that they can even help or be helped by other neighbours, thus creating an interdependence and mutual help which increases the community feeling among neighbours (Regnier and Scott, 2001, pp.63-64). In this matter, ergo therapy or occupational therapy could become very useful, even equivalent to the daily activities of a normal job, helping the elderly to get back their self-maintenance skills, keeping them active and committed to daily tasks. Sometimes animal-assisted therapy is also recommended because of the unconditional affection pets can provide to older people. On the other hand, the use of plants and vegetation in outside gardens or indoor patios is becoming quite common for its therapeutical potential, sometimes in "raised planter beds, to allow wheelchair-bound residents access to the colour, texture and aroma of plants" (Regnier and Scott, 2001, p.67).

Julienne Hanson (2002) describes two emergent lifestyles, as proposed by sociologists Gilleard and Higgs (2000): the "*third ager*" and the "*age resistor*", both radical approaches to active-ageing which might help to face urban life in a more positive way, contributing to the rebirth of city centres. So, the third agers see this life period as a special time, independent from work and family ties, an opportunity to enjoy leisure. In that sense, cities offer unparalleled opportunities in terms of going out, strolling, education, entertainment, culture and self-fulfilment, all of it "at hand" for the elderly who live at the city centre. On the other hand, the age resistors choose to stay young instead of getting old, asserting that functional ageing can be delayed through physical activity, clothing and cosmetics, food supplements and body shaping (Hanson, 2002, p.10). For all this, cities provide the necessary concentration of health clubs, personal trainers and physiotherapists to achieve these goals. In this way, these two subcultures might help to turn city centres appealing again to live in at third age. Hanson adds still another group, "*Generation M*", made of post-retirement workers whose option is to keep working. For these people, living inside the city, close to the job market, means avoiding commuting to the suburbs everyday (specially without driver's license). On the other hand, if the option is to remain economically active for a longer period in life, these older workers will need to update their knowledge, skills and expertise. So, the best option will also be to live inside the city,

closer to schools and universities. And finally, due to the young generations decline, it will up to the elderly to fill in some gaps in very important social activities which require life experience, free time and citizenship, such as charities and voluntary or community based organisations.

Because of all this, it is fundamental for the future of cities to make its centres attractive and pleasant environments, facilitating active ageing and aging in place for this very important sector of urban population.

2- The elderly and the free urban space

It is important to keep in mind that senior citizens' lives should not be confined to the interior spaces of their homes. Therefore the characteristics of open urban spaces become particularly relevant in terms of the free and easy access they provide to the elderly (specially the surrounding spaces of housing units, thus creating its neighbouring area and natural habitat), allowing them physical exercise, socialization, contact with the nature and the sun, contributing to their physical and psychological well-being.

The public open space we'll be studying in this paper correspond to the "neighbourhood unit" which we consider to be a variable territory of flexible boundaries (Jacobs, 1961), made of the outdoor spaces (streets, avenues, squares, gardens, parks, urban block interiors) that citizens use everyday and thus gradually become familiar to them. By definition, this neighbourhood unit evolves in its shape and spatial extension during the life cycles (growing progressively in childhood, getting its intricacies during teenage years and eventually stabilizing with adulthood routines). For the elderly, it will be quite natural that the neighbourhood unit might gradually shrink to a "physical comfort area" in the housing surroundings. The remaining territorial area, now less accessible but still vivid in memory, will nevertheless constitute the social and urban comforting frame that makes possible for the elderly to keep feeling they belong to a city, to a place.

Older people's spatial needs, namely in outdoors spaces, are delimited by their physical constraints derived from the natural ageing process (psycho-cognitive and biological-functional) and they can be classified into three classes (Hunt, 1991 cited by Bins Ely and Dorneles, 2006): physical needs, information needs and social needs.

Physical needs are related to physical health, safety and comfort of use. In practical terms they also correspond to the accessibility concerns, which implies that outdoor spaces must be free from obstacles and have non-slippery surfaces with easy maintenance to avoid accidents. For instance, "*the presence of ramps in circulation areas with different levels, facilitates the displacement of older people with muscle constraints; benches with back and side supports and a minimum seat-height of 45cm,* lessen the effort of sitting and getting up for the elderly" (Bins Ely and Dorneles, 2006).

Information needs will thus correspond to the way a person processes the environmental information, both in terms of perception (the process of getting or receiving information) and in terms of cognition (the way a person organizes and remembers the obtained information). In that sense, outdoor spaces should be readable and stimulate all senses so that, in case of any restriction in one of them, the environment can supply the needed information through the rest. In equal manner, the use of contrasting materials and colours in pavements can compensate the lack of sight accuracy,

helping in path orientation or signalling level differences. The creation of pattern or theme environments through repetitive use of colours or elements which communicate the same function or activity can help older people with difficulty in remembering the acquired information.

Social needs are related to privacy and social interaction issues, which implies space solutions that can provide a sense of community, where neighbourhood and comradeship may naturally occur. While in apartment buildings the existence of balconies and terraces promotes social interaction between neighbours, in outdoor areas there should be subspaces appealing to spontaneous gathering of people, as fundamental as the existence of isolated benches which provide quietness and isolation, when needed (Bins Ely and Dorneles, 2006).

In terms of accessibility conditions in urban open areas, Bins Ely and Dorneles (2006) suggest a system of solutions for the elderly based on: *orientation/information, displacement, use* and *communication*. In this system, *orientation/information* helps to understand the environment, guiding older people's walks along the information (visual, sound, olfactory, architectonic) given by the local environment, complemented with the existence of maps and information panels when spaces are large and complex. *Displacement* deals with movement constraints and free flow in circulations, both horizontal and vertical (even and non-slippery pavements, handrails on stairs and ramps, urban furniture outside circulation paths, etc.). *Use* is related to activity participation and the use of the available services and urban furniture; therefore its ergonomic characteristics and location in space become fundamental (bench height, tables to play with available space underneath for a wheelchair, etc.). Finally, *communication* consists on the easiness of interaction among space users and the environment, which can be enhanced by urban furniture location or even assistive technology (digital information displays, audio recordings, etc.).

Hanson (2002) claims that it is very important to create and maintain outdoor spaces that facilitate the elderly everyday life (without conflicting with the values and aspirations of other social groups), so that they can remain living in the city centre, thereby opposing the tendency of their displacement to senior communities located on the countryside or at the urban outskirts (and we may add, in the case of Lisbon, more often institutionalized in older people's homes or assisted living facilities). In that sense, a report on the elderly's needs of transportation (DTLR, 2001 as cited by Hanson, 2002) suggests that mobility becomes a key element to reduce social isolation. In fact, giving up driving is a very painful decision for the elderly, signalling the loss of the adult status and becoming dependent on others for transportation (car rides from family and friends, public transport, community buses or taxis). Hanson provides us thus with a list of poor design features which discourage the elderly from using town centres: difficult access, level changes, damaged pavements, heavy traffic streets with few crossing points, isolated unlit stops, lack of adequate urban furniture, lack of public toilets and high, steep steps. Actually older people are vulnerable and at risk outdoors: in the UK, almost half of the pedestrians killed on the roads are over 60 and an injury is six times as likely to be fatal to someone over 80 as for someone of 40. Other obstacles are safety, affordability, lack of information, unhelpful drivers and unreliability of public services (DTLR, 2001 cited by Hanson, 2002).

Public space can also be scrutinized in terms of accessibility (Hanson, 2004) for anyone with impaired mobility (including young healthy people pushing baby cars or carrying heavy loads, for

instance). This means universal accessibility based on a rather holistic design approach, known as "*inclusive design", "universal design*" or "*design for all*", which means creating spaces and products that can be easily used by everyone, with no need for specialist adaptations or design. It implies a deep change in the designers approach to space and services, evolving from an approach based on "*special needs*" to focus on "*inclusive design*" (Table 1).

Table 1. From "special needs" to "inclusive design" (source: Hanson, 2004)

Special Needs	Inclusive Design
Designer client. Persona of a young, fit, active, male, white adult the yardstick for good design.	People are individuals, who have different needs and requirements during their life course.
Others - older people and people with disabilities - are not 'normal' clients.	Us - we all have goals / aspirations as well as problems / impairments.
They have 'special needs'.	We share 'generic needs'.
Micro-environmental approach	Macro-environmental approach
Ethos of specialisation and pragmatism.	Ethos of normalisation and enablement.
Tailors the environment so that it is 'just right' for each client group.	Extends parameters of design until no one is excluded
Telling people what they need.	Asking people what they want.
Does your disability prevent you from using the city centre?	What is it about the design of the city centre that prevents you from using it?

Thus, an inclusive environment is "*one in which all users, whatever their abilities, are able to carry out their day to day activities comfortably, effectively and safely without being restricted by the poor design, maintenance or management of the built environment*" (Hanson, 2004, p.13). In that sense, the principles of inclusive design (Table 2) try to answer to the largest diversity of bodily shapes, dimensions and movements of people in order to alleviate environmental pressure and architectural disability to achieve greater social equity and justice.

Table 2. Principles of Inclusive Design (source: Hanson, 2004, adapted from Centre for Universal Design, 1995)

Principle	Description
equitable	the product is useful and marketable to people with a range of abilities
flexible	it can accommodate a wide range of individual needs and preferences
intuitive	the product is easy to use
effective	it works in most situations and for most people
tolerant	the product can cope with user-errors
efficient	it does not stress or tire the user
appropriate	it is ergonomically designed to be acceptable to the majority of users

Inclusive design is a complex process which requires an integrated approach to overcome individual perspectives and that's why it is essential to have an user-centred approach, trying to understand the user needs, to the point of sometimes being called "social design". It is a process of "*working with the people, not for the people"* (Sommer, 1983 cited by Hanson, 2004), requiring that designers give up part of their role as experts and accept to work in a more participatory approach, welcoming lay people' inputs as experiential knowledge which designers should embed in their

design solutions. Comparing inclusive design with non-inclusive design might help to sort out the differences (Table 3).

Table 3. Inclusive Design and Non-inclusive Design (Source: Hanson, 2004, adapted from Sommer, 1983 and Imrie and Hall, 2001)

Inclusive design	**Non-inclusive design**
Concern with meaning and context	Concern with style and ornament
Participatory	Non-participatory
Orientated to people	Orientated to organisations or institutions
User-centred design	Owner as exclusive client
Low cost	High cost
Bottom-up design approach	Top-down design approach
Democratic	Authoritarian
Seeking to change design attitudes	Conforming to prevailing attitudes to design
Use of appropriate technology	Use of high technology
Use of alternative models of the development process	Development process controlled by corporate interests
Heterogeneity	Homogeneity

Actually, the improvements in accessibility to public spaces (state buildings, cafés, restaurants, shops, outdoor places, etc.) will always serve a large span of users like the growing elderly population, but also parents carrying babies, little children, people carrying heavy loads, people with temporary impairment — in short, everyone.

For the same reason, urban transportation systems should be fully integrated to allow comfortable and "seamless travels" (Hanson, 2004, p. 26) between different routes and means of transportation, offering citizens a greater mobility and facilitating the access to the city centre. The existing model of transportation chain is the result of a "one size fits all" which does not adapt to its users' diversity.

According to recent research (Hanson, 2004) one of the facilities missing in the urban mobility chain is the "away from home" accessible toilet because without it, many elderly or impaired people are limited to being away from home for just a couple of hours at a time. Actually this is a basic human need with serious repercussion on mobility and living quality of the elderly, which is very rarely spoken about in public. Hence the design of away from home accessible toilets becomes specially relevant for urban space because besides its scarcity, when they do exist, its architectural disabilities are frequent: location below or above ground with stairs access only, urinal or wash hand basins inadequate heights (preventing its adequate use by small children, older or mobility impaired people), minimal dimensions (specially for women), etc. And when the users (older or not) are mobility impaired, this type of access restrictions or total absence of accessible toilets may create very humiliating situations of despair. This dependency on the existence of public toilets away from home makes "*women and disabled people rely on a "mental map" of customer toilets in department stores, supermarkets and shopping centres that afford them privacy, comfort, cleanliness, convenience and dignity*" (Hanson, 2004, p.30). Nevertheless the existence of special toilets for disabled people in private premises might transfer public responsibility to the private sector in terms of provision and maintenance of the accessible toilets, which would not be fair. On the other hand, having "toilets for the disabled" (frequently unisex, including baby changing facility, creating sometimes tension between waiting users) is not solving the segregation problem of exclusive use for

whom cannot have access to "normal" public facilities — if all public toilets, male and female, were designed for universal access, including baby changing facilities, many embarrassments of using the other sex facility to help someone disabled, could be solved. Not to mention the dilemma of using a public facility accompanied by a baby car: where to put the baby while using the toilet?

In fact, according to the World Health Organization, "*if we consider active ageing a continuing process, a ageing-friendly city is not just friendly for the elderly. Buildings and streets without obstacles improve mobility and independence of disabled people, both young and old. A safe neighbourhood makes children, young women and older people feel confident to go out and participate at leisure physical activities and social events. Families are less stressed when their older relatives have community support and the health services they need. The whole community benefits from older people's engagement in voluntary or paid work. Finally, local economy profits from older customers. The keyword concerning social and physical urban scenarios in age-friendly terms is capacitation*" (OMS, 2009, p.6).

On a "bottom-up" approach recommended by the United Nations, recent research undertaken by the World Health Organisation (WHO, 2007) directly involved older citizens from 33 cities in all continents[1] in order "*to give the elderly the capacity to contribute to society and participate in decision processes*", considering that "*the elderly are the best experts in their own lives*" (actually we could consider it also an example of Sommer's "social project" we previously referred to). Public, voluntary and private service providers, as well as care providers, also participated at the discussion groups, testifying their experiences and the ones of those they looked after.

All groups in every city discussed eight topics (previously identified in a former WHO research undertaken with older people, about the characteristics of elder-friendly communities) in order to verify until what degree a city is age-friendly, in global terms. These topics are: 1- outdoor spaces and buildings, 2- transportation, 3- housing, 4- social participation, 5- respect and social inclusion, 6- civic participation and employment, 7- communication and information, 8- community support and health services. Just like the determinants of active ageing, these eight aspects of city life overlap and interact with each other.

These factors can be translated into very real urban situations testified or defended by the participants in the discussion: the existence of green areas, the beauty of the outdoor spaces and natural surroundings of the city; the existence of places where older people can sit and rests; wide sidewalks and pathways with even and non-slippery pavements; well signalized and lighted pedestrian crossings, provided with pedestrian traffic lights with adequate timing and visual timer display; safe public spaces; separate pedestrian and bicycle paths; accessible public toilets near pedestrian paths and at public buildings; shops and local markets in housing areas; buildings provided with elevators, mechanical stairs, ramps, wide doors and corridors, low steps, non-slippery pavements; existence of benches at waiting-rooms in public buildings and separate or preferential queues to be attended in a calm and attentive manner.

[1] This study was published by the WHO in 2007 as "Global Age-Friendly Cities: A Guide" on October 1st, the International Day of the Elderly. Its Portuguese edition, dating from 2009, is the publication we refer to in this paper as "OMS, *Guia Global das Cidades Amigas das Pessoas Idosas*".

Transportation system and urban mobility are indeed, essential for the quality of living of the elderly: "*the ability to move around in the city determines social and civic participation and access to community and health services*" (OMS, 2009, p.20). Concerning that matter, the testimonies collected and OMS conclusions mention the need for accessible, affordable, frequent and reliable public transportation, within a broad enough range to reach the necessary places, adapted public transportation for easy access of the elderly and the disabled, bus numbers and route identification clearly visible, reserved seats and courteous passengers, attentive drivers who wait until the elderly are seated to get the bus moving again, sheltered bus stops, well located and lit, with seats and timetables in readable letters. Train stations and bus stations should have ramps, mechanical stairs, accessible public toilets and signs clearly readable. Taxis can be an alternative, however expensive and sometimes problematic for wheelchair passengers — therefore, the existence of communitarian transportation service is an excellent solution.

Driving their own car is a very important option for the autonomy and self-esteem of the elderly (Hanson, 2004) liberating them from public transportation system while they are healthy enough for it. In that case, the obstacles for city driving can be "*heavy traffic, bad road pavements, bad public lighting, hidden or badly located traffic signals and drivers' unlawful behaviour*" (OMS, 2009, p.26). And along with individual transport comes the parking problem, usually expensive and inadequate.

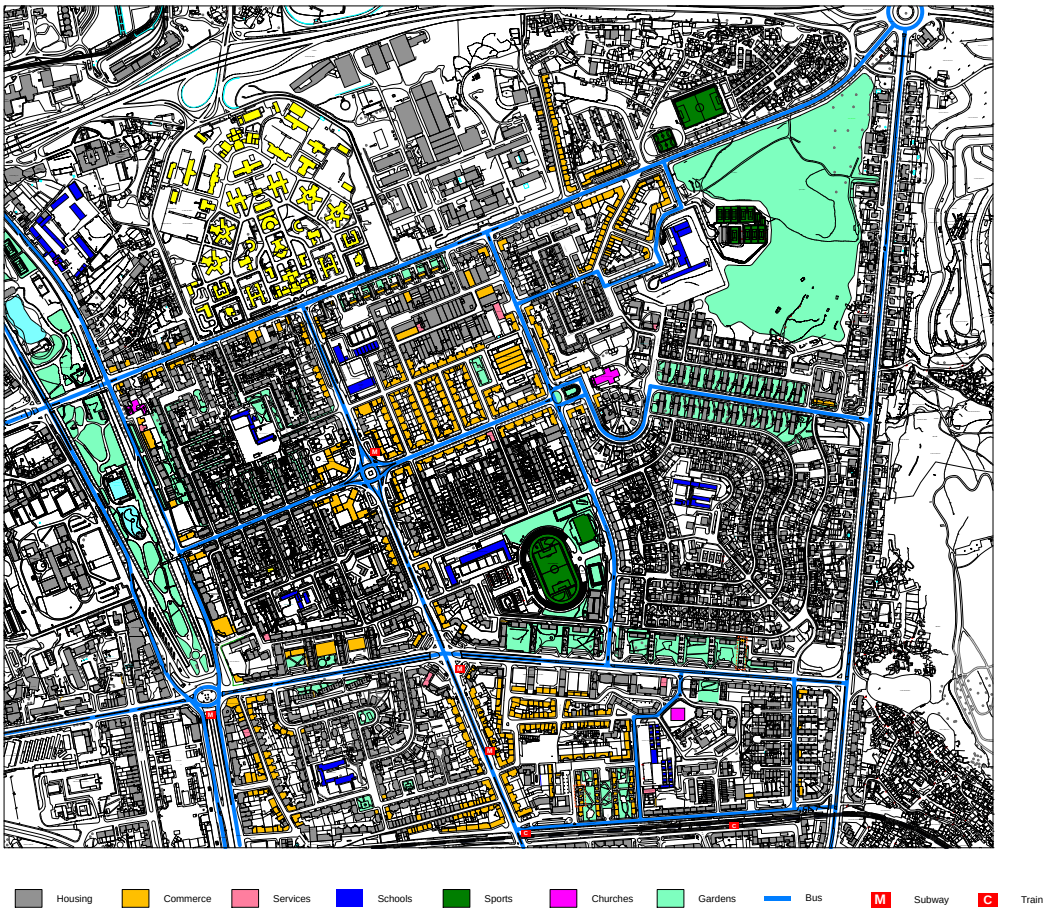


Figure 6. Alvalade district plan. (Source: António Carvalho).

3- Alvalade: a mixed-use district

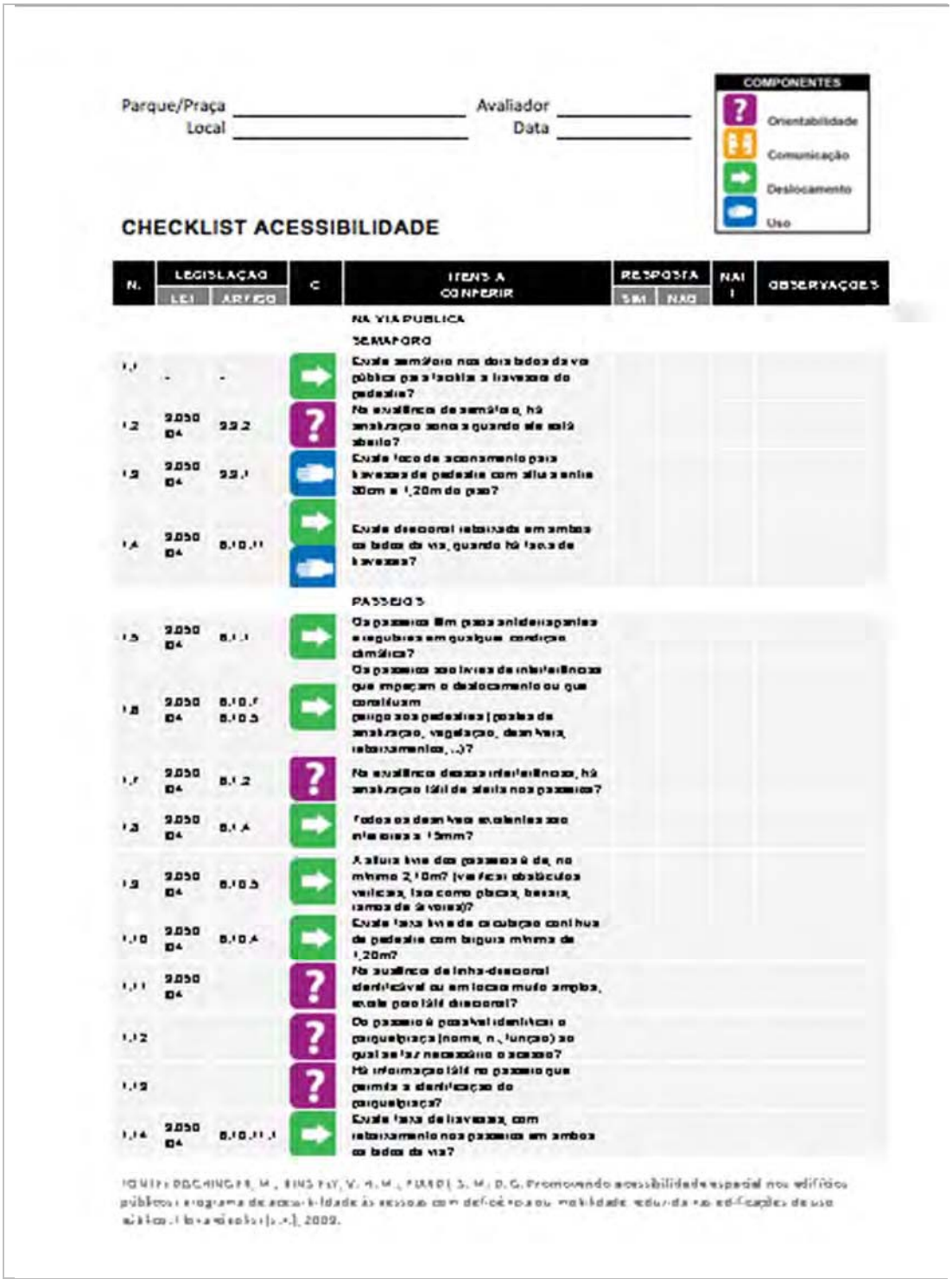
Alvalade district, in Lisbon, is the built result of an urban plan designed by Faria da Costa in 1945 for the city expansion towards north, in response to the lack of new housing for both the working class (who fled to the capital from the countryside) and the growing urban middle-class population. This plan was designed from the beginning based on a "cellular system" of urban units with a great concern for mixed uses and typology variety, creating identifiable neighbourhoods that later building designs from different authors would consolidate. The plan author would follow the construction of the urban cells (the whole area took about 25 years), in a fruitful dialogue with the different authors of the projects for the buildings, incorporating new suggestions and adapting the initial urban layout, thus transforming Alvalade district into a real urban and architectural laboratory, without loosing its overall coherence (Costa, 2002).

Sixty years after its construction, this area of Lisbon, once brand new and populated by young families is, today, one of the capital's most aged districts (Machado, 2007). This fact creates an opportunity to analyse the way one of the most significant areas of Lisbon from the Modernist period[2], already conceived according to new hygienic and functional principles (one of which was the car and the public transportation system), reacted to ageing and how it hosts its elderly at present times — and in the future.

Among other criteria, we will follow the "Accessibility checklist for outdoor spaces" (Figure 9) developed by Dischinger, Bins Ely and Piardi (2009) to evaluate what aspects are fulfilled at present stage in each of the chosen neighbourhood units in terms of *orientation/information, communication, displacement* and *use* and what needs to be improved. This is a thorough checklist with the following sections: street, traffic lights, sidewalks, circulation, vegetation, inner spaces, park access, stairs, ramps, parking spaces for disabled people, urban furniture, public telephones, drinking fountains.

For this purpose we chose six different housing areas that can be considered neighbourhood units, in order to analyse in which ways these urban spaces are age-friendly or not. These units were selected in terms of their "multiplying effect", i.e. units that are repeated through the Alvalade district cell to which they belong, so that the lessons learned can be applied to other similar units. This happens both in terms of urban spaces and buildings (project-type designs were adopted at the time and repeated to assure a faster construction of all the housing needed). The chosen neighbourhood units are: 1- Bairro das Estacas, 2- Av. EUA, 3- Rua Afonso Lopes Vieira, 4- Av. do Brasil, 5- Av. da Igreja, 6- Av. D. Rodrigo da Cunha.

[2] In this respect it is worth watching the Portuguese movie "Os Verdes Anos" directed by Paulo Rocha in 1963, filmed on location mostly in the Alvalade district, portraying both the brand new buildings and urban spaces — outskirts of the city at the time— and its social habitat made of urban middle class families and workers recently arrived from the rural countryside.



Parque/Praça _____ Avaliador _____
Local _____ Data _____

COMPONENTES
Orientabilidade
Comunicação
Deslocamento
Uso

CHECKLIST ACESSIBILIDADE

N.	LEGISLAÇÃO LEI	LEGISLAÇÃO ARTIGO	C	ITENS A CONFERIR	RESPOSTA SIM	RESPOSTA NÃO	NA/I	OBSERVAÇÕES
				NA VIA PÚBLICA				
				SEMÁFORO				
1.1	-	-		Existe semáforo nos dois lados da via pública para isolar o travessia do pedestre?				
1.2	2.050 §4	9.2.2		No existência de semáforo, há sinalização sonora quando ele está aberto?				
1.3	2.050 §4	9.2.1		Existe faixa de acionamento para travessia de pedestre com altura entre 80cm e 1,20m do piso?				
1.4	2.050 §4	8.10.11		Existe desnível rebaixado em ambos os lados da via, quando há faixa de travessia?				
				PASSEIOS				
1.5	2.050 §4	8.1.1		Os passeios têm pisos antiderrapantes e regulares em qualquer condição climática?				
1.6	2.050 §4	8.10.6 8.10.5		Os passeios são livres de interferências que impeçam o deslocamento ou que constituam perigo aos pedestres (postes de sinalização, vegetação, desníveis, rebaixamentos, ...)?				
1.7	2.050 §4	8.1.2		No existência dessas interferências, há sinalização tátil de alerta nos passeios?				
1.8	2.050 §4	8.1.4		Todos os desníveis existentes são inferiores a 15mm?				
1.9	2.050 §4	8.10.5		A altura livre dos passeios é de, no mínimo 2,10m? (verificar obstáculos verticais, tais como placas, bancas, ramos de árvores)?				
1.10	2.050 §4	8.10.4		Existe faixa livre de circulação contínua de pedestre com largura mínima de 1,20m?				
1.11	2.050 §4			No existência de linha-desnível identificável ou em locais mais amplos, existe possível diferencial?				
1.12				Os passeios possuem identificação (nome, nº, função) ao qual se faz necessário o acesso?				
1.13				Há informação tátil no passeio que permita a identificação do parque/praça?				
1.14	2.050 §4	8.10.11.1		Existe faixa de travessia, com rebaixamento nos passeios em ambos os lados da via?				

[illegible] 2009.

Figure 7. Acessibility checklist for outdoor spaces. (Source: Dischinger M, Bins Ely V and Piardi SM (2009) *Promovendo a acessibilidade nos edifícios públicos: programa de acessibilidade às pessoas com deficiência ou mobilidade reduzida nas edificações de uso público.* [s.n], Florianápolis).

1- Bairro das Estacas[3]:

The buildings and urban concept (Figure 8) were designed by Ruy d'Athouguia and Formozinho Sanches in 1949, who proposed a fundamental change in the urban plan by opening the blocks to the main streets, converting what was intended to be interior private gardens into open public parks.

The use of round columns (the "estacas/stakes"...) to support the medium height (0+4 floors) apartment buildings also meant liberating the ground floor, thereby enhancing the intended transparency for the urban space. On the other hand, this created a perimetric columnade effect around all the buildings, enlarging the sidewalks under the cantilevered apartments or cutting through underneath them, thus promoting people circulation and encounters (Hillier and Hanson, 1984).

Underneath the central buildings there is maximum transparency, only with columns and the stairwell surrounded by a glass box entry (Figure 9). Lateral buildings have commercial spaces, which, once more, enhance people circulation and outside activity (nowadays not so alive as 2 or 3 decades before, when apartments were filled with young families). Perimetric buildings (north and west), enclose the overall circulatory columnade effect, defining the open-air market-place which takes place at the north-western corner of the quarter.

Figure 8. Bairro das Estacas, plan. (Source: António Carvalho).

The three main public gardens in-between the central buildings were designed by landscape architect Gonçalo Ribeiro Telles as vicinity areas of getting together for the neighbours. Their layout is quite thoughtful and clear, organizing spaces for different functions: from the central recesses for parking lots (enough at the time but not anymore), children playgrounds, to tables and chairs for the elderly (Figure 10). All these connected by parallel or diagonal pathways, facilitating people's displacement.

[3] The name means "*Stake Quarter*" which is the popular name given to this group of apartment buildings built on top of cylindrical concrete columns —a modernist image totally new in Lisbon at the time.

Figure 9. Bairro das Estacas: ground floor transparency. (Photo: António Carvalho).

Applying the accessibility checklist (Figure 7) to this public space, the main problems we could identify in terms of an age-friendly environment were:

- nonexistence of tactile signals for the blind or visually impaired;
- nonexistence of handrails on stairs and ramps;
- nonexistence of ramps on the (very few) parking spaces for handicapped people;
- nonexistence of special benches for obese people and no free space for wheel-chairs by the normal benches;
- nonexistence of public telephones or telephones for the handicapped;
- nonexistence of drinking fountains;
- uneven, narrow and degraded pavements with level differences;

Figure 10. Bairro das Estacas: elderly playing cards. (Photo: António Carvalho).

Taking those problems into consideration, we propose some simple corrections and low-cost improvements for this neighbourhood unit:

- provision of tactile pavement signals on the main footpaths;
- provision of handrails on the stairs, carefully designed according to the Modernist character of the buildings;
- provision of ramps and accessible paths for wheel-chairs from the parking lots to the main footpaths in all public areas (there are no steep slopes) and building entrances;
- provision of special benches for obese people and creation of free spaces near by the existing benches, so that someone on a wheel-chair can park there and have a conversation with the others on the bench;
- provision of one drinking fountain at each main green area, ergonomically adapted for the elderly and the handicapped;
- provision of one public telephone at low height, for the handicapped;
- careful introduction of wider, smooth surfaced footpaths for wheel-chairs and the elderly (without destroying the highly qualified original stone footpaths).

2- Av. Estados Unidos da América (EUA):

The buildings and urban concept (Figure 11) were designed by Manuel Laginha, Vasconcelos Esteves and Pedro Cid, in 1954, following the general plan designed by Faria da Costa, perpendicular to the avenue (Figure 12).

Figure 11. Av. Estados Unidos da América, plan. (Source: António Carvalho).

The architects assumed a clear Corbusian "*unité d'habitation*" influence for the tall buildings (0+10 floors) which they chose to support on large *pilotis*, creating a total transparency at the ground level, with the exception of the minimum space for the entrance hall + stairwell + elevators. The open areas between buildings are public lawns, each of them with its own character, allowing pedestrians to cross through under the buildings (Figure 13).

Figure 12. Av. EUA: perpendicular blocks with public gardens. (Photo: António Carvalho).

Figure 13. Av. EUA: ground floor continuity under the buildings. (Photo: António Carvalho).

The main accessibility problems we could identify are:

- nonexistence of tactile signals for the blind or visually impaired;
- nonexistence of ramps on the (very few) parking spaces for handicapped people;
- nonexistence of special benches for obese people;
- nonexistence of public telephones or telephones for the handicapped;
- nonexistence of drinking fountains;
- uneven and degraded pavements with level differences;
- traffic signals for pedestrians with short timing do not allow crossing the avenue at once;
- some pedestrian traffic signals at crossings do not have sound signal for the blind or visually impaired;
- some public stairs do not have alternative ramps for accessibility.

Taking that into consideration, the corrections and improvements we propose for this neighbourhood unit are:

-- provision of tactile pavement signals on the main footpaths;

- provision of ramps and accessible paths for wheel-chairs from the parking lots to the main footpaths in all public areas (there are no steep slopes) and building entrances;
- provision of special benches for obese people and improvement of the footpath pavements leading to the existing benches, so that someone on a wheel-chair can get there autonomously and have a conversation with people on the benches;
- provision of one drinking fountain at each main green area, ergonomically adapted for the elderly and the handicapped;
- provision of one public telephone at low height, for the handicapped;
- careful introduction of wider, smooth surfaced footpaths for wheel-chairs and the elderly (without destroying the highly qualified original stone footpaths);
- setting the pedestrian traffic lights with the appropriate timing, complemented with visual timer, would allow the elderly to cross safely this heavy traffic avenue;
- provision of sound system for all pedestrian traffic lights;
- provision of wheel-chair platforms at the wide steep stairs connecting the public parks to the upper street on the north side.

3- Rua Afonso Lopes Vieira:

The buildings (Figure 14) were built according to 9 types designed by Miguel Jacobetty in 1945 for the municipality, answering the urgent need of low-cost housing in Lisbon. Its construction started at the same time as the global infrastructure works for the whole Alvalade district (Costa, 2002).

Figure 14. Rua Afonso Lopes Vieira, plan. (Source: António Carvalho).

Figure 15. R. Afonso Lopes Vieira: cars over the sidewalks. (Photo: António Carvalho).

Figure 16. R. João Lúcio: green front yards and narrow sidewalks. (Photo: António Carvalho).

The layout followed the urban plan (Figure 14), providing the area with 300 buildings (about 2000 apartments) in just 3 years (1947-1950), sheltering low-income families displaced from a more central area downtown. The outdoor spaces are mainly private front yards (Figure 15) separating the facades from the sidewalks (Figure 16) and the backyards (gradually occupied by the housing tenants). A main feature in this area is the existence of a “secret” network of footpaths (Figure 17) and pedestrian walks connecting all the backyards, providing useful (but sometimes unsafe) shortcuts in the urban fabric. This network of footpaths is a real public space with traditional sidewalk pavements (often degraded) and public lighting.

The only open public space in this large area of dense housing, which shows a traditional layout, is the park surrounding the primary school, with lawns, footpaths and benches.

Figure 17. Backyards and footpaths. (Photo: António Carvalho).

The main accessibility problems we could identify were:

- cars parked over the sidewalks everywhere;
- narrow sidewalks with tree alignments leave a too narrow space for wheel-chairs and push-cars;
- no traffic lights for pedestrians at the crossings;
- some pedestrian crossings don't even have ramped curbs;
- nonexistence of tactile signals for the blind or visually impaired (actually, not even space for them to walk on the sidewalks);
- nonexistence of handrails on stairs and ramps;
- nonexistence of ramps on the (very few) parking spaces for handicapped people;
- nonexistence of special benches for obese people and no free space for wheel-chairs nearby the normal benches;
- nonexistence of public telephones or telephones for the handicapped;
- nonexistence of drinking fountains;
- uneven, narrow and degraded pavements, often with level differences;
- vegetation invading the footpaths and sidewalks;
- steep stairs;

Taking that into consideration, we propose some corrections and improvements for this neighbourhood unit:

- provision of car parking barriers along the curbs;
- provision of levelling solutions (grids, porous pavements, etc.) around the tree trunks to widen the free walking area;
- provision of ramped curbs at the pedestrian crossings;
- provision of tactile pavement signals on the main footpaths;
- provision of handrails on the stairs and ramps;
- provision of ramps and accessible paths for wheel-chairs from the parking lots to the main footpaths and building entrances;

- provision of special benches for obese people and creation of free spaces near by the existing benches, so that someone on a wheel-chair can park there and have a conversation with the others on the bench;
- provision of drinking fountains, ergonomically adapted for the elderly and the handicapped;
- provision of one public telephone at low height, for the handicapped;
- careful introduction of wider, smooth surfaced footpaths for wheel-chairs and the elderly.

4- Av. do Brasil:

This group of 8 buildings (Figure 18) was designed by Jorge Segurado in 1958, converting the buildings parallel to the avenue proposed in the urban plan into the existing perpendicular volumes, thereby creating open public gardens between them.

Figure 18. Av. do Brasil, plan. (Source: António Carvalho).

Recessed from the avenue there are one-story buildings (Figure 19) for commerce, separating the gardens from the secondary street (R. Aprígio Mafra) which actually is the main car access to all the buildings, with small parking lots between them (Figure 20).

Figure 19. Public park with commercial building between housing blocks. (Photo: António Carvalho).

Figure 20. R. Aprígio Mafra: car access and parking. (Photo: António Carvalho).

The main accessibility problems we could identify are:

- nonexistence of tactile signals for the blind or visually impaired;
- nonexistence of handrails on stairs and ramps;
- nonexistence of ramps on the (very few) parking spaces for handicapped people;
- nonexistence of special benches for obese people and no free space for wheel-chairs nearby the normal benches;
- nonexistence of public telephones or telephones for the handicapped;
- nonexistence of drinking fountains;
- uneven, narrow and degraded pavements, often with level differences;

Taking that into consideration, we propose some corrections and improvements for this neighbourhood unit:

- provision of tactile pavement signals on the main footpaths;
- provision of handrails on the stairs, carefully designed according to the Modernist character of the buildings;
- provision of ramps and accessible paths for wheel-chairs from the parking lots to the main footpaths in all public areas (there are no steep slopes) and building entrances;
- provision of special benches for obese people and creation of free spaces near by the existing benches, so that someone on a wheel-chair can park there and have a conversation with the others on the bench;
- provision of one drinking fountain at each main green area, ergonomically adapted for the elderly and the handicapped;
- provision of one public telephone at low height, for the handicapped;
- careful introduction of wider, smooth surfaced footpaths for wheel-chairs and the elderly (without destroying the original stone footpaths).

5- Av. da Igreja (East):

This avenue has two very distinct areas: the western side (totally occupied by social-housing buildings) and the eastern side (occupied by middle-class housing with commerce on the ground-floor). On this eastern side (Figure 21), because of all the shops, the sidewalks are large and totally paved (on the western part they have large flowerbeds) providing conditions for a very busy pedestrian activity, therefore enhancing commerce. The upper floors in all buildings facing the avenue there are comfortable apartments with large balconies towards the busy avenue (Figure 22). Fernando Silva designed all buildings in 1947, according to 5 types. This area was assumed in the urban plan as a commercial district which was vital for the population of the 2000 social-housing apartments located on the south and on the western half of the avenue, in an isolated area of the city at the time, and thus its construction immediately followed the social housing (Costa, 2002). The vicinity of the Alvalade Market was a commercial complement for this area and population.

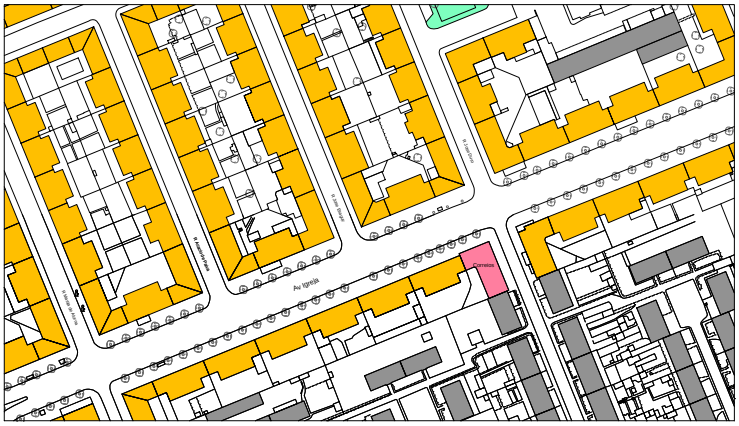


Figure 21. Av. da Igreja, plan. Source: António Carvalho.

Figure 22. Av. da Igreja. Photo: António Carvalho.

The main problems we could identify in terms of an age-friendly environment were:

- no traffic lights for pedestrians at the crossings (nevertheless, the intensity of pedestrian movement and the many crossings force cars to move slowly, in a quite peaceful coexistence);
- nonexistence of tactile signals for the blind or visually impaired;
- nonexistence of ramps on the (very few) parking spaces for handicapped people;
- nonexistence of special benches for obese people;
- nonexistence of telephones for the handicapped;
- nonexistence of drinking fountains;

Figure 23. Av. da Igreja: urban furniture at use on the large sidewalks. (Photo: António Carvalho).

Taking that into consideration, we propose some corrections and improvements:

- provision of tactile pavement signals on the main footpaths;
- provision of ramps and accessible paths for wheel-chairs from the parking lots to the sidewalks and building entrances;
- provision of special benches for obese people;
- provision of drinking fountains, ergonomically adapted for the elderly and the handicapped;
- provision of one public telephone at low height, for the handicapped.

6- Av. D. Rodrigo da Cunha:

This group of 20 buildings (Figure 24) was designed by Joaquim Ferreira in 1949 in agreement with the urban plan author, Faria da Costa, who recognized some design failures in the design of the social housing blocks (R. Afonso Lopes Vieira) where the backyards use was soon abandoned by the tenants, becoming degraded areas. Therefore this set of buildings followed Modernist principles of East-West facade orientation (perpendicular to the avenue – Figure 25) and included for the first time in the overall concept the public gardens (designed by landscaper Gonçalo Ribeiro Telles in 1950). In architectural terms, the land slope (Figure 26) was a good justification for the creation of a building-type in half-stories[4], symmetrically located along the avenue.

[4] Separated by the central stair-well with 2 entrance landings at different levels, each floor has 4 apartments with the 2 on the left “half-story” bellow the 2 apartments on the right.

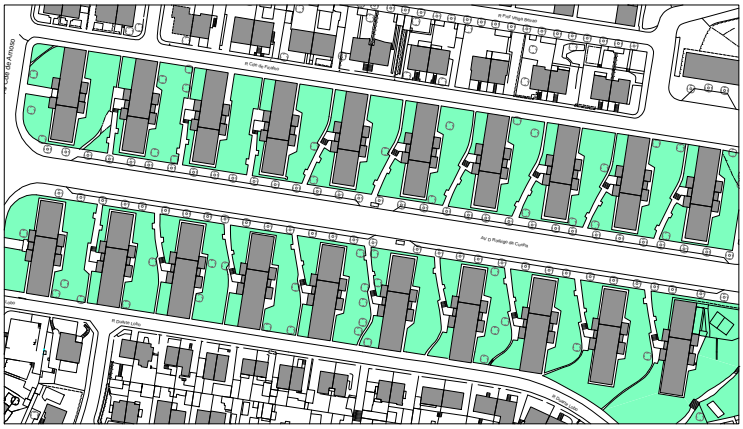


Figure 24. Av. D. Rodrigo da Cunha, plan (Source: António Carvalho).

Applying the accessibility checklist (Figure 7) to this public space, the main problems we could identify in terms of an age-friendly environment were:

- no traffic lights for pedestrians at the crossings;
- some pedestrian crossings don't even have ramped curbs;
- nonexistence of tactile signals for the blind or visually impaired;
- nonexistence of handrails on stairs and ramps;
- nonexistence of ramps on the (very few) parking spaces for handicapped people;
- nonexistence of special benches for obese people and no free space for wheel-chairs nearby the normal benches;
- nonexistence of public telephones or telephones for the handicapped;
- nonexistence of drinking fountains;
- narrow and steep ramps.

Figure 25. Groundfloor relation with avenue and public parks. (Photo: António Carvalho).

Figure 26. Entrance footpath and public park (Photo: António Carvalho).

Taking those problems into consideration, we propose some simple corrections and low-cost improvements for this neighbourhood unit:

- provision of tactile pavement signals on the main footpaths;
- provision of handrails on the stairs and ramps, carefully designed according to the Modernist character of the buildings;
- provision of ramps and accessible paths for wheel-chairs from the parking lots to the main footpaths in all public areas and building entrances;
- provision of special benches for obese people and creation of free spaces near by the existing benches, so that someone on a wheel-chair can park there and have a conversation with the others on the bench;
- provision of one drinking fountain at each main green area, ergonomically adapted for the elderly and the handicapped;
- provision of one public telephone at low height, for the handicapped;
- careful introduction of wider footpaths for wheel-chairs and the elderly (without destroying the highly qualified original stone footpaths).

4- Conclusion

The Alvalade district, in Lisbon, is a good example of a mixed-use urban area designed according to Modernist principles which, 60 years after its inception, shows the need —but also the capacity— to be adapted in terms of universal design.

If the identified problems can be solved by the introduction of simple and low-cost solutions as the ones we propose, the Alvalade district very old and still ageing population can therefore *age in place* (Pastalan, 1990), delaying —or even avoiding— the need for institutionalization.

This way people can remain active longer in their lifetime homes and neighbourhoods, contributing to street life and local economy — indeed, for transportation reasons mainly, older people tend to buy locally from people they know and trust, therefore enhancing local commerce.

Socially, this will prove to be a more balanced solution for families because it promotes an easier intergenerational help (first, babysitting grandchildren and in later years getting assistance from children and grandchildren, always at home —the “granny home”). Each generation can live in its own home, according to its own rhythm and tastes, and still avoid the stress of longer, artificial or stranger routes to visit parents and grand-parents in old people’s homes, because when people *age in place*, the whole family is *aging in place* too and naturally getting used to it.

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Designing public spaces for increased socialization amongst people of all ages

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«Today there is an increasing need to design for contact as family sizes dwindle. More and more people live alone, the proportion of old people increases, and more people do monotonous jobs with little collaboration», M. Egelius (Mikellides, 1980, 137)
This project tackles issues on socialization in the public space of the city. The main aim is to encourage communication and interaction between strangers of various ages in the realm of public space (using public areas). This is expected to be enhanced through the adaptation of "informal acting" in the public area of the city, so that groups of people of different age-groups and varying degrees of familiarity with each other may take part in the impulsive, informal performance of the city as actors or spectators.
In the process of choosing the right area, it was considered important that the target area is situated along existing anchors, ensuring a constant flow of people. "Free" space was also considered important, as it provides the opportunity for the development of public uses, that encourage an unofficial performance to occur, as well as giving the opportunity to people to stay for a while in the area. A pause in the area may interfere with the constant flow of people and thus encourage passive social contact. Taking the above criteria into consideration, the historic core of Strovolos - a municipality within the Nicosia district of Cyprus - was selected as the platform for urban design engineering experimentation.

Keywords: public space; socialization; age group; informal acting; theatricality

1. Introduction

This project involves issues of socialization in the public space of the city. The main aim of this study is to explore ways of encouraging the communication and interaction between strangers of various ages using public space, through a number of interventions.

2. The Right to the Public Life

"The right to the city" is a slogan closely associated with French philosopher Henri Lefebvre who argues that the city is a work in which all its citizens should participate (Mitchell, 2003). He also argues that cities are necessarily public and therefore places of social interaction and exchange with people of all ages are essential. "Moreover, this right is related to objective needs, such as the need for creative activity – and not only for products and consumable goods – but also for information, symbolism, imaginary and play. It is also related to the right to freedom, to diversity in socialization, to habitat and to inhabitation – and perhaps the implied right of participation and appropriation" (Lefebvre, 1996 [1968]). The right to the city is therefore a right to urban life, to renewed centrality, to places of encounter and exchange, to life rhythms and time uses, enabling the full and complete usage of moments and places (Lefebvre, 1996 [1968]) and it is a right that has to be ensured for people of all ages.

In addition, resisting the hegemony of "abstract space" is to produce what Lefebvre calls "differentiated space," a straggle for rights which is a determinate of the actual social content, of the dialectic between abstract and differentiated space. It is this struggle, which results in the production

of public space and the way in which it is used and transformed within cities (Lefebvre, 1991). Similarly, Carr states that a basic premise is that public spaces should be responsive in their design and management to meet the needs of all their users and to be made accessible to groups that are often marginalized, such as the elderly, by providing freedom of access and action. They should also be meaningful in ways that allow people to make strong connections between the place, their personal lives and the larger context. Accordingly, when designs are not grounded in social understanding and social inclusion, they may fall back on simple geometry, a fact that negates the responsibility to understand and serve the public good (Carr et al., 1992).

2.1 The Importance of Public Life

The existence of some form of public life is a prerequisite to the development of public spaces. Although every society has some mixture of public and private, the emphasis given to each one and the values they express help to explain the differences across settings, across cultures and across times (Carr et al., 1992). According to Carr "The public spaces created by societies serve as a mirror of their public and private values as can be seen in the Greek agora, the Roman forum, the New England common and the contemporary plaza. When public life and public spaces are missing from a community, all residents but especially the elderly, may become isolated from each other and less likely to offer mutual help and support.

2.2 Cultural Forces Shaping Public Life

Three main cultural forces that shape public life may be identified according to Carr: The first is predominantly a social one, served by multipurpose spaces with various activities, but mainly focused on the social and inclusionary life of the community. The second is a functional form of public life serving the basic needs of a society – flows of people on the paths and streets accessible to young and old alike, obtaining food for the household, providing shelter against the elements for themselves and for the collective. The third is symbolic public life, which develops out of the shared meaning, people and especially long time residents of a community, have for physical settings and rituals that occur in public. They are the spiritual and mystical experiences that occur in a society, the celebrations of past and memorable events that forge connections amongst people of all ages (Carr et al., 1992; Low, 2000).

By observing other people and their activities and participating with them in shared tasks, the existence of an inclusive community can be perceived, enabling people to feel that they participate as part of a larger group in an active manner. However, temporary this may be, for the time it occurs there is a direct sense of sharing for some of those present. Particularly for the elderly population this is an immediate if perhaps short-lived participation in an event that can best be experienced with others. The development of a social-symbolic life close to the home of the elderly members of a community, as well as the settings to support it, may be required (Carr et al., 1992). It may be necessary to create easily accessible gathering places such as the churches and their courtyards, as seen in medieval towns and preserved in the historic cores of present day agglomerations. The modern equivalents are likely to be recreational ones, for sports, shopping and walking, but perhaps some spiritual settings or places for meditation and relaxation will emerge as well (Rivlin, 1987).

Squares should be designed to include various combinations of trees, flowers, plants and grass because these elements tend to soften the quality of the spaces they occupy, attract the passerby and provide a place of pause for the elderly users.

3. Representation of public life

Representation, whether of oneself or of a group, such as the elderly inhabitants of a community, demands space and, while it is true that human beings have no choice but to occupy a space, it does not follow that such a space allows for comprehensive, adequate and self-directed representation of human beings, either to themselves or to others (Smith, 1994). Implicit in the public sphere is the assumption that the provision of an adequate space and democratic control of that space will guarantee a vibrant and inclusionary public life. The erosion of such places is likewise often argued to be crucial to the closing down of public life and the exclusion of segments of the society. But in the end, what makes a space public and accessible is its ability to fulfill the need of some groups, such as the elderly, to appropriate space and through its actions to make it public (Mitchell, 2003). The very act of representing one's group to a larger public creates a space for representation, which both demands space and creates space. It is therefore fundamental for the product to relate to that particular need and to be spatial.

3.1 Public space as the place of performance

If cause and effect and influence are weak descriptions of the relation between public life and the public place, there is a logical relationship between the stage and the street. This logical relationship has four parts (Sennett, 1977). First, this informal "theater" shares a problem not with society in general, but with the city. The problem is one of audience – specifically, how to arouse belief in one's appearance among a milieu of strangers. Second, rules can arise in a city for making believable appearances before strangers that have continuity in rules that govern response to the stage at the time. The audience can then play a common role in both realms. Third, a public geography must be produced. Fourth, to the extent a public geography exists, social expression should be conceived as a presentation to other people. These parts are then those of audience, of continuity of rules, of public geography and of expression (Sennett, 1977).

3.2 Public space as a platform for observation

Many people, and particularly the elderly, just want a place to sit and watch the crowds, and there is no doubt that such places have enlivened and made accessible whole sections of cities, by being perhaps the modern equivalent of the agora and the street market. The importance of such pedestrian environments in the city is far greater than simply their aesthetic appeal or even the fact that they may provide an opportunity to spend some time outdoors (Cooper Marcus and Francis, 1998). Quoting psychotherapist Joanna Poppink, "Spending time in an outdoor café or bustling shopping street is more than just a pleasant diversion, it is a necessary element of healthy urban life. It is important to leave the house and get to see people of different ages, different ethnicities and different relationships that one can observe firsthand" (Morgan, 1996). These encounters can help to build a sense of community and tolerance for people of all ages that in turn provides the

underpinnings for thriving urban life in an otherwise underperforming historic center, such as the case presented later in this paper.

3.3 Public space as common ground

Public space may also be perceived as the common ground where people carry out the functional and ritual activities that bind a community, whether in the normal routines of daily life or in periodic festivities (Carr et al., 1992). There is an increased recognition that public space is also used for "private" purposes – for buying or selling things, for gardening, for self improvement through exercise or for simply finding a place to exist, accessible to all.

4 Interaction between people

As D. Halpern - currently working in the Institute of Government, London - has observed, "for most people, the greatest source of satisfaction in life is other people" (Wernick, 2008, 73) and human interaction is a necessary human psychological need.

4.1 The Importance of interaction between people

Social interaction is equally important for children, adults and elderly. In the case of children, according to a guide for parents developed by Prof Dr Deanna Binder, it is important that parents create opportunities for their child to be in contact with other children. Similarly, it is important that children can observe relationships between older people and be in contact with such people. In this way, the child begins to understand the social life that exists beyond the school boundaries, therefore creating the preconditions necessary for a smoother induction into society. Furthermore, social contact between children and adults enables knowledge transfer, which is a long-established method for the socialization of children.

In the case of adults, interaction with other people is the remedy against job burnout, which affects a significant number of them. Contact and the ability to communicate with other people as well as change of the surroundings can help in dealing with psychosomatic problems caused by work related stress that many individuals suffer from.

The need for social interaction is much more augmented in elderly people. After retirement, previously active members of the society become excluded, as they are now considered unproductive. This is one of the reasons why many elderly people suffer from emotional disturbances and more precisely suffer from depression. The ability to observe, as well as be in contact and communicate with other people of various ages, is a remedy for such social disturbances and a means of escaping temporarily from health problems, which they commonly suffer from.

4.2 Communication in everyday life – visual contact

Communication between people, whether verbal or non-verbal, is essential in order for interaction between people to take place. Verbal communication describes the ability of two or more people to communicate through speaking exchanging thoughts, information, instructions, questions, feelings and experiences. On the other hand, communication can take place in the absence of speaking. Speaking, in such cases, is replaced mainly by visual contact, which encourages non-verbal

communication. According to E. Kourti Assistant Professor of Social Psychology at the University of Crete, non-verbal communication is something difficult to avoid, as during the interaction between people, they send out non-verbal information, exchanging messages about themselves and others (Kourti, 2007).

Facial expression has the most important role in non-verbal communication. According to E. T. Hall an American anthropologist, eyes cannot only receive information through visual contact, but also transmit information through the way they look (Hall, 1966). They can encourage the spectator, induce anxiety or worry or even impose dominance. Communication between people can also be established through observing each other's body language. The way one stands or moves his or her body, or even particular gestures of that person, may be considered a form of communication. Gestures and body language also convey messages to the spectator about the social status of the performer. Finally, clothing, hairstyle, tattoos or the objects one carries – in fact anything that can be visualised - may inform the spectator about the social identity of the person being watched.

4.3 Communication in theatre – visual contact

"*The only difference between life and theatre is that theatre is a condensed version of life*", Peter Brook (Breton, 1989).

The aim of this study, which involves the subtleties of communication between strangers who use public space, is expected to be enhanced through the adaptation of "staged theatrical elements" in the public area, so that groups of people of different age-groups and varying degrees of familiarity with each other may take part in the impulsive, informal performance of the city as actors or spectators (figure 1).

The role of visual contact, in communication between people, is described through an analysis of non-verbal communication. Visual contact is equally important in acting or in some form of performance where communication between the actor and the spectator is achieved not only through words, but also through the sense of vision. This is indicated by the etymology of the word 'theatre', which comes from the Greek word 'θέατρο' (theatro), originally from the verb 'θεώμαι' (theome) meaning to observe or to see.

An actor's expressions, body language, posture or movement – elements that become apparent through vision – are complementary elements, equally important to speech for the sense of expression of a theatrical character. Each actor utilizes the elements stated above, the choice of attire and accessories worn or carried to convey visual information about her theatrical persona to the spectator.

5 The adaptation of "informal acting" in the city

Two criteria were used for the selection of an area where by utilizing architectural and urban design tools an attempt is to be made to create a physical environment that sets the stage, so to speak, for enhanced communication to occur in the everyday life of people of various ages using it. To ensure the constant flow of people in the area, it was considered important that the design proposal should occur and be aligned or should work towards creating an obvious passage between two destination nodes. The presence of available public space in the area was also considered important. This space

provides the ability to develop public uses, which will encourage an unofficial performance, give control of the space to the users and allow its appropriation to encourage familiarization between people sharing it through frequent planned meetings or accidental encounters. These public uses will also encourage people to remain in the area for a more extended period instead of using the area as a mere passage from one node to the other. A pause in the area can interfere with the natural and constant flow of people, and in doing so, it may prompt passive social contact.

5.1 Site selection

Taking the criteria above into consideration, an informal corridor was chosen for this architectural and urban design exploration, which connects the historic core of Strovolos - a municipality within the Nicosia District of Cyprus - across the Pedieos River and its adjoining linear park to the City Hall and Municipal Theatre area beyond (fig.1). The chosen corridor is of 500m length, a distance that can be covered by pedestrians of all ages.

Figure 1. Strovolos Historic Center Redevelopment Area (1. City Hall; 2. Municipal Theater; 3. Proposed and Existing Pedestrianized Roads and Paths; 4. Elementary School & Lifelong Learning Center; 5. Public Park; 6. Program Spaces (in new and adaptively reused fabric); 7. Panagia Chryseleousa Church; 8. Multipurpose Cooperative Society Building)

5.2 Observation of current pedestrian movements in the surrounding area

The significant vehicular traffic through the centre of Strovolos and the lack of adequate parking or pedestrian corridors for efficient and safe access in the vicinity of the historic core discourage the passage of pedestrians and hence the social contact between people.

There are some singularly active poles of attraction in the area, many of which activate pedestrian movement. For example, the Chryseleousa church and a grocery store which are located in the urban core, encourage daily movements of people of all ages and especially elderly people from neighbouring houses and parking places towards them. The Chryselousa primary school activates networks located around it during morning and lunch hours, while the Ayia Marina primary school activates the bridge, which crosses over the river and ends at the primary school during the same hours. Individuals, using the above-mentioned routes of transfer during these specific time periods, are mainly children who are commonly accompanied by their parents or grandparents. The Strovolos Cooperative and the cookery 'Diomedes' which are located at the urban core originate movements of adults and elderly between official and unofficial parking places which are located at a close distance to these uses during the morning and lunch hours respectively. Lastly, the Pedieos River Linear Park, which is located along the side of the river, constitutes on its own a core for movement, as it collects people of all ages daily, mainly from the areas of Strovolos and Arhcangelos, but also from other areas in Nicosia.

Pedestrian movements also take place between current public uses of the area, in cases where one use complements the other. For instance, the library of the municipality of Strovolos can constitute a complementary use of the two primary schools as it organises at a low frequency some literature-morning gatherings which are relevant to primary school children, encouraging the movement of pupils from the school towards the core where the library is located. Another complementary use for primary schools is the Chryseleousa church, since students are taken to the church once a month. Some buildings, which are used for art exhibitions, can include in their collections work of art created in art workshops, which are also located both in the surrounding area as well as the urban core. Similarly, they can host work created during the afternoon painting and woodcarving lessons that take place at the two primary schools. In this way, movements between these places are encouraged. Furthermore, two small acting schools, as well as the two primary schools which prepare plays, can be related to buildings used for such performances i.e the Chryseleousa Foundation of Strovolos and the Strovolos Municipal Theatre, thereby encouraging movements of children and adults on foot at low frequencies.

5.3 Activation of pedestrian movements – Interventions at the urban scale

Currently, pedestrian movements, that are usually due to some prescribed journeys to and from specific nodes that exist in the area, or between current public uses located therein, where such uses are complementary to each other, are not so frequent and are of a low density.

Corrective interventions at the urban scale are therefore essential in order to increase the frequency and density of pedestrian use, thereby activating the proposed corridor and the surrounding area. Pedestrian movements are essential if these informal "theatrical performances" are to take place in public urban space.

5.3.1 Reinforcement of existing commercial zone

One of the main design intents is to use the architectural qualities afforded by the existing buildings in the area of intervention by adaptively reusing a number of abandoned buildings along the sides of the

currently downgraded commercial zone. This zone of use is adjacent to the historic core of Strovolos, and the proposed intervention looks to the addition of strategically selected commercial uses to jumpstart social interaction. The intent is to increase the length of stay and frequency of passage through this area.

5.3.2 Addition of complementary uses

Suggestions for the reuse of the underutilized or abandoned buildings in the area include building stock in the periphery of St George's church as well. Such buildings may be used to create an afterschool care station for children. In this way it is expected that some existing circulation networks, as well as the proposed corridor, which connects the school in the target area to the school in the proximity of St. George's church, will be activated by young pedestrian usage on a daily basis.

Suggestions about the addition of complementary uses to current public uses with the aim of encouraging pedestrian movements from one such use to the other, apply to the proposed corridor as well. In this corridor, a public space is chosen (point '6' in Figure 1), part of which is currently used as an unofficial parking area, for the introduction of these complementary uses. This part constitutes the weakest spot in terms of unofficial performance in this corridor.

Taking into consideration the existence of the linear park along the river which is heavily frequented by people power-walking and jogging as they pass by here from the residential concentrations in the Strovolos and Archangelos areas, the addition of a gym as part of the architectural program of the proposed corridor is suggested. The spectacle that life offers in such a place consists of the opportunities for informal performances that the main characters of the gym can communicate to pass-by spectators by sending non-verbal messages about themselves.

The addition of an acting workshop in the area may not only provide the opportunity for an unofficial performance through theatrical scenes from the rehearsals and the daily routines of the workshop's students, but it can also host an official performance to take place on its premises and in the surrounding context. Such a use can encourage movements from other theatrical workshops in the vicinity and from the two schools towards the place of intervention, as well as movements from the area of intervention to another popular and well established performance venue, the Strovolos Municipal Theatre across the Pedieos River.

Lastly, the addition of a cafeteria in the area is a complementary use for many current uses in and around the historic centre as well as the Strovolos Municipal Theatre and the Linear Park. Its goal would be to enhance this part of the proposed corridor and to activate the existing passages leading to the area of intervention, so as to encourage passersby to explore the proposed development and to make use of the services provided for leisure and relaxation and social interaction. Scenes from the life of the cafeteria can also add to the theatricality of the area.

The choice of the program elements for the complementary uses mentioned above, which will be designed in the weakened spot of the proposed corridor, results not only in their relation to existing uses, with the aim of increasing pedestrian movements, but also in the enhanced sense of theatricality, their function may project to the area of intervention. The theatricality promoted by these uses is expected to be recognised either by someone who uses this area as a passage from the river area towards the core, or by users who take the opportunity to stop in the area. Additionally, the

combination of uses is expected to encourage individuals of all ages to visit the area each for their own reasons at regular time points, and in such way encouraging these people to get to know each other through their frequent encounters.

5.3.3 Network management

In order for the movements described above to be possible at an urban scale, it is important that some vehicular circulation routes are to be pedestrianized, while others are to be designed in such a way that pedestrians get priority of movement. Additionally, some empty spaces, on the periphery of the core, are intended to be used as parking places, encouraging people to park there and continue their exploration towards the historic centre on foot.

5.4 Activation of pedestrian movements – Interventions between the two anchors

For the activation of the proposed corridor through the flow of people, it is important, beyond the actions already mentioned at the urban scale, to carry out a number of interventions between the two heavily used anchors, which are served by it – these are the river and the historic core of Strovolos. It is therefore suggested that the Town Hall Square, which is attached to the linear park and the river, should be projected and the area of influence extended on to the other side of the river. The intention here is to utilize more actively the existing bridge, which crosses the river transferring pedestrian flows between the Town Hall and Agia Marina primary school. The primary school should be designed as a permeable boundary doubling upon on the use of its open space and making it accessible to the public.

It is also suggested that buildings along the corridor between the river and the historic core should acquire public uses and be made accessible to people of all ages and especially the elderly, which can also encourage the unofficial performance of their users, such as a dry cleaners and a florist shop, where customers may wait, observe and interact with their fellow community members and to convey a variety of emotions in this appropriation of public space. Lastly, it is suggested that a building used as a marketplace, which interrupts the direct connection of the corridor with the Chryseleousa church, situated in the historic core, should be removed and its uses relocated in the area of intervention. The new marketplace will be designed as part of the suggested programme and will itself contain components of a theatrical character and other elements that encourage enhanced interaction amongst all its users.

Additionally, the vegetation planted along the Pedieos river – on one anchor of the corridor – is suggested to be extended to the whole area covered by the corridor and in that way to encourage the movement of pedestrians at any time of the day, even during the hot summer period, thereby creating a healthy and pleasant passage space.

5.5 Acts of informal performance in the corridor

Acts of informal performance, seen on the path between the green area of the river and the old core of the city, as they exist in the area and as they are expected to be formed based on the suggested interventions, include the following “informal theatrical acts”:

- The waiting of people outside the Strovolos municipal theatre, which take place in the slightly elevated, semi-open-air space located outside the foyer of the theatre.
- Life concentrated in the town hall square on the two sides of the road.
- Activities in the space offered in route to places or as a space for exercise in the linear park.
- The life of children in the school yard during morning and lunch hours and in the area in the periphery of the school during the times when children enter and leave the school, as well as acts from the evening life of the school from older people who attend evening classes.
- The life of elderly people, which is concentrated in a coffee shop situated tangentially to the main promenade.
- Transactions in the market area.
- The life of students of the acting workshop both during rehearsals as well as during performances.
- The life of people in the proposed health spa and gymnasium.
- The people at the coffee shop.
- The movements of people in the Chryseleousa Church Square.
- People conducting business at the Cooperative Society building.

All the zones of unofficial performance mentioned above, are exchanged during the process of movement of an individual from one anchor to the other. As Alan Jacobs notes: «Great streets require physical characteristics that help the eyes do what they want to do, must do: move» (Jacobs, 1995). In many instances, one act follows the other, while in other instances one act complements the other, extending their boundaries within each other. On one hand, each one of these zones of unofficial performances can be read as a fragmentary act in the space provided, and on the other hand they may be expected to contribute as a whole, to the creation of a theatrical passage, which is expected to encourage communication between users of the public area who are unfamiliar to each other.

5.6 Creation of “socialisation nodes”

In every instance of the connecting corridor between the river and the historical centre where the flow of people meets a point of unofficial performance, it is suggested that the context is designed to provide conditions, which encourage slowing down or pausing. With this, the intent is to create “socialisation nodes” along the corridor, which can channel a passersby from linear movements to an adjacent program area and to reveal to them aspects of the informal performance of the city through which they can socialize and communicate with strangers.

Observing the architecture of the current buildings located at the core of the old Strovolos, one can see that there is continuous street façade, which characterizes the city centre. The front elevation of the buildings located on the street have a rectilinear geometry, while the back yards of the buildings usually have irregular geometries, which either absorb or intervene with other architectural elements of each building.

It is suggested that the chosen corridor is used in such a way as to engage both the rectilinear geometries of the front elevations of the buildings, as well as the irregular geometries of the back yards. The corridor as a whole shares the geometries of the front elevations allowing, where

possible, the expedient progression of those who use the area as a mere passage. The main passage between the two anchors can be made through the empty space between the sides of the current buildings. In the case of the addition of the new complementary uses at the spot of the corridor which is weakened in terms of theatricality, the buildings proposed to accommodate the suggested uses will be arranged in such a way that they allow the passage through the empty space between them.

Elements of a smaller or larger scale, with characteristics similar to the back yards of the existing buildings, will be added in the regular flow of the passage as explained above. These geometries intervene in some occasions with architectural elements whose aim is to extend the unofficial performance of the public uses towards the newly created public space or to provide an opportunity for stopping and observing an unofficial performance. Furthermore, these geometries incorporate architectural elements, enabling pauses in the area, while at the same time promoting a form of unofficial performance due to a clustering of people.

5.7 The importance of topography

It is suggested that topographical differences and differences in the elevation of different parts of the intervention are also used in the design as a technique that can encourage the unofficial performance in the city. Through these differentiations there may be an alternation between the relationship of the observer and the performer among the users of the public area, if these are designed accordingly. Additionally, differences in topography and site elevations may offer additional opportunities for a pause in the area.

In the corridor itself, differences in topography and site elevations are designed mainly in the weakened part where the addition of complementary uses takes place. In this area, additional to the passage that exists at the ground level - created in the public space between different architectural elements - there is an opportunity to have an alternative passage to and transition to the accessible roof level of the structure housing the health spa and gymnasium, in such a way as to alternate the relationship between the observer and the performer. In this elevated platform, the opportunity for a pause is also provided by the addition of slight differences in elevation and by green spaces, enabling the users to observe the broader area and to be themselves acknowledged by the passersby.

In the remaining existing parts of the corridor, elevation differences are incorporated in smaller scale interventions, mainly to encourage pausing in the area. Additionally, it is suggested that existing elevation differences, like for example the difference between the Municipality Square and the sunken linear park along the Pedieos River, are designed in such a way as to promote elements of theatricality. A further suggestion would be to design, at the section of the linear park, which is visible from the municipality square, a parking area for the users of the park in order to enhance accessibility to the site and to provide the patrons with additional areas for resting, chatting and exercising. This area can become complementary to other opportunities for pausing, which are suggested to be designed in the Municipality Square, as it provides that area with views into the informal performances concentrated at this specific stop as well as of the flow of people who exercise or promenade along the linear park.

6. Conclusion

When designing the new topography and the space between the existing and proposed buildings in the area, it is very important to take into consideration that there needs to be easy access for individuals of all ages. Therefore, ramps should be designed in a number of places, while elevators may be added to other places in order to make the development more accessible by people of all ages in the community. In this way, people can engage in the experience offered by the elevated architectural elements which are themselves in dialogue with the rest of the architectural elements and interventions in the broader area.

As Sassi notes: «The places allowing meeting and socializing (should be) attractive and encourage people of all ages to attend them» (Sassi, 2011)

In conclusion, the theoretical context presented above and the illustrative case study that followed were aiming to present the potential for the reactivation of urban sites, which although they may have fallen into disuse, nonetheless retain distinctive architectural and spatial features and are of an intimate enough scale so that the concept of the inherent theatricality of a place may provide the venue for enhanced social interaction amongst all the members of a community and especially of the elderly segment..

As a result, communication between all users of public space is encouraged and spreads not only in the area of intervention, but also in the surrounding urban space as well, working synergistically with existing uses and prompting the development of complementary ones for the socioeconomic benefit of that area's stakeholders and for users of all ages.

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Urban design and ageing – public space for the elderly people in residential areas

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> *"Ageing in the 21st century" (Brown et al., 2004)*
> "*Population ageing and urbanization are two global trends that together represent the major forces shaping the twenty-first century.*" (WHO, 2007)

The issue addressed in this article converges to the motto of WHO enhanced by the election of 2012 as the year of active ageing. Within this concept of public spaces as "place of ageing", there is a clear encouragement for the elderly to get out of their "private / home" space, revealing a vital opportunity to promote health through the benefits of activity stimulating outdoor daily routine (Peace et al., 2006).
This research project is focused in innovative skills that connect urban design with new local policies and professionals. Together it is possible to achieve an international good practice for urban design in residential areas. We must consider the fact that the city should go beyond the adaptation to its own structures, and services. The (social) cognitive dimension must be supportive of the urban design principles which define the public space as a promoter of active living dedicated to seniors. These must be suited to different needs and degrees of capacity in terms of limitations, constraints and adaptation always taking in account the main of common people as well as younger people of the society.
The research has three main goals: i) the relation between needs and activities of elderly people and quality of public space assessments; ii) new design criteria for public spaces regarding elderly outdoor daily life; and iii) new parameters that should guide municipal plans, rules and policies.

Keywords: urban design in residential areas; home zoning; age-friendly cities; active ageing; quality of life.

1 Introduction

This research project about "Ageing" explores a theme of high importance and fits simultaneously in an international case study. Results of WHO Global Guide confirm the prediction of disproportion between the number of children and elderly in all European cities, giving support to progressive increase of "contingent of residents aged 60 years or more" (WHO, 2007), particularly in developed countries.

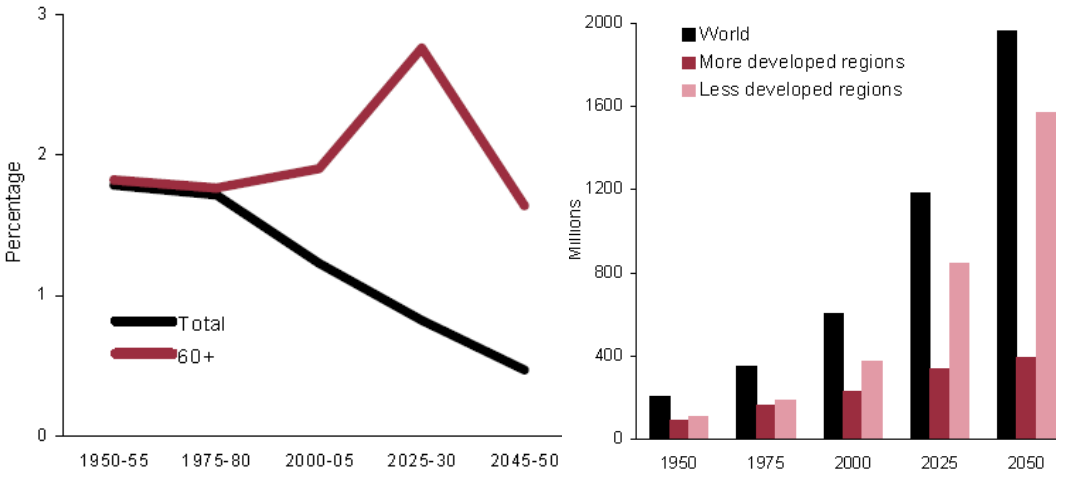
According to WHO (2005), INE (2012) and Oliveira (2010), among other sources, the global society are experiencing an exponential ageing. The mid-century forecasts are providing a marked tendency translated by the worrying number of people over 60 years old. For sure from 2006 to 2050 the proportion will increase from 11% to 22%, which exceeds by large the number of children (aged 0-14 years) in the European population.

This trend of global society imposes an urgent study centred on elderly people quality of life (Meyer and Gullotta, 2012; CRINU, 2012; Farrelly, 2011; Bloomberg, 2011; OMS, 2010; Kalache, 2009) with carefully structured criteria to enable the assessment of public space, specific to the requirements of this particular group. (Pérez, 2011; Carstens, 1993; Abbott, 2009).

In Portugal the social problem of XXI century is more evident as well as the increase that characterizes the necessary evolution of the society. In particular culture and the new economical (and social) sustaining policies translated into practical steps and measures in management and

urban planning, building and housing, as substitutes of the first steps to the 'age-friendly cities', among other interventions (local) also undertaken by the (central) government.

We are living a time set in between where the growing number of the elderly has tripled in the past 50 years and where it will triple again in the next 50 years, as verified on the following graphics**:**



Graphic 1. Number of world population aged 60 or over since 1950 to 2050.
(left to right) Average annual growth rate compared to total population and proportion between world and (more/ less) development regions population.

This scenario reveals the world population evolution. Starting in 1950 with about 205 million over worldwide, there were 3 countries with more than 10 million (Aging; NATO): China (42 million), India (20 million), and the United States of America (20 million). In the year 2000 there are 12 countries with more than 10 million and 5 countries with more than 20 million: China (129 million), India (77 million), United States America (46 million), Japan (30 million) and Russian Federation (27 million).

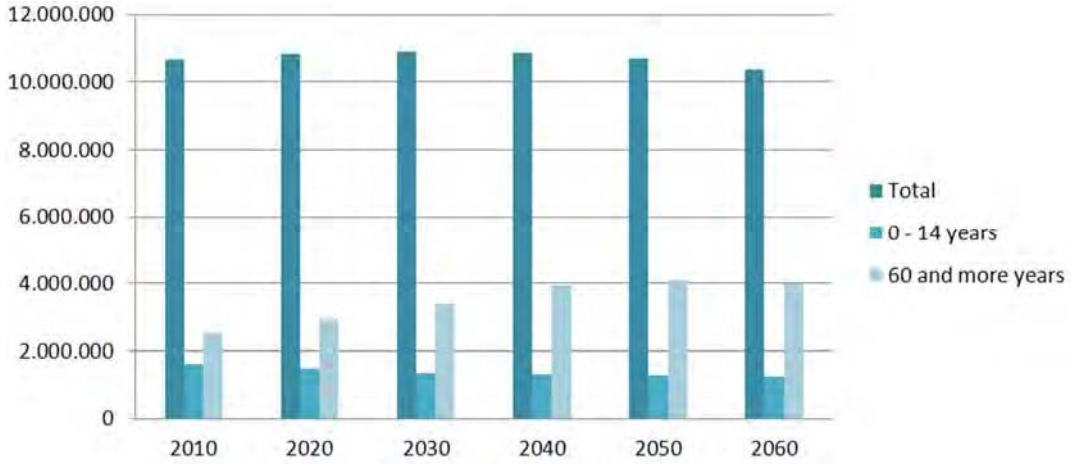
Over the first half of the century (predicts to 2050) the growth is over the triple, representing almost 2 billion worldwide, 33 countries with more than 10 million and 5 countries with more than 50 million: China (437 million), India (324 million), United States (107 million), Indonesia (70 million) and Brazil (58 million).

Figure 1. This shows the prediction of progress in the ageing of global population, which will double. This implies that the actual youth will represent an expressive group of elderly people in the next fifty years.(CRINU, 2012)

1.1. Characterization of Portuguese population

Analysing Graphic 2, the Portuguese population ageing rate in 2060 will be 323 people over 60 years old to every 100 people that are 14 years old or less. This represents more than the double of the 154 quantified in 2010.

From 2010 to 2060 the ageing population will decrease from 260 to 127. The ratio of dependent people over 60 years old per 100 people in working age will decrease from 51 to 49 due to the sharp decline in the index dependency of young people – which is 23 to 30 young people per 100 at working age - this opposed to dependency ratio of elderly people in the same period of observation that increases from 20 to 26 seniors in each 100 in working age.



Graphic 2. Resident population projections (No. of Total and Age group) 2010, 2020, 2030, 2040, 2050 and 2060. Source: Database of Statistics Portugal (INE)**.**

On the next age pyramids group, predictions from the National (Portuguese) Statistics Institute show that the process of ageing of Portuguese population will rapidly become more prominent (INE, 2008).

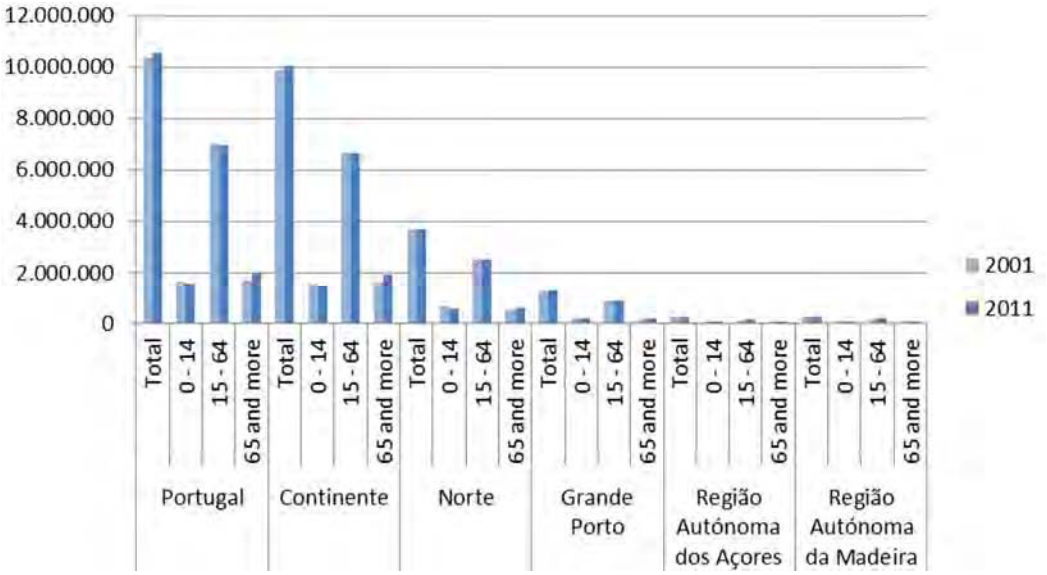
As a complement, the polarity of the Portuguese Population reveals that the female group will be much more expressive than male group through the process of ageing, getting an exponent over 85 years old.

In the Portuguese study we will make an analysis in different geographic scales where the higher scale corresponds to country (Portugal), divided by administrative areas – Continent and both autonomous regions (Região Autónoma da Madeira and Região Autónoma dos Açores), integrating the continental area are the lower scales in order to obtain the smaller scale. Being: Norte (Portuguese north region), Grande Porto (metropolitan area north region), Porto (as the main municipality where the metropolitan area is integrated) and Aldoar (a civil parish of the Porto and where we established a case study explained in point 4 - Case Studies).

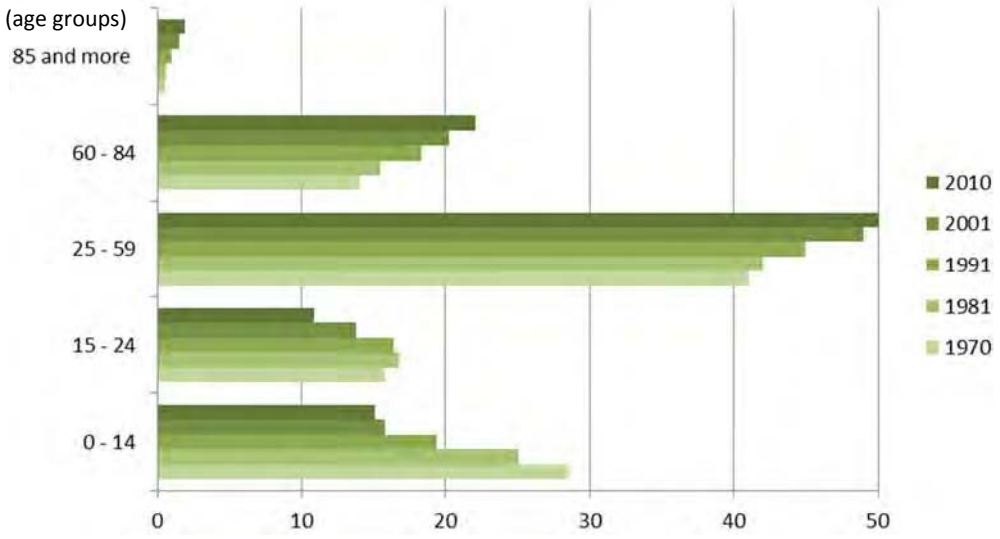
Graphic 3. Age pyramids (respectively left to right/top-down, 2010, 2020, 2030, 2040, 2050 and 2060). Source: Statistics Portugal.

The next graphic predicts the total Portuguese Population will decline as well as the group of children (0-14 years), in opposition with the growing group of elderly people over 60 years old.

The next graphic compares the decade of 2001 to 2011, in different geographic scales and making an approach to Porto and corresponding to the metropolitan area. It shows that the predictions are very real whichever the geographical area.



Graphic 4. Resident population (No.) by Place of residence, Sex and Age group; Decennial. Statistical table from INE.



Graphic 5. Distribution of resident population in Portugal (%) by Age Group. Since 1970 to 2010 by Portuguese census year. (Source: Statistics Portugal, Annual estimates of resident population. Last update date: 09-Jun-2011).

This graphic relates to the evolution and distribution of the resident population[1] in Portugal systematized by years of Census, first and last available periods, by main age groups.

[1] Distribution of resident population is the age interval in years to which a person belongs at the time of reference (1970-2010). The persons who regardless of the fact that at the moment of observation ' 0:00 a.m. of the reference day are present or absent in a given housing unit, this unit being where they live during most of the year with their family, or where they have all or most of their belongings. Source: Statistics Portugal, Annual estimates of resident population. www.ine.pt

The perception of the declining number of resident population is alarming when we observe the recent closest halving number of children in opposition to the almost doubling number of the group with 60 years and older and the triple of people who are 85 years old and over.

Facts based on past and recent present concern the decreasing percentage of births and the group of 0-14 years old from 28,5% to 15,1%, the increase of the working age population, 25-60 (65) years old, from 41% to 50,1% (60,9%) and the high growth of the group above 85 years old from 0,5% to 1,9%.

The following table summarizes the first and last results of the available period processed by Statistics Portugal, where the tendency of resident population can be checked in both dimensions: Total population, with 65 years old and over. Although Portugal had increased the elderly population in 4,2%, this just happened in Continente, Norte and Grande Porto all with a perceptible increase. Porto only increased 0,1% and the autonomous regions remained at the same growth rate 0,3%.

Considering this geographical areas, from scale of country to city, it should be noted that while the population of children (0-14 years) decreased from 1991 to 2010, rounding -4,2%, -4,1% and -3,4%, population with 65 years old and over increased 4,2%, 5,3% and 6,1%, as well older population (over 75 years old) 3,2%, 3,1% and 4,2%. Analysing by gender, during the process of ageing, tendency of proportion of older women exceeds the proportion of older men.

Finally, about the total of the population, it is curious and alarming to verify that in a decade Portugal and Grande Porto had an increase of 6,7% and 8,9%, respectively, as opposed to Porto which had a loss of 32,2%.

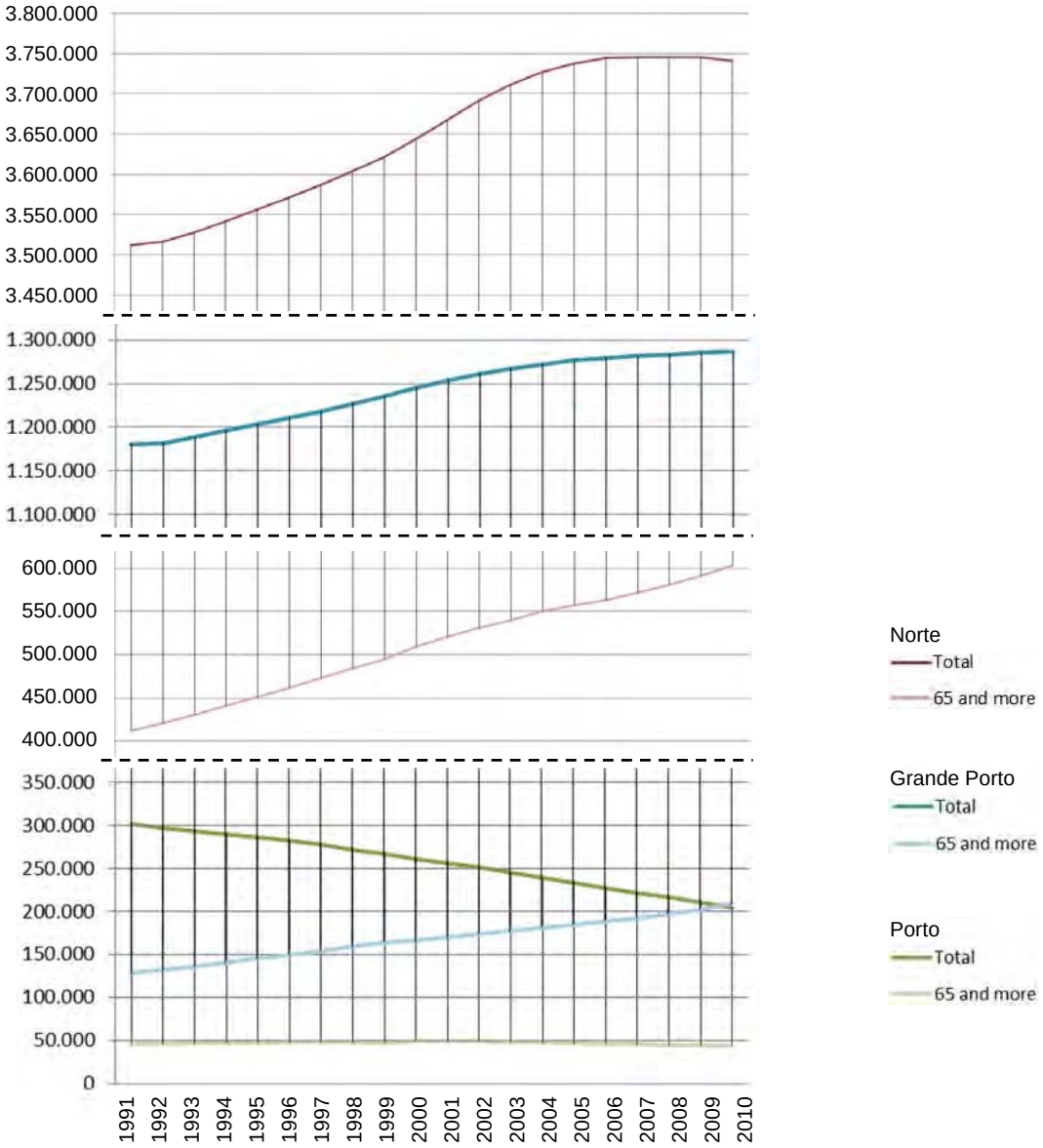
Table 1. Adapted from Table of resident population (No.) by Place of residence, Sex and Age group (By life cycles). First (1991) and last (2010) available period. Source: Idem.

Data reference period	Place of residence	Total	65 and more	% of ageing people in Portugal
2010	Portugal	10.636.979	1.931.457	18,2%
	Continente	10.143.600	1.868.405	17,6%
	Norte	3.741.092	602.798	5,7%
	Grande Porto	1.286.111	208.420	2,0%
	Porto	204.788	43.584	0,4%
	Região Autónoma dos Açores	245.811	30.864	0,3%
	Região Autónoma da Madeira	247.568	32.188	0,3%
1991	Portugal	9.965.315	1.388.040	13,9%
	Continente	9.471.980	1.328.036	13,3%
	Norte	3.511.771	411.956	4,1%
	Grande Porto	1.180.696	128.313	1,3%
	Porto	302.126	45.924	0,5%
	Região Autónoma dos Açores	239.336	30.036	0,3%
	Região Autónoma da Madeira	253.999	29.964	0,3%

Focussing on the three geographic areas of Portugal - Norte, Grande Porto and Porto - the number of resident population[2] reveals at the scale of the city that the Total population is decreasing

[2] Resident Population - persons who regardless of the fact that at the moment of observation ' 0:00 a.m. of the reference day ' are present or absent in a given housing unit, this unit being where they live during most of the year with their family, or where they have all or most of their belongings. (Source: Statistics Portugal, Annual estimates of resident population. Or Set of persons who, regardless of being present or absent in a given housing unit at the moment of observation, have lived in the place of their usual residence for a continuous period of 12 months prior to the moment. Source: Statistics Portugal, Population and housing census).

very quickly, but contrary from country, region and metropolitan area, Porto has maintained quite constant number of people with 65 years old and over.

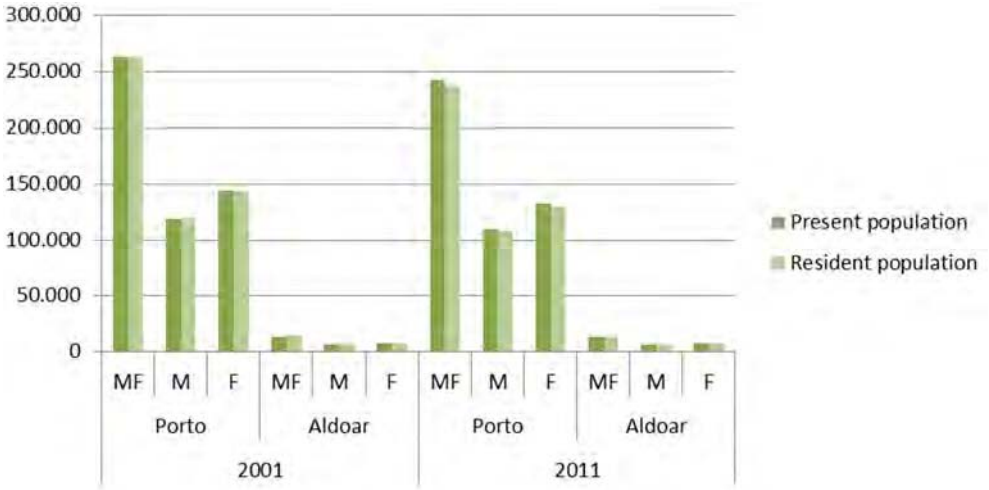


Graphic 6. Resident population (No.) by Place of residence, Sex and Age group (By life cycles); Annual (1991-2010). Source: Statistics Portugal, Annual estimates of resident population. Last update date: 07-Jun-2011.

An approach to local scale is needed to get the results of the decade (2001 to 2011), where Porto and Aldoar have had a loss on the number of both population – Present and Resident[3] – as showed in the following graphic.

[3] Present Population comprises persons who, at the time census day - 00:00 hours on the day of reference - are at a dwelling even if they do not reside there, or who, even if they are not there at the time, arrive by 12:00 hours on that day. Source: Statistics Portugal, Census - historical series.

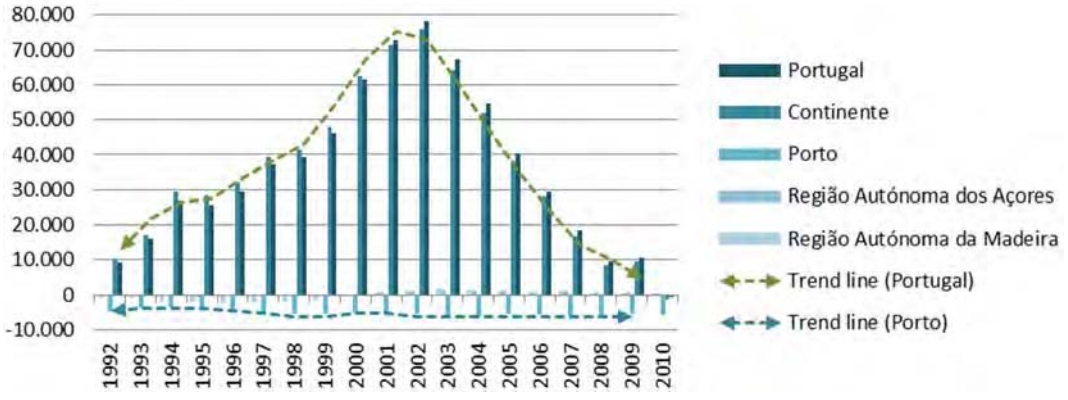
This geographic local areas had a decrease, respectively, of -7,9 and -9,7% and of -4,5% and -8%, by gender having more impact on the loss of women in Porto and of men in Aldoar.



Graphic 7. Present and Resident population (No.) by Place of residence, Sex and Age group; Decennial (2001-2011). Source: Statistics Portugal, Census - historical series and Population and housing census. Last update date: 30-Jun-2011 and 20-Nov-2012.

The next graphic about Population change[4], reports that from 1992 to 2010, Portugal experienced a big change of population in three consecutive years (2000 to 2003) reaching nearly 78 thousand people.

In opposition the Oporto city maintained a regular negative affluence, till both converge in 2010, as demonstrated by these trend lines which show that the population are going out of Porto and of Portugal respectively, roughly about to -5770 and -700 people.

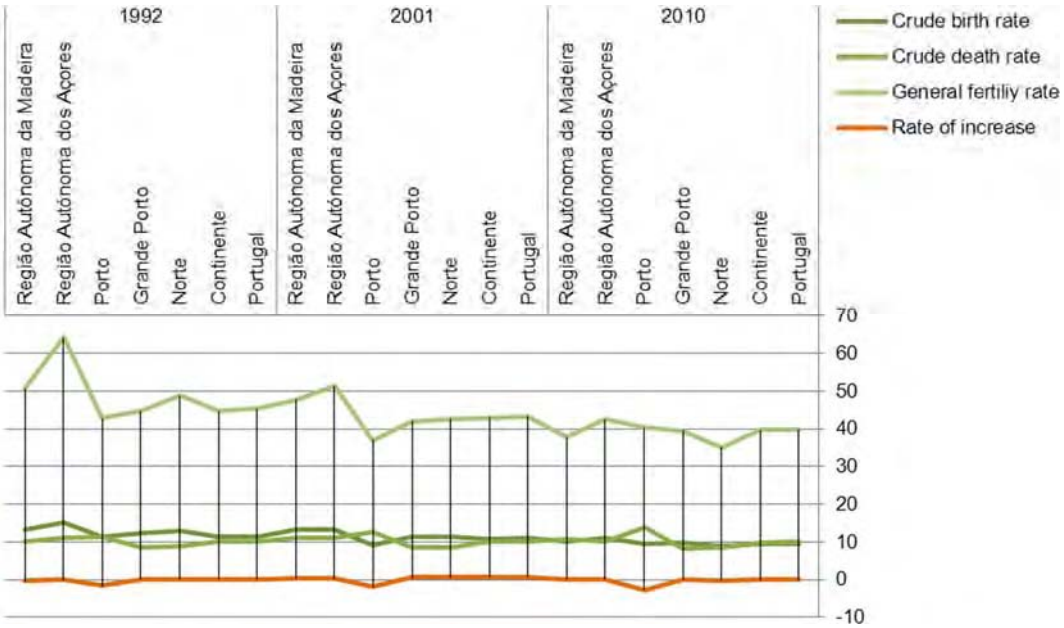


Graphic 8. Population change (No.) by Place of residence; Annual (1992 to 2010). Source: Statistics Portugal, Demographic indicators. Last update date: 10-Feb-2012.

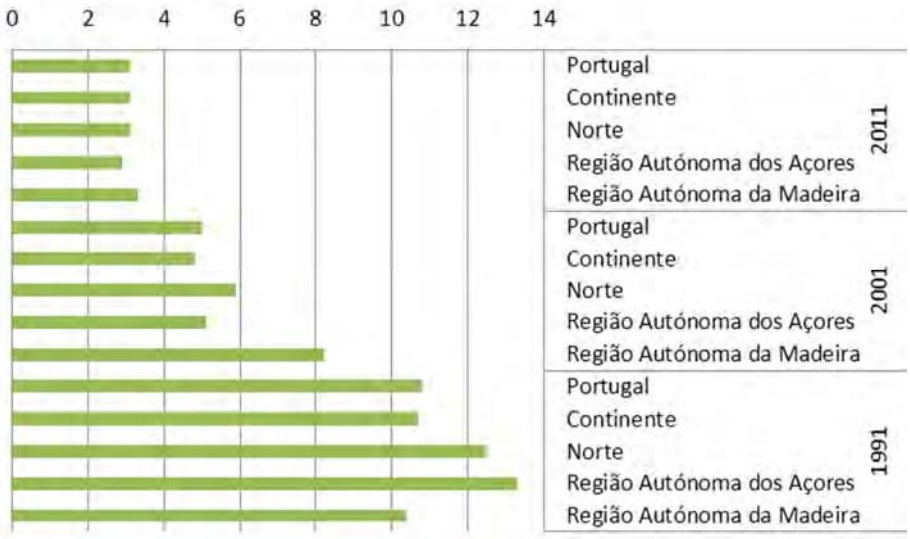
[4] Population change is the difference between the size of the population at the end and the beginning of a period (usually two consecutive year ends). Can be calculated by the algebraic sum of the natural increase and net migration. Source: Statistics Portugal, Demographic indicators. www.ine.pt

About birth, mortality and effects on population trends, we can see in the two graphs shown below that the increase rate has a progressive growth suppression on the corresponding geographic area of Oporto city (Porto), being regular in the other geographic scales.

The general fertility rate, which was higher in the autonomous region of Azores, had a big decrease mainly in Oporto city, and in the past decade in the autonomous region of Madeira and North of the Portuguese continent.



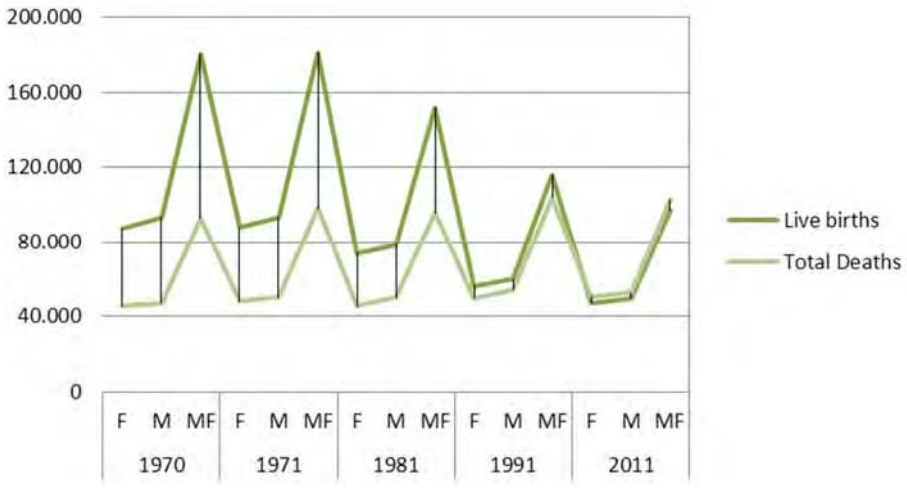
Graphic 9. (‰) Crude birth and death rate, General fertility rate and Rate of increase. All by Place of residence (first and last available period and last decade) 1992, 2001 and 2010. Source: Statistics Portugal, Demographic Indicators. Last update date: 25-Nov-2011 and 07-Jun-2011.



Graphic 10. Infant mortality rate (‰) by Place of residence (NUTS 2002). (decade and last available period) 1991, 2001 and 2011. Source: Demographic Indicators. Last update date: 25-Jun-2011.

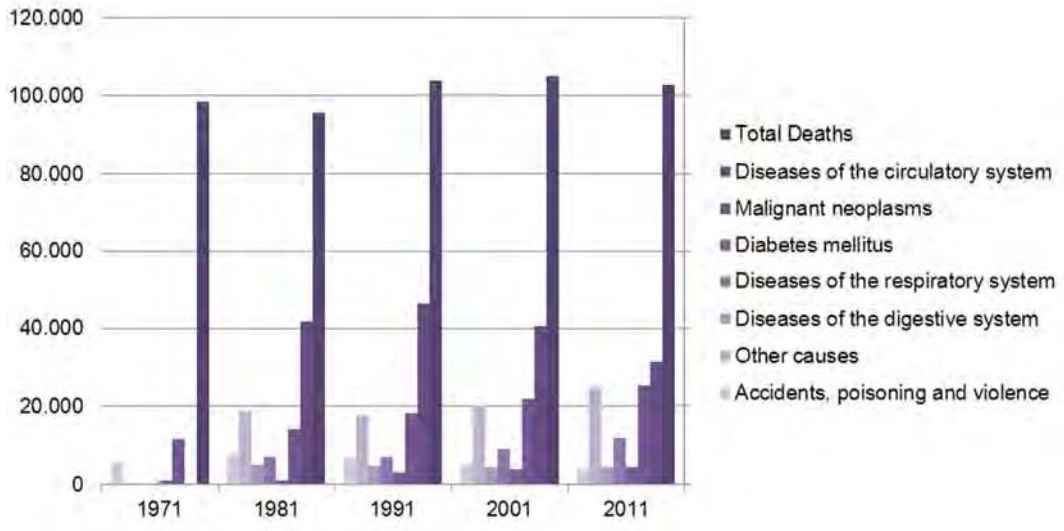
In conclusion, and considering the substantial reduction of the infant mortality rate, more and less in similar periods, the Portuguese population manages to maintain similar levels of crude birth and death rate.

This can also mean that we are getting older and older, as we can verify on the next graphic where the numbers of living births and total deaths are getting closer and closer, in the same proportion.



Graphic 11. (No.) Live births and Deaths (Total), by Sex and Death cause. By first and last available period and decade. (Source: Statistics Portugal, Live-birth statistics and Morbidity by cause of death. Last update date: 28-Jun-2012 and 17-Oct-2012).

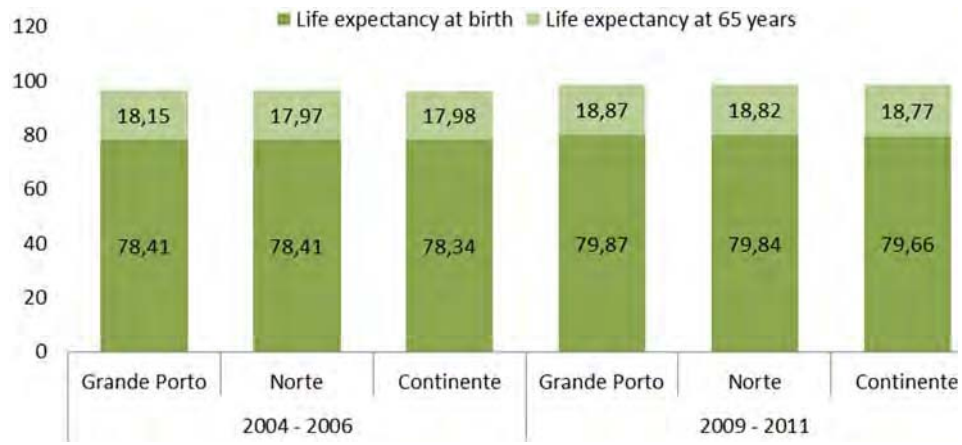
Although the number of Total deaths has a small oscillation from 1971 to 2011the point where it is a little bit higher, though more expressive, is caused by diseases of the circulatory system, being in a exponentially way closely followed by other causes and by malignant neoplasm.



Graphic 12. Deaths (No.) by Sex and Death cause. By decade and last available period. (Source: Statistics Portugal, Morbidity by cause of death. Last update date: 17-Oct-2012).

Life expectancy at birth in 1980-1982, in Portugal amounted to an average of 71.78 years and for those above 65 years an increase of 14.86. As seen in other geographic scales there was a progressive increase in life expectancy, but Porto surpassed national averages, even those of Portugal (79.55 and 18.75 years, respectively, at birth and at 65 years).

To be noted that life expectancy at birth in Portugal has increased twice (7.77 years) in relation to life expectancy at 65 years (3.89 years), which confirms the tendency of predictions about the increase of the number of citizens with 65 years old and over.



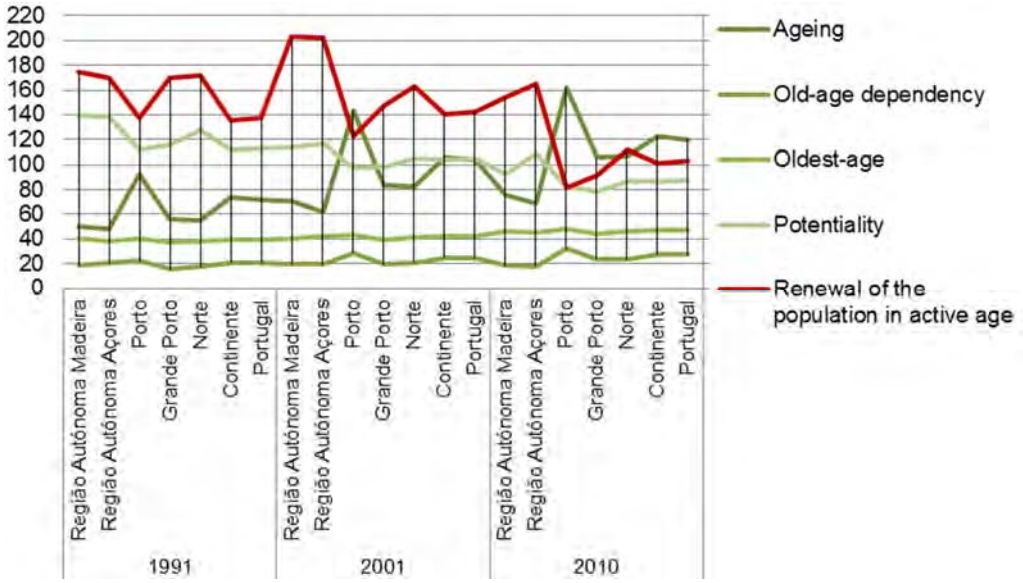
Graphic 13. Life expectancy at birth and age of 65 years (Methodology 2007 - Years).[5] By Place of residence (NUTS - 2002) in 2004-2006 and 2009-2011. Source: Statistics Portugal. Last update date: 21-Nov-2012.

The evolution ratio of old-age dependency and Oldest-age are similar and follow the same trends by geographic area. Keeping constant values over the last three decades, except in Porto where the old-age dependency has a growing expression, the index renewal of the population in active age is noticeably smaller. This negative trend is also accentuated on the Continent area in Portugal.

While Potentiality ratio is clearly decreasing by decade, the lower value corresponds to the region Grande Porto. In opposition the Ageing ratio is getting higher and higher, having more expression in Porto with a geographic peak of ageing of about 55,7% from 1991 to 2001 and of 13,3% in 2010, representing in twenty years an increase of 76,5% if compared to the 66,8% in Portugal.

According to the performed analysis the renewal trend of population in active age, assumes a homogeneous decline in different geographical scales over the three decades, being the city of Porto, similar to what has already been observed, which holds a sharper decline reaching a major depression in 2010.

[5] Life expectancy at birth (2007 methodology - Years), mean number of years that a newborn child can expect to live if subjected throughout his life to the current mortality conditions (age specific probabilities of dying). Life expectancy at 65 years (2007 methodology - Years), mean number of years still to be lived by a person who have reached a certain exact age, if subjected throughout the rest of his life to the current age specific probabilities of dying. Source: Statistics Portugal, Complete life tables.



Graphic 14. (No.) Ratio of Ageing, Old-age dependency and Oldest-age, Index of Potentiality and Renewal of the population in active age.[6] All by Place of residence (decade) 1991, 2001 and 2010. Source: Statistics Portugal. Last update date: 07-Jun-2011.

1.2. The ageing issue

By concept of ageing, we have in motto the active, healthy and participatory ageing (Kalache, 2009). Nowadays life course of global society implies the concept of quality of life (the society and the elderly) that provides the sustainability of health, state and local, regional and global society. This means that we have a new paradigm – A paradigm of culture about active ageing in a humanistic and social perspective of urban design.

In this way we can consider the concept of the elderly people as a resource, and the age-friendly city based in the concepts of WHO, (2007) that define active ageing as '*a process of life shaped by several factors*'. This is preceded by the approach of '*mobilize cities to become more age-friendly, in order to enjoy the potential that older people represent for humanity*' (WHO, 2007).

The final goal to lead this project: '*An ageing friendly city encourages the active ageing by optimizing opportunities for health, participation and security, to increase the quality of life as people age*' (WHO, 2007).

[6] Ageing ratio (No.), the ratio of the number of elderly persons of an age when they are generally economically inactive (aged 65 and over) to the number of young persons (from 0 to 14). Old-age dependency ratio (No.), the ratio of the number of elderly persons of an age when they are generally economically inactive (aged 65 and over) to the number of persons of working age (from 15 to 64). Potentiality index (No.), Relation between the two halves of female population theoretically more fecund. Renewal index of the population in active age (No.), ratio between the population that is potentially entering and that which is leaving the labour market, normally defined as the quotient between the number of people aged between 20 and 29 years and the number of people aged between 55 and 64. Source: Statistics Portugal, (ratio) Annual estimates of resident population and (Index) Demographic indicators.

2 State of art

Considering public spaces as a "place of aging" that encourage the elderly to get rid of their space "private / home," can be considered as a vital opportunity to promote health through activity that can be developed outdoor (Peace et al., 2005).

The proposed theme is a relevant study in two knowledge fields. One relatively to active ageing by analysing the program of the age-friendly cities (WHO, 2007)[7] and second in order to the international classification of functioning (CIF)[8]; including the components and determinants of the program ELEA[9] (Fernández-Ballesteros, 2011); as well as projects for healthy and age-friendly cities.

This relevance is based on the following concepts which concern:

- Quality of life among older people is about much more than just health and physical functioning, including the fact that advanced age affects visual perception, mobility and autonomy; (Portugal, 2010)
- Public Space "( ) *improving socio-economic health, social networking, gathering emotional needs and other key factors*." (Aldridge, 2006), viewing public space as an inter-relational field of generations at the stage where (in) directly the 'individual' interacts with the 'collective' - that is why in residential areas public space should enable older people to meet levels of sociability, helpfulness and leisure, in healthier and therapeutic environments;
- Biological condition, considering the "*effects of aging are a function of genetic predisposition, individual lifestyle and environmental influences* ( )", as a natural process that "( ) *includes a number of physiological changes that influence the ability of an individual to perform tasks and limit the perception* ( )" (Russ, 2009), such as:
    - biological age (maturity levels and physical health);
    - psychological state (related to the cognitive-emotional development, with the ability to adapt, learning and motivation)
    - social condition (status, roles and functions to be performed).

In second, the field of urban design to create a lexicon to identify the determinants of urban design to quantify the quality of public space, considering the following concepts:

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[7] Based on the guidelines of Global Guide for age-friendly cities and communities of WHO, 2010, which have a checklist obtained through an study that involved thirty three cities from twenty two countries (all from WHO region) to identify the key elements of the urban environment that gives support to active and healthy ageing. That project included older people as active and full partners as cities work to identify how they can become age-friendly or more age-friendly.
http://www.who.int/ageing/age_friendly_cities_guide/en/index.html

[8] The International Classification of Functioning, Disability and Health (WHO, 2004), is an classification accepted by 191 countries as the new international standard for describing health and disability, classifying functioning, disability and health of human beings in the world, establishing a common language for health and describing the health states associated with it. https://docs.google.com/viewer?url=http://www.inr.pt/uploads/docs/cif/CIF_port_%25202004.pdf&pli=1

[9] ELEA Active Ageing. Conceptual and methodological issues. Rocío Fernández-Ballesteros of Autonomous University of Madrid - European Centre for Social Welfare. Policy and Research, Sept. 7, 2011.
Is a longitudinal study about ageing that established a methodology with predictors, determinants and out comings of active ageing, which includes the following Three European Studies: HALE. Healthy Ageing an EU study on ageing (Bogers et al 2005); EXCELSA. Cross-European Long. Study Fdez.-Ballesteros, Rudinger,Schroots et al (2004); SHARE. Health and Retirement Study BörschSupan, Hank, & Jürges (2005).
http://www.euro.centre.org/data/1315992081_89732.pdf

- Relate the interaction between the elderly and urban space in terms of comfort, the invitation to enjoy and experience outdoor environment and practice of outdoor activities;
    - Bodyspace (Michael et al., 2006);
    - Urbaging (Biddulph, 2010; Sassi and Molteni; Peace et al., 2005);
    - Home Zone (Biddulph, 2010);
    - Walkability (Walkinginfo.org).
- Relevance of local services and food supply as a determinant of quality of life in a residential area;
    - Food and Urban Design (Grant, 2003; Carstens, 1993).
- Relationship between dementia and the neighbourhood, to understand how the social relations of proximity can for example reduce and mitigate episodes of memory loss, disorientation as the introduction of signage or other elements that allow or help elderly people to retain orientation points, including mental maps among other solutions;
    - Dementia and Neighbourhoods (Burton et al., 2013; I'DGO, 2007; Portugal, 2010; Society).

So, it is expectable to get the following relationship with the public space:

1. Association with physical activity

This means that the relationship with the environment requires movement (most often on foot) therefore physically active lifestyle is well documented and is a key contributor to healthy ageing. (Carstens, 1993; Abbott, 2009; Ball, 2012; Barton et al., 2010; Burton and Mitchell, 2007)

The reality shows that the access to public spaces improves individual health, functional capacity and prevents depression. Public places promoting activity highlights references to "walkability" of places in which levels of activity are influenced by urban design. Availability of public spaces such as local shopping areas, infrastructure and attractiveness of neighbourhoods are important pawns designing "local opportunities to go". (Alves, 2003; Ball, 2012; Barton et al., 2010; Brown et al., 2004; Burton and Mitchell, 2007; DGS, 2010; Kalache, 2009; Walkinginfo.org; Wong, 2003)

2. Social interaction and public spaces

Participation in public spaces, in general, implies the (in) direct involvement with others. Social interaction is the common experience in public spaces, which intent is to provide common places for the enjoyment and benefit of all citizens. (Burton et al., 2013; Ward Thompson et al., 2012; I'DGO, 2011; Michael et al., 2006; Peace et al., 2005; Pérez, 2011; Shaftoe, 2008)

3 Methodology

This proposal integrates a methodology for urban design (Alves, 2003; Pedro, 2000; Sassi and Molteni) based on life´s quality models and active ageing highlights. (Hamano, 2012; SA, 2012; EW, 2012; Doryńska, 2012; Kalache, 2009; Barton et al., 2010; Biddulph, 2006; Burton and Mitchell, 2007; C.M.P., 2001; Fernández-Ballesteros, 2011; Grant, 2003; Morgan and Kunkel, 2011; Wong, 2003)

The human component that characterizes the proposed method highlights the needs and expectations taking into account the prevalence phase of the life course marked out by ageing (I'DGO, 2011; Fernández-Ballesteros, 2011; Oliveira, 2010; Kalache, 2009; Abbott, 2009; Morgan and Kunkel, 2011).

For this purpose, we must define the type of elderly profile, seeking their active and early stages of prevalence (dementia and degeneration). This will enable the identification of requirements and objective factors, enhancers of active ageing, promoters of quality of life and will also provide quality in public spaces in residential areas.

Therefore it is important to retain international good practice for urban design in residential areas, along with the WHO guidelines, in conjunction with the standard language defined in the International Classification of Functionality (CIF)(OMS and DGS, 2004), as an universal lexicon for urban design - International Classification of Urban Design (CI-DU), which should be associated with an educational program (e-DUcar) disclosed by various media and social networks. Moreover it can even be a component of the education sector (adaptable to different levels), because it's directly designed to promote the culture of fundamental principles, like citizenship and prevention on active ageing.

It is intended to get an inclusive urban design where the rules assist the planning part (urban area) with all (nearby) surroundings, giving to residential areas a solid network of proximity and access to primary services, promoting social and generational interaction, with the binomial principle to integrate elderly people quality of life (Brorsson et al., 2011; Lynch, 2010; Cuyás, 2003; Carmona et al., 2010; Wong, 2003; Geddes; Ball, 2012).

The public space is of great importance in everyday life and social behaviour of their users (daily and occasional) must be directed (un)consciously whether appropriating healthy or not. So we must deeply mark the quality of daily life of the residents as well as who transits in the area and leave the legacy for future generations.

Among the various factors that contribute to the excellence of urban public space, and taking as a start point data from the doctoral thesis of Pedro, (2000), it is worth mentioning that the most directly associated with quality of life in residential areas are:

1. Housing as a "basic necessity of every household" representing the shelter from outside agents and the right to privacy.
2. Neighbourhood as a second necessity considering the social nature of man.
3. Urban environment as a third need, in association with the dwelling, configure the environment outside the family home and assist in the daily lives of residents, since their characteristics might influence attitudes and behaviours, "( ) want to constrain or prevent certain activities either to foster or provide other ( ) ".
4. Physical characteristics of public space (orientation, size, geometry, framing, flooring, textures, etc.), that were kept over generations, decades or mandates (local), and binding mark uses (and habits) featuring residential areas conferring inherent determinants that make them distinct from each other (the character's identity versus collective space).
5. Features of the environment that foster synergies network proximity (between home and access to services) on a sustainable basis (in which reigns the economic factor as the

consumption from street lighting, maintenance, upkeep, etc.), network and socio-cultural community of residential area (the relation between security and culture).

Aware of the magnitude of the issue is urgent, at this time. It is intended to sharpen the delineation of the proposed study to steer through a focused research in the field of urban design and public space within the particular residential areas for seniors.

The interdisciplinary critical analysis of knowledge shared by different authors in the field of active ageing and quality of life will consolidate the study considering:

1. Formulating the concept of plasticity of urban design, we find principles which give the basis for the elaboration of a program of requirements for the quality of urban public space, accurate information on the (inter) nationally.
2. Considering the previous point, we are eager to develop a study through which we can articulate the synthesis of this knowledge (analysis and evaluation), applied to the needs and requirements of elderly people (children and people with special needs), from the level of urban design including the level of quality of life, striving for suitability to the national reality and the demands of intergenerational dynamics. (Hamano, 2012; Russ, 2009; APA; Aging)
3. Defining a method of evaluating the parameters associated to both quality of life and active ageing, which establish behavioural patterns of healthy lifestyles, active and involved, and cherish the need to leave home during the ageing process (until the terminal stage of the life cycle).

3.1. Objectives

Theories and concepts in the field of health and urban policy, integrating inter relational analysis of parameters of health and urban design - the public space of the residential areas gathered and analysed: the determinants and components of the CIF (OMS and DGS, 2004) in health states and related fields; practices developed in the (inter) national territory to compare and assess parameters for the design of urban spaces in urban residential areas; defining factors, determinants and components that take the role to construct in view to an International Classification of urban design (CI-DU).

As a complement and considering culture as a key factor as a transversal matrix to any society, the intention of this paper is to include a pilot project named e.DU.car., devoted to the culture of active ageing to be ministered in schools at age groups that are the most receptive.

In other words each one matches:

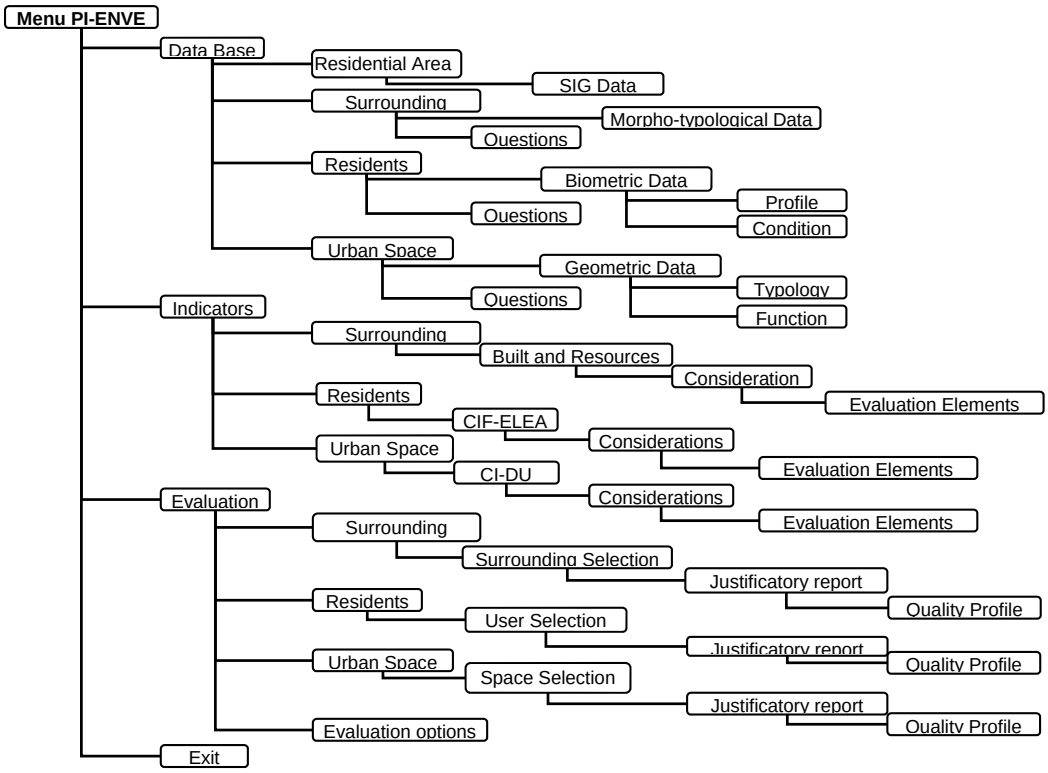
- (Support) CIF: international classification of functioning and disability;
- (Proposal) CI-DU: international classification of urban design;
- (Result proposed) PI-ENVE: computer program for decision support on active ageing, quality of life and public space;
- (Proposal) e.DU.car: pilot project for active ageing culture in long term education and at distance.

The research will comprehend:

- The relation of elderly costumes and activities and the assessment of the quality of public space.
- New design criteria for public spaces regarding elderly outdoor daily life.
- New parameters that should drive the municipal rules and policies.
- An approach to the elderly people's health and needs driven by an urban design practice on the level of public space in residential areas.

3.2. Programme PI-ENVE

Proposed architecture scheme for PI-ENVE program:



The following list enumerates issues that are expected to integrate the database such as structure and size of the materials to be verified by an integrated analysis in order to be proposed in the methodology:

1. Characterization of Public Space;
2. Materials;
3. Textures;
4. Colours;
5. Magnetism;
6. Perception urban / visual;
7. Field emotional, relational and security associated with childhood;
8. Field emotional, relational and security associated with over 60;

9. The urban public space as a scientific object;
10. Bioclimatology applied and Sustainability;
11. Urban space as a promoter of synergies;
12. Field of synergy in line with the feed;
13. Sensory field associated with science – Feng-Shui;
14. Conclusions about binomials for sustainability: accessibility / mobility, communication / comfort and safety / health.

3.3. Study development

Residential area or public area (collective) of comfort have a decisive influence on many aspects on the everyday needs of the individual (resident) or the collective residents who populate a certain area (cell) of the medium (tissue) urban. (Cuyás, 2003; Brandão and Remesar, 2000; Hall, 1995; Prinz, 1984b, 1984a)

The quality of life expectations and future opportunities will be shaped by themselves according to the dynamic of the residential area, which will have an expression directly on the users' satisfaction rate. This constitutes an important objective among every intervenient in promoting, financing, designing, constructing, supervisioning, managing and using of the urban spaces, which in this study is restricted to the typology of residential areas.

That's why the present study aims to define the architecture of a computer program as a tool for decision support platform. This creates combined assessment of quality parameters of urban design and ageing to the typology of public space in residential areas for seniors, with which we can promote active ageing. It includes the following components:

1. Definition - description of each factor analysis of urban design and active aging, which in this case requires the extension of the study to the field of health, particularly regarding parameters marked out by the "International Classification of Functioning, Disability and Health" abbreviated by international acronym CIF, and prevalence of dementia.
    a. What does "active aging"?
    b. Is urban design formula associated with active aging?
    c. What levels of quality parameters in which the quality is based for older residential areas?
    d. What conditions of environment influence the performance of the solutions?
2. What are the constructs of public space quality and are they geared towards active aging?
3. Definition - state of the art regarding the WHO studies in the field of active aging, with special focus on Global Guide Cities Friends of the Elderly (Doryńska, 2012; Kalache, 2009; OMS, 2008, 2010; Tempo; VIDA; WHO, 2005, 2007). Experiences and practical cases in terms of urban design for residential areas that are the foundation of the document Program Rating International Functioning. Disability and Health, within CI-DU will assume the role of generic preliminary program for elderly in residential areas. This document will be prepared based on the collection and study of literature, (inter)

national analysis of existing solutions and delivery of test models, and can serve as a reference when designing new or intervened public spaces, which shall contain the organization program data, defining the main requirements and performance specifications, and models exemplary.

4. Presentation Programme CI- DU as to its objective, content, scope, application, utility, limitations, and methodology development.
5. Presentation of the following aspects of the Public Space and neighbourhood Surroundings: classifying spaces; classification functions; characterization of typologies; definition of requirements; design specifications; presentation templates and examples. (Alves, 2003; Ward Thompson et al., 2012)
6. Assessment - the production of an Assessment Method PI-ENVE is proposed as a goal. It will allow the performance of objective assessments on the level of quality of the public space on residential areas viewing active ageing. The results of the evaluation method serve formulation and justification of decisions on issues relating to residential areas. It is anticipated that the evaluation method is developed according to a model of type multi-criteria based on the requirements outlined in the Residential Program Ageing. (Biddulph, 2010; Brown et al., 2004; Caldeira, 2009; I'DGO, 2011; Boruff et al., 2012; Lamas, 2000; Martinoni; Meneses, 2002; Sassi and Molteni; Moughtin, 2003; Pedro, 2000; Porto Vivo, 2010; Russ, 2009; MENZ, 2005)
7. Description of methods for analysis and evaluation set. (Teles, 2009; Alves, 2003; Sassi and Molteni; Martinoni)
8. Presentation Assessment Method PI-ENVE: purpose and scope, objectives and quality attributes used, criteria weighting, synthesis method results, presentation of results, software, application methodology, interests and limitations.
9. Sample Application Assessment Method PI-ENVE based computer program and analysis of the results.

As a starting point, the architecture of the proposed methodology presents two sections (1) Urban Design and (2) Health. Both appear inseparable, given the close interplay between the condition of the environment and the human physical condition.

On that basis, sector 2 will be standardized based on the prevalence of dementia status (developed in the next chapter) and CIF. On the latter, the key factor is due to the scientific studies undertaken over the past years. These have been active with the participation of 65 countries for the implementation of the CIF, independently of culture, age group or gender, and allow collecting reliable and comparable criteria in relation to health of individuals and populations.

Sector 1, how to support the methodological framework of the research proposal, was decided to analyse four case studies, to which it provides the first level of following criteria:

1. Specificity of the residential area;
2. Diversity of physical scale;
3. Variation of population and housing density;
4. Percentage of age groups;
5. Centralization in relation to nearby surroundings;

6. Relevance of urban design.

In association with international case works as reference and contribution we can define parameters for the measurement of urban design parameters for seniors, focused on inclusive design and quality of life skilfully promoted.

The goal is to set a methodology to allow professionals exerting a sustained practice to get the standard tools for an urban public space, in particular for residential areas, to be as successful and sustainable as hopefully to promote urban space quality.

To suppress the level of abstraction of certain factors inherent to the human dimensions of public space, the comprehensive study of the rights and needs of users in the evaluation process gives the necessary measurability.

The human component that characterizes the proposed method emphasizes the needs and expectations of potential users, and its identification with the environment requirements. Also, it enables the possibility to check the sustainability of public space, in which exemplary practices concerning the state of the art are based, on European cases and WHO guidelines as a starting point for assessing the condition it aims.

Classification criteria of function, size and sustainability of urban public space, allows a careful analysis of the methodology inherent in the process of urban design. (Teles, 2009; Alves, 2003; Sassi and Molteni; Martinoni) Correlating the different dimensions of space (economic, social, cultural and psychological / mental) will clarify a broader level of the methodology of urban design as a discipline.

Methodology for "Urban Design Skills" will be drafted and structured based on inclusion and ability to define the prevalence prevention research:

1. List of activities and habits of the elderly and quality evaluation of public space;
2. New design criteria for urban public space in relation to exterior everyday life of the elderly;
3. New parameters that should guide and regulate municipal regulations and policy.

About the documentary sources, the research will be developed based on plans drawn up and built work (case examples), municipal plans and strategies regarding urban design and ageing, including timely consultation to institutions geared to the theme when the targeted municipalities have proposed a study, and publications targeted to the topic presented.

The drawings shall be consulted whenever provided, existing in the targeted municipalities and social enterprises offices of the discipline (the designers).

Research will focus on documentary collection sources complementary to national jurisdiction, allowing a thorough identification of guidelines for the design of urban residential areas developed to international standards, when considered possible, stays abroad as privileged moments for consultation and verification consolidate the progress in the investigation.

Clarifying field (2), CIF classification (OMS, 2008; WHO, 2007) contain the fields of health and health-related, described from the perspective of the body, the individual and society into two basic lists: (2.1) Functions and Body Structures; (2.2) Activities and Participation, by replacing the terms "impairment", "disability" and "restriction (handicap)," extending the scope of classification, allowing the description of positive experiences , and used for specific meanings that may differ from its use in everyday life.

Functionality term now includes all body functions, activities and participation, including the inability deficiencies, activity limitations or participation restrictions, which are the structures with which environmental factors interact.

Such interaction is to allow the user to record useful profiles of functioning, disability and health of individuals in various fields, through practical and meaningful sets of functions related to physiology, anatomical structures, actions, tasks or areas of life.

In the international classification known as CID-10 (complementary to CIF), deficiencies - signs and symptoms - are used as parts of a whole that constitute a "disease" or, in general, was part of the "disease process".

In accordance to the presentation summary of the support base of the sector (2) health, it is appropriate to systematize on the following table the correlation with the sector (1) urban design, intended to articulate the following architecture program for support decision, in order to develop the scope of this research work.

Table 2 CIF and CID-10 (WHO) classification framework and CI-DU (proposal).

CIF	CID-10	CI-DU
Functioning and disability associated with health conditions	Health conditions (diseases, disorders, lesions, etc.). Different types of diseases	Urban quality of life promoter (Senior Citizens) and active ageing construct
Complementary between each other. In combination, help on the monitorization of population health status by associating them with their territorial distribution, evaluating the degree of incidence of each one related in with the different causes of the surrounding environment		Friendly support domain for decision and practice
International classification of WHO for encoding a wide health information as well a standard lexicon (on health and health care) by providing a worldwide global communication for the multiple disciplines and related sciences		Classification to integrate in the WHO global lexicon
assumes a neutral position regarding the aetiology to facilitate the study of the determinants and risk factors, including a list of environmental factors that describe the context in which the individual lives and how quality assurance and evaluation of results in different cultures	provides a basic aetiological infrastructure and diagnosis supplemented with CIF information about functionality	methodological framework for diagnosis and virtual simulation of outside environment to intervened e-DUcar

Our proposed International Classification of Urban Design (CI-DU), aims to:

1. Provide a scientific basis for understanding and studying the determinants of active aging, results and conditions relating to quality of life;
2. Establish a common language for describing health and health-related states, to improve communication between different users, such as health professionals, researchers, politicians, policy makers and the public, including people with disabilities;
3. Allow comparison of data between countries, between disciplines related to active aging and practice in public spaces in residential areas;
4. Providing a universal coding scheme to base an information system geared for urban design, public spaces including residential areas, decision support and best practices as predicted discipline.

3.4. Application as a tool

1. Statistics - collecting and recording data (studies and surveys on the population and / or information systems for urban management, socio-economic and public health);
2. Research - measuring outcomes, quality of life or environmental factors;
3. Clinic - assessing needs, matching treatments with specific urban conditions, evaluate the skills of the elderly, rehabilitation and outcome of geriatric studies;
4. Urban policy - planning and mobility systems integration, development projects and urban geriatric policy;
    a. Elaboration and implementation of Integrated Plans for Active Ageing (IP-EA)
    b. Intervention in public space mediated by computer program proactive aging, such as a decision support tool, called PI-ENVE.
5. Pedagogical – educational development programs to raise awareness and promote active ageing culture (e-DUcar).
    a. Platform for Distance Learning - E-Learning - as (com) supplement to the normal teaching curriculum.

CI-DU is a classification of public space as a first step, and under the present research work will be confined to residential areas.

This basis foresees its usefulness as a construction in the development of urban policies and legislation, environmental changes, active ageing policies, economy, education and culture, since the CIF may be an appropriate tool for the development of national legislation on rights of the senior citizen (and in general), as well as international law.

These reasons may come to incorporate all social classifications of the United Nations and this sequence may integrate the Standardized Rules for the Equalization of Opportunities for Persons with Disabilities.

It is expected then that the interaction of classifications - CIF and CI-DU - will be very useful in a wide scope of different applications, such as urban security, management assessment of health care, local population surveys, national and international, prevention of the degenerative effects of ageing. All these based on a conceptual framework for information applicable to personal healthcare, especially dedicated to the prevention, health promotion and healthy behaviours, and improved participation by removing or reducing social barriers, physical and cultural, encouraging participation, health and safety - pillars of the WHO Active Ageing.

The aim of the program is to clarify and define the subject of the classification study, the universe described, scope, categories, and organization and how the elements that structure the proposed methodology interact.

The set of aspects of active ageing and components relevant to the quality of life, describing them in terms of fields of dementia (degeneration biophysics: see, hear, walk, learn and remember) and areas related to dementia (accessibility, transport, education and social interaction), will limit the initial stages of the prevalence in cases where they exist.

The classification will then be limited to the first level of dementia applicable to older people, based on the assumption of an urban design as an universal application for active ageing, to describe situations related with functionality of the human being and its limitations (disability) and the quality of

urban space, serving as a framework for structuring and organizing this information in an integrated useful accessible tool.

The information is divided in two parts with the following components:

1. Components of Functioning and Disability (CIF-based)

The Body component includes two classifications: one for the organ system functions and another for the body structures.

The Activities and Participation component cover the full range of areas that indicate the aspects of functionality, both in individual and in social perspectives.

2. Urban components of factors

The Urban Environment component will be critical given the impact on all components of functioning and disability. It should be organized sequentially, from the immediate urban environment to the individual, and then to the general environment. (kt-equal, 2009)

Personal factors may be considered as another component, but due to great social and cultural variations, these will not be classified for the purposes of this study. (DGS, 2010)

However, the presence of deficiency corresponds to a function or dysfunction of body structures, relatable to any disease, disorder or physiological condition, and may result in part or expression of a health condition. It does not necessarily indicate the presence of disease or that an individual patient should be considered. However, it may be the cause of other disabilities, such as decreased muscle strength, given the direct influence of the movement functions; heart function therefore triggering the deficit lung function and dysfunction in perception as it is related to the functions of the mind.

In conclusion, the deficiencies are due in categories through identification of defined criteria (whether present or absent according to a threshold value), and the same applies for the functions and structures of the body, namely: (a) loss or absence (b) decrease (c) increase or excess and (d) deviation. Once confirmed the presence of a disability, it can be graded in terms of severity using the generic CIF qualifier.

"Environmental Factors" interact with body functions, such as air quality and breathing, light and vision, sounds and hearing, confusing stimuli and attention, pavement texture and balance, environmental temperature and regulation of body temperature.

"Activities and Participation" (activity limitations and participation restrictions) being Activity the execution of a task or action by an individual and Participation the involvement in a life situation. The Limitations of activity correspond to the inability of the individual to find activity, and the participation restrictions correspond to the inability of an individual to experience involvement in real life situations.

Activities and Participation as components of the CIF database domains, listed in a single list that includes all the vital areas (from learning basic or mere observation to more complex areas such as interpersonal interactions or work), is incorporated into the volume Attachments. The component can be used to describe the activities (a) or involvement (p) or both (ap).

The domains of this component are classified by qualifiers - performance and capacity, and determine the domains listed in the following table:

"Qualifier Performance" describes what the individual does in his usual living environment, including the social context understood as "involvement in a life situation" or "lived experience" in the

real context in which he lives. This context includes the environmental factors - all aspects of the physical, social and general behaviour that can be encoded by the component Environmental Factors.

"Capacity qualifier" describes the ability of an individual to perform a task or action. This construction aims to indicate the approximate maximum level of functionality that one can achieve in a given area at a given time. Thus assess of the full capacity of the individual environmental demands have a "standardized" variable to neutralize the impact of different environments on the ability of individuals, ranging from: (a) in a real environment, to: (b) evaluating the ability in test situations where it is not possible as an environment that might be considered as having an uniform impact designated as "uniform" or "standard", where the capacity reflects the ability of the individual adjusted to the environment. This adjustment should be the same for all people and in all countries to allow international comparisons.

4 Case studies

As a piece of this proposal a practice part is now presented which will focus different areas, each one of them bellowing to the United Kingdom (Burton et al., 2013; Biddulph, 2010; Russ, 2009) and Portugal (Porto Vivo, 2010; C.M.P., 2001; VIDA; Tempo; Saúde; Norte; DGS; CMVRSA; CMPL; CMP; CMM; CMFC; CMAH; CMAF). One localised in a residential area of Hampstead Heath, which integrates Camden civil parish established in 1965 in addition to Hampstead, belonging to London city. The other in the civil parish of Porto named Aldoar, also belonging to a local urban residence area. Both countries attend to the European Year for Active ageing and the solidarity between generations (CRINU, 2012) among the 27 EU Member States (to whom Iceland, Liechtenstein and Norway are associated), where one national coordinator per country is elected to articulate the national activities of his own country, to promote local and regional activities and involve all relevant stakeholders in the European Year.

Regarding London, the Hampstead case is located just over six kilometres northwest of Charing Cross and Trafalgar Square. It is known for the set of associations (intellectual, artistic, musical and literary) and its large park, Hampstead Heath, approximately 790 hectares wide from where you can observe London. Heath is extremely popular among Londoners for being an excellent place to go during the summer months, where workers and families make the most of the open space and sun. But Hampstead is also known for having some of the most expensive homes across the city and focus more millionaires within its boundaries than any other place in Britain.

Concerning the Porto case, Aldoar integrates the urbanization built by CETA - Cooperative Housing Economic CRL, founded in 1977, turned into a bigger complex by association with the Robert Auzelle urbanization, both resulting from a dwelling promotion developed between CETA and Sache.

Our study area located in Aldoar, is the first housing estate of CETA. Built between 1982-1985 this initial phase had 176 dwellings and a sportive area. This area includes the following additions: complement 1 - built between 1990 and 1991, added another 24 houses and 6 establishments; complement 2 - built from 1991 to 1993, included 15 dwellings, 3 stores and 80 parking spaces; and complement 3 - (under construction) in addition to housing will include a social equipment.

Figure 2. Hampstead Heath map[10] (the main attraction of NW3 and CS Lewis residence, author of "Chronicles of Narnia")

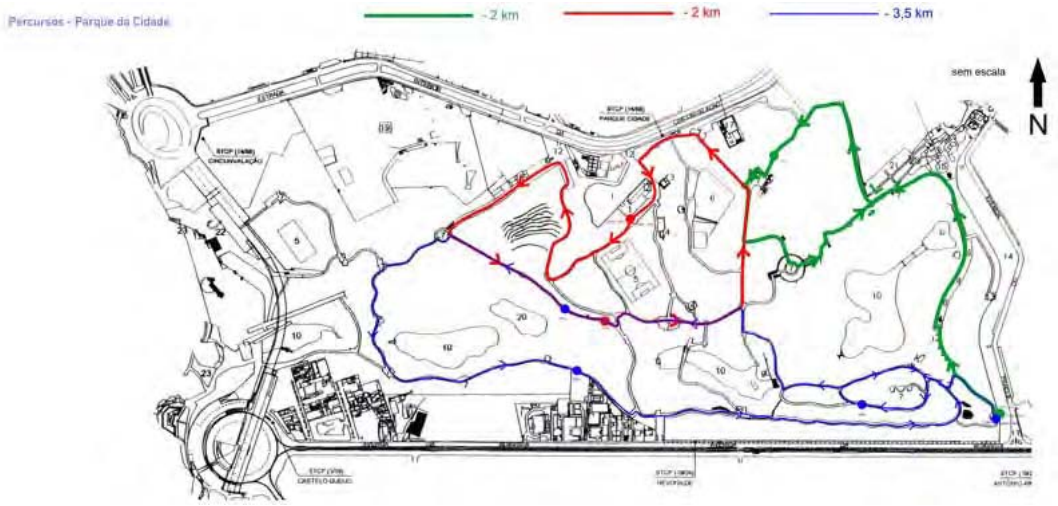


Figure 3. Parque da Cidade map.[11] Possible pathways about of 3,5km (blue line) and 2km (green and red lines).

The architectural design of the initial phase and of the complements 1 and 2 were the responsibility of the architect Luis Vasconcelos. The complement 3 was assumed by Architect Gomes Fernandes.[12]

The nearby Parque da Cidade is the largest urban park of Portugal, 83 acres wide of green naturalized area extended till the Atlantic Ocean, having a rare peculiarity worldwide.

[10] Source: http://www.cityoflondon.gov.uk/things-to-do/green-spaces/hampstead-heath/Documents/hampstead-heath-map.pdf
[11] Source: http://www.portolazer.pt/fotos/gca/1112778035percursos-parque-cidade-gra.jpg
[12] Source: www.ceta.pt

Provided for in the Urban Plan of the architect Robert Auzelle in the '60s, it was designed by landscape architect Sidónio Pardal, opened in 1993 (1st phase) and ended in 2002 with the construction of the Maritime Front.

In 2000 it was selected by the Engineers as one of the "100 most notable works of the twentieth century built in Portugal."

These two study cases are to apply in the parameters set in the development of this research work, and to test the contents of the computer program to develop, accompanying the presented program and development of this work, attending the proposed methodology, and as a tool for decision support (Farrelly, 2011) regarding the urban design of public spaces (Moughtin, 2003; Roberts and Sykes, 1999) residential areas (Barton et al., 2010; Biddulph, 2006) for seniors (Burton and Mitchell, 2007; Burton et al., 2013).

The cases selection took in account the characteristics of the urban areas: both are located in an urban perimeter of major cities, on the Country Capital (London) and on the Regional Capital (the big metropolitan area of Oporto - GAMP), both with surrounding urban parks next to the scale of the city it serves, Hampstead Park and City Park (Parque da Cidade), respectively and morphological and functional similarities.

5 Conclusions

If life expectancy at birth and at the age of 65 is increasing, the process of ageing, reporting to Portuguese population, rapidly will become more prominent in 2046 getting the rate of 238 people over 65 years for every 100 people that are 14 years old or less. (INE, 2012)

It means that between 1990 and 2006, the ageing population raised from 20 to 26 as to people over 65 years of age per 100 people of working age, representing a decrease from 51 to 49 the total dependency ratio due to the sharp decline in the index dependence of young people.

For this study purposes it should be noted that in the same period the population aged 80 and more increased 35% as estimated on December 31st 2006.

In the context of elderly family care, the 2006 data shows that the majority 62.8% lived with the spouse, 20.7% lived alone and 16.5% without a spouse. By type of household, the highest proportion of elderly lived alone with their spouse 44.2%.

However, by gender, the analysis reveals significant differences: while elderly men lived mostly in couples only 48.4% of women with same age were living with their spouse.

This is the principle care that we intend to take in account and apply in future interventions in housing estates and residential areas in Portugal, supported by a number of innovative devices that should govern the design and practice of urban projects.

In view of this innovative principle that "An age-friendly city encourages active ageing by optimizing opportunities for health, participation and security, to increase the quality of life as people age" here is a list of Principles of Urban Design for Elderly, that will be elaborated, within a deep ‘inclusive’ skill (Carmona et al., 2010; Institute et al., 2002; Gehl, 2011):

1. Qualify outdoor residential public spaces, in Portugal and UK (and abroad), to finally turn on these kind of spaces into better spaces to accommodate the elderly in the future, promoting meetings at higher levels of sociability, helpfulness and leisure,

healthier environments, more therapeutic and dignifying and therefore more sustainable;

2. Contribute to new rigorous and specialized information that will help (in future) decision-makers and planners and architects to ensure the quality and well-being of public space users within the perspective of sustainability of their proposals.

The strategy and methodology developed here was proposed to reveal the relationships, determinants and requirements to promote and given support to parameters of measuring the quality of the public space (WHO, 2007; Tempo; Teles, 2009; Sassi and Molteni; Pedro, 2000; Martinoni; kt-equal, 2009; I'DGO, 2011; Grant, 2003; Gehl, 2011; Fernández-Ballesteros, 2011; Carmona et al., 2010; Burton and Mitchell, 2007; Biddulph, 2010; Alves, 2003).

So, as the quality of urban design is inseparable from the quality of life inherent in study groups, it should be considered to effect the following aspects, to the following basic purposes, which will set the measurability of the evaluation of urban public spaces in residential areas for children and the elderly, (Bloomberg, 2011; Porto Vivo, 2010; Fonseca, 2010; Vasconcellos et al., 2010; Caldeira, 2009; MENZ, 2005; Obaid, 2005; Franscisco, 2005; Moughtin, 2003; Meneses, 2002; C.M.P., 2001; Lamas, 2000; Frey, 1999; MPATP, 1995; White, 1994; Kaplan, 1974; Aging) such as:

3. Perception of Safety - occurrence of attacks / assaults / robberies / fear of youth groups;
4. Comfort and safety - preventing accidents or falls and security relationship with the traffic;
5. Health (physical) - opportunity for exercise and outdoor access, to preserve independence (Cawley and Cawley, 2011);
6. Emotional well-being - mental health and opportunity for relaxation, to sustain the activity;
7. Mobility - easy access and open space (which may include assistive technology), ability to orient, able to successfully reach the destination and autonomy;
8. Sense of community - a sense of belonging and social support of working groups;
9. Satisfaction with the neighbourhood - attractiveness, cleanliness, noise and lack of security surrounding public space, have access to outdoor with quality, appealing and welcoming;
10. Social interaction - the need for variety and purpose in daily activities and infrastructure;
11. Leisure / Entertainment - the need for social interaction and mobility;
12. Stimulation - the need to maintain cognitive activity and purpose in daily activities;
13. Autonomy and control - based on three basic pillars: independence, health and mobility;
14. Care and support - need to be cared for the team and family, to integrate and combat the isolation and exhaustion, social integration.

The methodology will be supported in some strategic principles, whether in terms of assessing the quality of urban public space, whether from the study of populations, or even from the comfort level of the outdoor environment, including:

- Adequate technical equipment / laboratory;

- Vital software to analysis, modelling and representation of information processed in case studies;
- Comparative analysis of interventions in public spaces in residential areas.

In conclusion, if around 80% of people with dementia currently live at home partly because, as people age, remaining in a familiar home and neighbourhood becomes increasingly important and if neighbourhoods are designed to give confidence to go out, it means that Dementia-friendly neighbourhoods (Burton and Mitchell, 2007; Burton et al., 2013) also encourage older people to access facilities and public transport, allowing opportunities for recreation (Jones, 2008; Madanipour, 2009), encouraging them to interact socially, meet up with friends and relatives and generally take part in the social life of the community (Shaftoe, 2008; Whyte, 1980; Kasprisin, 2011).

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Characteristics of age-friendly neighbourhood built environments according to age-friendly community models

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Over the last years, health agencies, organizations representing older adults and governments have developed age-friendly community models that incorporate aspects of the natural, built, and social environment and aim to optimize opportunities for well being in old age.
The purpose of this paper is to identify and analyse the characteristics of an age-friendly neighbourhood built environment, providing a review of the literature and identification of empirical evidence in this area, with an emphasis on the importance of the physical features of the neighbourhood for securing older adults' quality of life.
To achieve this goal, 10 models and assessment tools of age-friendly communities were analysed, the physical features of the built environment identified and their importance for older neighbourhood users discussed.
Based on the recurring issues, seven categories emerged as consensual physical characteristics of an age-friendly neighbourhood: (1) proximity of destinations; (2) access, transportation and driving conditions; (3) walkability; (4) crime safety; (5) neighbourhood aesthetics; (6) accessible buildings; and (7) housing options. Other consistently reported attributes were: affordability of housing, services and activities; availability of health and supportive services; social participation; and access to information.
These physical characteristics of an age-friendly neighbourhood can be included in assessment tools and in urban design recommendations.

Keywords: Age-friendly; Liveable; Neighbourhood; Community; Built environment

1 Introduction

Older people tend to be more vulnerable to neighbourhood environments and to have greater reliance on local resources and services (Baltes and Mayer, 1999; Oswald and Whal, 2005) due to age related losses in mobility (Marottoli et al., 2000), vision, physical ability and cognitive capacity (Cachadinha et al., 2010); loss of social support; and shrinking social networks (van Tilburg, 1998; Shaw et al., 2007). These factors and the tendency to travel outside the residential neighbourhood less often after retirement may confine interactions to the vicinity of the home and increase the duration of exposure to the residential neighbourhood. Thus, neighbourhood effects in older adults may be stronger and, unlike the home environment, stress levels cannot be adapted to a particular individual.

Evidence regarding the influence of the neighbourhood built environment on older adults' health and quality of life is beginning to accumulate. Recent empirical studies have investigated neighbourhood effects in older adults and shown that perceived and objective physical features of the neighbourhood influence older adults' physical activity (Nagel et al., 2008), physical functioning (Beard et al., 2009), social participation (Richard et al., 2009; Bowling and Stafford, 2007), mobility (Cao et al., 2007), security (De Donder et al., 2005), and mental (Berke et al., 2007) and

cardiovascular health (Li et al., 2009). Also, maintaining social participation in late life has been associated with positive outcomes on health indicators such as physical (Rubio et al., 2009) and cognitive functioning (Hughes and Ganguli, 2009), psychological well being (Cacioppo et al., 2006) and survival (Holt-Lunstad et al., 2010). On the other hand, healthier older adults contribute to reduce the demands on and costs of local health care, and social active older people were found to have a lower likelihood of entry to residential care (Bridge et al., 2008). Also, older adults' desire to remain in the current home may depend more on attachment to local area than to the family home (Olsberg and Winters, 2005) and neighbourhoods that support ageing in place may contribute to economic sustainability, due to savings associated with informal care and lack of accommodation costs within a home-based setting (Bridge et al., 2008).

Acknowledging these benefits, governments have identified age-friendly neighbourhoods as central features of sustainable communities and set "ageing in place" as a policy goal (ACT, 2009; Harding, 2007). Accordingly, international organizations and governments have developed age-friendly community models that incorporate aspects of the natural, built, and social environment and aim to optimize opportunities for health and well being in old age.

However, the physical characteristics of an age-friendly neighbourhood have not yet been reviewed and integrated in urban planning assessments and recommendations. Indeed, literature on the intersection between community design and quality of life (e.g., New Urbanism, Healthy Communities, Smart Growth, Sustainable Communities) do not specifically address the needs of older adults, emphasizing the characteristics that are important for them (Alley et al., 2007).

Given the multiple benefits associated with age-friendly communities, it is critical from an urban design standpoint to identify and analyse the characteristics of an age-friendly neighbourhood built environment, providing a review of the literature and identification of empirical evidence in this area. To achieve this goal, age-friendly community models were identified through literature review, their categories and contents compared to detect the most recurrent physical features, and the importance of these features for older neighbourhood users discussed.

2 Materials and methods

Studies and publications on age-friendly communities were identified through search of electronic databases using keywords such as "elder-friendly", "age-friendly", "liveable" and "lifetime", combined with the expressions "community" and "neighbourhood". Additional publications were identified through review of reference lists of included publications. Models and assessment tools that identified the physical features of an age-friendly community published from 2000 in English language were included.

Publications were classified in relation to domains, aim and background research (Table 1). However, no model was excluded on methodological grounds. Next, contents of age-friendly community models were compared and a first set of recurrent physical environment attributes identified. Keywords associated with these attributes were listed and used to re-examine the texts. The techniques of constructing tables, counting, and drawing comparisons were employed to create a matrix of recurrent age-friendly built environment features. Common physical attributes of an age-

friendly neighbourhood and built environment indicators associated with these attributes were identified.

3 Results

3.1 Study characteristics

Nine models and assessments of age-friendly communities and one manifesto for lifetime neighbourhoods were identified (Table1).

Table 1. Featured age-friendly community models and assessments

Model	Domains	Aim	Background research
(1) **AARP**, Liveable communities: An Evaluation Guide, USA (Kihl et al., 2005)	1 Transportation 2 Walkability 3 Safety and Security 4 Shopping 5 Housing 6 Health Services 7 Recreation and cultural activities 8 Caring community	Help private citizens and civic groups to identify areas where the liveability of their community can be improved.	14 focus groups with older residents and caregivers in 13 USA cities, 2002. Online survey (n=80) with older citizens.
(2) **AdvantAge** Initiative, USA (Feldman et al., 2004)	1 Basic needs 2 Physical health and well-being 3 Independence for frail and disabled 4 Social and civic engagement	Measure community's preparation to sustain an ageing population. Help local leaders to plan and monitor community change to better serve elders.	14 focus groups with 35+ and community leaders in 4 cities. Expert interviews. Community survey (n>5100) with 65+ in 10 communities, 2002. National representative survey (N=1512) with 65+, 2003.
(3) **Calgary** Elder Friendly Communities Project, Canada (Austin et al., 2001)	1 Being valued and respected 2 Staying active 3 Building community 4 Making ends meet 5 Feeling safe 6 A place to call home 7 Getting what you need 8 Getting around	Engagement and self-empowerment of older adults through a community-development process.	28 focus groups with seniors, caregivers, service providers, community leaders and experts, 2000-2001. Interviews (n=57) in one community, 2001. Interviews (n=12) with key informants, 2001.
(4) **Ageing in Place** Blueprint – USA (Partners for Liveable Communities [Partners] et al., 2007)	1 Housing 2 Planning and zoning 3 Transportation 4 Health and supportive services Culture and lifelong learning Public safety Civic engagement and volunteer opportunities	Assist communities promoting Ageing in Place. Determine how local governments address older adults' needs. Provide local leaders with tools to create liveable communities.	Community assistance (n=9), 2004-2007. Survey of counties and municipalities (n= 1.790), 2006. Survey of selected local governments (n=134), 2006.
(5.1) **Florida** Blueprint: Communities for a Lifetime (Florida Department of Elder Affairs [DOEA], 2007)	1 Health and wellness 2 Employment 3 Volunteerism and intergenerational connections	Assist Florida communities to implement improvements to help the residents to age in place.	–
(5.2) **Florida** Blueprint for Affordable Elder Housing (Florida Housing Coalition, 2009)	4 Housing 5 Transportation; Mobility	Synthesize information on affordable housing, housing assistance, accessible design, healthy ageing and liveable communities.	Interdisciplinary literature review. Site visits, photo documentation and interviews.

Model	Domains	Aim	Background research
(6) **Michigan** Community for a Lifetime Assessment, USA (State Advisory Council on Ageing [SAC] et al., 2007)	1 Walkability/bikeability 2 Supportive community systems 3 Access to Health Care 4 Safety and Security 5 Housing: Availability, Affordability 6 Housing: Modification, Maintenance 7 Public Transportation 8 Commerce 9 Enrichment 10 Inclusion	Help communities to implement local projects to build an age friendly community.	Experts' discussion. Literature review of previous assessments. Input from participating communities. Pilot test of assessment draft.
(7) **WHO** Age-friendly City Guide (World Health Organization [WHO], 2007)	1 Outdoor spaces and buildings 2 Transportation 3 Housing 4 Social participation 5 Respect and social inclusion 6 Civic participation and employment 7 Communication and information 8 Community support and health services	Encourage cities to plan for ageing. Assess cities' age-friendliness and identify areas for action.	158 focus groups with older adults, caregivers and service providers in 22 countries.
(8) **AFRRC**, Age-Friendly Rural and Remote Communities, Canada (Federal, Provincial and Territorial [F/P/T] Ministers Responsible for Seniors, 2007)		Awareness of what seniors need in their communities. Identify community's barriers.	20 focus groups with older adults, caregivers and service providers in 10 communities.
(9) **CLG** Lifetime neighbourhood, UK (Harding, 2007)	1 Built environment 2 Housing 3 Services and amenities 4 Social cohesion and sense of place 5 Social capital and inclusion 6 Cross-sectorial planning 7 Intergenerational site usage 8 Innovation (information technology)	Definition of a lifetime neighbourhood. Identification of benefits of a lifetime neighbourhood. Definition of how lifetime neighbourhoods should be planned.	Experts' discussion, 2007. Literature review.
(10) **Manifesto** for Lifetime Neighbourhoods, UK (Help the Aged, 2008)	1 Access to basic services 2 Safe, secure and clean streets 3 Transport options for all 4 Public seating 5 Information and advice 6 Lifetime homes 7 Older people's voices heard 8 Places to meet and spend time 9 Pavements in good repair 10 Public toilets	Ensure that the physical design of places empowers and enables people to be active in older age. Definition of essential components for lifetime neighbourhoods.	Literature review.

Five of these models were developed in the United States, two in Canada, one in the United Kingdom, one was an international project by the World Health Organization, and the Manifesto for Lifetime Neighbourhoods was written by a UK charity. Most models (n=7) synthesized the results of their research in assessments, toolkits and checklists.

The majority of models were based on studies that collected primary data; yet one model was based exclusively on literature review (Help the Aged, 2008). Most models used qualitative research, mainly focus group meetings, to identify the community characteristics that older adults perceive as the most important according to their lived experience (Table 2). The size and scale of the studies varied. Several studies conducted focus groups in different cities or communities from the same country. The WHO's project (WHO, 2007) had an international scope and therefore a greater geographical range, conducting focus groups in 33 cities from 22 developed and developing countries, while the AdvantAge Initiative (Feldman et al., 2004) used the largest variety of methods and the widest sample size (n=5100). The geographic scope of a community ranged from

administratively defined boundaries to individual-driven approaches that accept residents' perceptions of the community.

Table 2 – Data collection procedures adopted by reviewed models

Methods	AARP, USA	AdvantAge, USA	Calgary, CAN	Ageing in Place, USA	Florida, USA	Michigan, USA	WHO, International	AFRRC, CAN	CLG, UK	Manifesto, UK
Focus group meetings	■	■	■				■	■		
Interviews		■	■		■					
Expert discussions						■			■	
Surveys	■	■		■						
Literature review					■	■			■	■

Depending on the organizations' main concerns, some models focus more on "place" and on the role of the built environment in influencing ageing in place (Kihl et al., 2005; SAC et al., 2007; Harding, 2007; Help the Aged, 2008), while others highlight older adults' "social needs" (Austin et al., 2001), health, participation, and the financial ability to age in place (Feldman et al., 2004). Even if different models emphasize particular aspects, most models stress the importance of the social and the built environment and the relationship between them to allow older people to age in place (Alley, et al., 2007). All models, except one (F/P/T Ministers Responsible for Seniors, 2007), focus on urban settings. However, characteristics identified in rural and remote communities are similar to those in the WHO's model, only diverging in terms of emphasis given within each domain.

3.2 Physical attributes recurrently mentioned in age-friendly community models

Seven categories emerged as consensual physical characteristics of an age-friendly neighbourhood: (1) proximity of frequent destinations; (2) access, transportation and driving conditions; (3) walkability; (4) crime safety; (5) neighbourhood aesthetics; (6) accessible buildings; and (7) housing options.

1. Proximity of frequent destinations refers to the walking distance from the home to shopping, services and other facilities and is the most consensual physical attribute of an age-friendly community. Grocery or general food stores, recreational facilities (specially a community centre), shops in general, transport stops, drugstores, banks, libraries and health facilities are the amenities that most models identify as facilities that should be located within walking distance of older people's housing (Table 3).

Table 3. Number of models mentioning *proximity of frequent destinations* as an attribute of age-friendly communities

Physical characteristics of an age-friendly neighbourhood	**AARP, USA**	**AdvantAge, USA**	**Calgary, CAN**	**Ageing in Place, USA**	**Florida, USA**	**Michigan, USA**	**WHO, International**	**AFRRC, CAN**	**CLG, UK**	**Manifesto, UK**
Proximity of frequent destinations (7+3)	▣	▣	▣	▣	☐	☐	▣	▣	☐	▣
Grocery / general food store (5+4)	▣	☐	☐	▣	▣	▣		▣	☐	☐
Shops other than grocery (2+6)	▣	☐	☐	☐		☐	☐		☐	▣
Drugstore/pharmacy (2+5)	☐	☐	☐	▣		▣			☐	☐
Bank (2+5)	▣	☐	☐	☐		▣			☐	☐
Transit stops (4+3)	▣	▣	☐		☐	▣	▣		☐	
Park/green space (3+4)	☐	▣		☐		▣	☐		☐	▣
Senior/recreational/community center (6+2)	▣	▣	▣			▣	☐	▣	☐	▣
Recreational facilities (3+6)	▣	▣	☐	☐		▣	☐	☐	☐	☐
Health facilities/ primary care physician (3+3)	☐		☐	▣				▣	☐	▣
Library (2+5)	▣		☐	☐		▣	☐		☐	☐

▣ - Feature included in an assessment tool, set of questions or as a category
☐ - Feature mentioned at least once in the document

2. Access, transportation and driving conditions addresses senior driver safety, availability of transportation to specific facilities and transportation alternatives available to seniors, including public transportation, demand-response transportation, private transit, specialized transit (e.g., assisted transportation), and low speed vehicles (Beverly Foundation, 2003). Availability of transportation options is mentioned in all models and included as a domain in most of them. All models stress the importance of public transportation in old age and nine models refer to the need of having access to medical facilities. In addition, some models identify parking and driving conditions suitable for seniors, acknowledging the importance of continuing to drive for the independence and engagement of older adults (Table 4).

Table 4. Number of models mentioning *access, transportation and driving conditions* as attributes of age-friendly communities

Physical characteristics of an age-friendly neighbourhood	**AARP, USA**	**AdvantAge, USA**	**Calgary, CAN**	**Ageing in Place, USA**	**Florida, USA**	**Michigan, USA**	**WHO, International**	**AFRRC, CAN**	**CLG, UK**	**Manifesto, UK**
2. ACCESS, TRANSPORTATION, DRIVING CONDITIONS (7+2)	▣	▣	▣	▣	▣	☐	☐	▣		▣
Access to public transport (7+3)	▣	▣	☐	▣	▣	▣	▣	▣	☐	☐
Distribution / access to health facilities (5+4)	▣	☐	☐	▣		▣	▣	▣	☐	☐
Access to shopping facilities (4+5)	▣	☐	☐		☐	▣	▣	▣	☐	☐
Access to entertainment, recreation or activities (4+5)	▣	☐		☐	☐	▣	▣	▣	☐	☐
Driving conditions (3+5)	▣	☐	☐	☐		☐	▣	▣	☐	
Street signs, traffic lines (4+1)	▣			☐		▣	▣	▣		

3. Walkability refers to availability of walking and cycling facilities, pedestrian safety, wheelchair accessibility, and other pedestrian friendly neighbourhood design features that enable a comfortable use of the public space. All featured age-friendly community models refer, with more or less detail, to the need of having accessible and pedestrian friendly outdoor environments. Within this category, safety from traffic, walking and cycling facilities, comfort in outdoor environments, safety from falling, and wheelchair accessibility were commonly addressed walkability indicators. When describing important age-friendly walkability features, most models mention the existence of a sidewalk system without gaps; the condition and maintenance of sidewalks; the adequacy of street lighting; the presence of outdoor seating; the existence of shelter from weather; and the accessibility and safety of pedestrian crossings (Table 5).

Table 5. Number of models mentioning *walkability* as an attribute of age-friendly communities

Physical characteristics of an age-friendly neighbourhood	**AARP, USA**	**AdvantAge, USA**	**Calgary, CAN**	**Ageing in Place, USA**	**Florida, USA**	**Michigan, USA**	**WHO, International**	**AFRRC, CAN**	**CLG, UK**	**Manifesto, UK**
Walkability (3+7)	▣	☐	☐	▣	☐	▣	☐	☐	☐	☐
Adequate signs (e.g., clear directions) (4+1)	▣					▣	▣	▣	☐	
Safety from traffic/ pedestrian safety (1+9)	☐	☐	☐	▣	☐	☐	☐	☐	☐	☐
Safe crossings / enough traffic light time (4+3)	▣	▣	☐	☐	☐	▣	▣			
Traffic calming strategies (1+4)	☐				☐	☐	▣		☐	
Walking/cycling facilities (1+4)	▣			☐	☐	☐	☐			
Sidewalk coverage/ sidewalks without gaps (5+1)	▣	▣		☐		▣		▣		
Comfort in outdoor environment (0+9)	☐	☐	☐	☐		☐	☐	☐	☐	☐
Shelter from weather (e.g., shadows) (4+3)	▣			☐		▣	▣	▣	☐	☐
Outdoor seating (4+3)	▣			☐		▣	▣	▣	☐	▣
Well designed bus stops (seats, shelter) (4+1)	▣			▣		▣	▣			☐
Public toilets (3+2)			☐				▣	▣	☐	▣
Safety from falling (0+9)	☐	☐	☐	☐		☐	☐	☐	☐	☐
Street/sidewalk maintenance/condition (7+2)	▣	▣	▣	☐		▣	▣	▣	☐	▣
Street lighting (3+5)	▣	▣		☐		☐	▣	☐	☐	☐
Regular, smooth, non-slip walking surface (3+3)	☐			☐			▣	▣	☐	▣
Wheelchair accessibility (3+4)	☐		▣	☐		▣	☐	▣	☐	
Accessible pedestrian crossings (4+2)	▣		▣	☐		▣	☐	▣		

4. Crime safety includes the aspects of the built environment that influence perceived or objective fear of crime. Nine models address neighbourhood security and seven mention links between crime prevention and urban design. Of the specific strategies that can be adopted to reduce the propensity of the physical environment to support criminal behaviour, the most frequently mentioned was lighting to increase natural surveillance (Table 6).

Table 6. Number of models mentioning *crime safety* as an attribute of age-friendly communities

Physical characteristics of an age-friendly neighbourhood	AARP, USA	AdvantAge, USA	Calgary, CAN	Ageing in Place, USA	Florida, USA	Michigan, USA	WHO, International	AFRRC, CAN	CLG, UK	Manifesto, UK
Crime safety (7+2)	▣	▣	▣	▣		▣	☐	▣	☐	▣
Crime prevention through environmental design (1+6)	▣				☐	☐	☐	☐	☐	☐
Streets well lit at night (6+2)	▣	▣		☐		▣	▣	▣	☐	▣

5. Neighbourhood aesthetics refers to the qualities that contribute to the attractiveness, appeal and identity of a place, such as its design, maintenance, preserved appearance and landscaping. All models address the aesthetic quality of the neighbourhood, although most of them only refer to this attribute indirectly. Within this category, the appearance and maintenance of public space and buildings; a clean public space without litter, dog droppings or graffiti; and landscaping, including natural sights, green and open space area, trees along routes, and front gardens were the most frequently addressed aesthetic indicators (Table 7).

Table 7. Number of models mentioning *neighbourhood aesthetics* as an attribute of age-friendly communities

Physical characteristics of an age-friendly neighbourhood	AARP, USA	AdvantAge, USA	Calgary, CAN	Ageing in Place, USA	Florida, USA	Michigan, USA	WHO, International	AFRRC, CAN	CLG, UK	Manifesto, UK
Neighbourhood aesthetics (1+9)	☐	☐	☐	☐	☐	☐	☐	☐	▣	☐
Appearance of buildings and space (3+4)	▣	▣		☐			▣	☐	☐	☐
Clean public space (no litter, graffiti) (2+3)	☐		☐				▣		☐	▣
Landscaping, sights, trees, front gardens (3+2)	▣				☐	▣	▣		☐	

6. Accessible buildings refer to being able to enter, use and navigate within public and private facilities regardless of physical, sensory or mental impairments. Seven models refer to accessibility within various types of public buildings (e.g. stores, libraries, places of worship, transport stations) and within recreation, health and service facilities. The provision of accessible toilets in public buildings is mentioned as an age-friendly feature that contributes to avoid the social isolation of people with incontinence and physical impairments. Also, availability of places to sit and rest in stores and other buildings is a commonly mentioned age-friendly feature.

Accessibility within housing is addressed in seven models. American models recommend the adoption of universal design principles into current building practices and/or compliance with visitability standards in new detached homes, while UK models recommend the incorporation of Lifetime Homes standards in new mainstream housing (Table 8).

Table 8. Number of models mentioning *accessible buildings* as an attribute of age-friendly communities

Physical characteristics of an age-friendly neighbourhood	AARP, USA	AdvantAge, USA	Calgary, CAN	Ageing in Place, USA	Florida, USA	Michigan, USA	WHO, International	AFRRC, CAN	CLG, UK	Manifesto, UK
6. Accessible buildings (0+8)	☐		☐	☐		☐	☐	☐	☐	☐
Accessibility within public buildings (2+5)	☐		☐	☐		☐	▣	▣	☐	
Accessible toilets in public buildings (3+2)			☐			▣	▣	▣		☐
Places to sit or rest in public buildings or stores (2+3)	☐		☐			▣	▣			☐
Accessibility within housing buildings (7+1)	▣			▣	▣	▣	▣	▣	☐	▣

7. Housing options refers to the extend to which a community includes a variety of dwelling types and sizes, a mix of tenures, flexible housing arrangements, and residential options with integrated services. Availability of housing options within the community is addressed in 8 models. Within this category, availability of supportive housing arrangements, variety of dwelling types and sizes, and retirement and nursing homes are the most frequently mentioned housing options (Table 9).

Table 9. Number of models mentioning availability of *housing options* as an attribute of age-friendly communities

Physical characteristics of an age-friendly neighbourhood	AARP, USA	AdvantAge, USA	Calgary, CAN	Ageing in Place, USA	Florida, USA	Michigan, USA	WHO, International	AFRRC, CAN	CLG, UK	Manifesto, UK
7. HOUSING OPTIONS (7+1)	▣		▣	▣	▣	▣	▣	▣	☐	
Supportive housing arrangements (5+3)	▣		▣	▣	▣	☐	☐	▣	☐	
Variety of dwelling types/ sizes (4+1)	▣				▣	▣	☐	▣		
Retirement homes and nursing homes (4+1)	▣		▣		▣	▣	☐			

3.3 Other attributes recurrently mentioned in age-friendly community models

Other consistently reported attributes of age-friendly communities were: affordability of housing, services and activities; access to health and supportive services; social participation; and access to information (Table 10).

Affordability – Nine models refer to affordability as an important feature of an age-friendly community. Eight of them mention that affordable housing and assisted living options integrated within the community should be available for older adults to avoid forcing them to sell their home because they can no longer afford the costs associated with maintaining it. Affordable services such as home maintenance or repair, transportation, health care costs and activities for seniors are other commonly mentioned age-friendly features.

Table 10. Non-physical attributes recurrently mentioned in age-friendly community models

Non-physical characteristics of an age-friendly neighbourhood	AARP, USA	AdvantAge, USA	Calgary, CAN	Ageing in Place, USA	Florida, USA	Michigan, USA	WHO, International	AFRRC, CAN	CLG, UK	Manifesto, UK
Affordability (9)	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Affordable housing options (8)	☐	☐	☐	☐	☐	☐	☐	☐		
Affordable transportation (8)	☐	☐	☐	☐	☐	☐	☐	☐		
Affordable home maintenance/repair (7)	☐	☐	☐	☐		☐	☐	☐		
Affordable health care costs (6)	☐	☐	☐	☐			☐	☐		
Affordable activities for seniors (5)			☐			☐	☐	☐	☐	
Supportive services (9)	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Support to caregivers/respite care (9)	☐	☐	☐	☐	☐	☐	☐	☐		☐
Housing services (9)	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Housing modifications (9)	☐	☐		☐	☐	☐	☐	☐	☐	☐
Housing repair (7)	☐	☐	☐	☐		☐	☐	☐		
Housing maintenance (6)	☐		☐			☐	☐	☐	☐	
Home delivered meals (6)	☐	☐	☐			☐	☐	☐		
Home health care (6)	☐	☐			☐	☐	☐	☐		
Social and civic engagement (9)	☐	☐	☐	☐	☐	☐	☐	☐		☐
Volunteering (10)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Work and employment (6)		☐		☐	☐		☐	☐	☐	
Lifelong learning opportunities (7)	☐			☐	☐	☐	☐	☐		☐
Access to information (8)	☐	☐	☐	☐		☐	☐	☐		☐
"One-stop" information center (6)	☐			☐		☐	☐	☐		☐

Access to supportive services – Models consistently mention that an age-friendly community should have a range of supportive and housing services, including housing modifications, repair, and maintenance; home delivered meals; and home health care. In addition, nine models mention the provision of support to caregivers. This feature is addressed within community services and basic needs categories, but also within social participation topics, suggesting that respite care is a way of helping older caregivers and their charges to continue participating in society.

Social participation - Nine models refer to older adults' active participation in the community and all models identify benefits of volunteering in old age. Other aspects of social participation and civic engagement frequently addressed are late life paid employment and lifelong learning opportunities. Also, some models emphasize the importance of acquiring skills to deal with information and communication technology and refer to community technology infrastructure (e.g., cell phone coverage, multi-channel TV, high speed internet) and to new and emerging assistive technologies as age-friendly features.

Access to information – Access to information is addressed in 8 models. Six of these models call for an easy-to-access “one-stop” information centre, known throughout the community, where older adults can get relevant information on local services and activities.

4 Discussion

International, American, Canadian, and British age-friendly community models were analysed to identify recurrently mentioned built environment attributes. Proximity of frequent destinations; access, transportation and driving conditions; walkability; crime safety; neighbourhood aesthetics; accessible buildings; and housing options emerged as commonly addressed age-friendly features.

According to the literature on age-friendly communities, proximity of recreation, services, and retail enables older adults to easily reach daily necessities and community amenities; attracts people maximizing spontaneous social contact (Oberlink, 2008); helps to make streets feel safer due to more pedestrian traffic (Khil et al., 2005; Oberlink, 2008) and gives older residents opportunities to be physically active while running for errands (Gilroy, 2008; Kochera et al., 2005). Qualitative research studies on how neighbourhood design encourages active ageing align with our review results in identifying proximity to destinations as a neighbourhood attribute that supports an active lifestyle (Michael et al., 2006; Strath et al., 2007). Also, quantitative evidence has found proximity to destinations, particularly grocery stores and parks, to be positively associated with older adults’ walking levels (Satariano et al., 2010; Li et al., 2005; Nagel et al., 2008; Cao et al., 2007; Michael et al., 2010), and shorter distance to a bus stop has been linked to physical functioning (Beard et al., 2009). In addition, living in an area with more groceries and pharmacies within 400 m from home seems to reduce weekly vehicle miles driven (Cao et al., 2007), and quality and quantity of local recreation facilities were associated with reduced trip length to leisure destinations (Föbker and Grotz, 2003).

Furthermore, models highlight the importance of senior driver safety and availability of transportation options within the neighbourhood. Multimodal mobility allows residents to reach other people, services and activities; to connect with their communities; and to maintain social, civic and economic participation, influencing older adults’ independence, community attachment, sense of control over life, and successful ageing (WHO, 2007; Kochera et al., 2005; Florida DOEA, 2007; Coughlin, 2001). As people age, availability of transportation options becomes more important for the performance of instrumental activities of daily living. Adults aged 75 and over report more difficulty in travelling to key services than the general population, even when controlling for different levels of household car availability and other factors (Ruston, 2002). Also, older drivers have to face the possibility of driving cessation and of becoming transportation dependent in very old age (85 years and older) due to age-related changes in health and functioning (Foley et al., 2002). Accordingly, the provision of alternative sources of transportation reduces the pressure to continue driving despite age-related functional limitations that affect driving skills with important personal safety consequences for older adults (Beverly Foundation, 2003) who have about a 3-fold increased risk of crashing per mile driven compared to middle-aged drivers (Cerrelli 1994, cited by Foley et al. 2002). Also, perceived limited access to public transportation has been associated with later functional loss

(Balfour and Kaplan, 2002) and availability of transportation options may contribute to reduce some negative consequences linked to driving cessation, such as decreased participation in out-of-home activities and increased risk of entry to long-term care (Marottoli et al., 2000; Freedman et al., 2006).

Walkability is another neighbourhood attribute recurrently mentioned in age-friendly community models due to its implications in older adults' independence, safety (both in terms of falling and being run-over), physical activity and comfort. Empirical studies found that neighbourhood walkability was positively associated with mental (Berke et al., 2007) and cardiovascular health (Li et al., 2009), and that availability of walking paths or trails was associated with older adults' walking levels (Gomez et al., 2010; Hall and McAuley, 2010; Michael et al., 2010). Although mixed evidence exists (Gomez et al., 2010; Borst et al., 2009; Nagel et al., 2008), street connectivity has been positively correlated with older adults' physical activity (Li et al., 2005; Satariano et al., 2010) and with performance in instrumental activities of daily living (Freedman et al., 2008). However, no association was found between older adults' walking route choice and street link characteristics such as outdoor seating, traffic noise, pavement quality, ramps on pavements, and obstacles along street links (Borst et al., 2009).

Literature on age-friendly communities reports that neighbourhood security influences the activities that older residents are willing to conduct, affecting their independence, physical health, social integration and emotional well-being (Kochera et al., 2005; WHO, 2007). However, although lower crime rates were observed in estates built according to secured by design principles (Armitage, 2000; Armitage and Monchuk, 2009), no association was found between perceived neighbourhood crime safety and older adults' walking levels (Hall and McAuley, 2010) or social activity (Bowling and Stafford, 2007), and results for physical functioning were mixed (Beard et al., 2009; Clark et al., 2009; Clarke and George, 2005).

Among age-friendly community models, aesthetic attributes of the neighbourhood, such as landscaping, maintenance and cleanliness of public space, are commonly mentioned. Qualitative research studies on how neighbourhood design encourages active ageing report that older adults perceive neighbourhood attractiveness, (e.g., availability of green space, "interesting things to look at", and aspects that make walking more pleasant) as an attribute that supports their physical activity (Michael et al., 2006; Strath et al., 2007). Furthermore, empirical evidence found a positive association between total area of parks and green or open space for recreation and older adults' walking levels (Li et al., 2005; Gomez et al., 2010). However, no association was found between walking route choice and street links with trees (potentially more aesthetically pleasing) or with attributes reflecting neglect or disorder such as streets with dog droppings, graffiti, vacant buildings and waste terrain (Borst et al., 2009). Also, no association was found between disability prevalence among older adults and a composite score of neighbourhood decay (Beard et al., 2009), or between perceptions of neighbourhood aesthetic quality and older adults' walking levels (Hall and McAuley, 2010; Satariano et al., 2010).

Age-friendly community models stress the importance of accessible public and housing buildings for ageing in place. Indeed, a mismatch between residents' functional ability and housing accessibility (Person-Environment fit) is associated with dependence in activities of daily living (Iwarsson, 2005), and difficulties in performing activities of daily living tend to increase the time and

effort required to have an independent life leaving little time available for other activities (Nauman, 2006). Also, residents who felt their home would not meet their physical needs as they grow older were more likely to have less community engagement, to know fewer neighbours on a first-name basis, to report feeling isolated, to socialize less with neighbours at home and were less likely to want to remain in the current home for as long as possible and to want to live in the same community in five years (Kochera et al, 2005).

Finally, availability of housing options is another commonly mentioned age-friendly feature. A range of housing sizes and types reflects older adults heterogeneity and broadens choices for independent and shared living, and home-based caregiving (Florida Housing Coalition, 2009). A community with affordable housing options enables older adults to move to more appropriate housing when their needs or care requirements change without leaving their neighbourhood, their social ties and established informal supports, contributing to preserve older adults' independence and their feeling of belonging. Also, nearby residential options with increased levels of assistance allow older adults to stay close to a partner placed in continuing care (Austin et al., 2001; Khil et al., 2005, Kochera et al., 2005). However, empirical evidence found both positive and negative health outcomes associated with neighbourhood residential stability. One study found it was negatively associated with poor self-reported health (Subramanian et al., 2006) and another study found a positive association between residential stability and depressive symptoms among urban older residents (Aneshensel et al., 2007).

5 Conclusion

Analysis of the most frequently referred attributes of the built environment through literature review of age-friendly community models suggests congruence between different models regarding the physical components of a community that support ageing in place. The relative importance placed on each component varies, depending on the specificities of the community and on the main concerns of organizations involved. Most of these attributes are in accordance with empirical studies that investigated neighbourhood effects for older adults. Empirical support was found for associations between living close to destinations and in a walkable neighbourhood and older adults' mobility and health, and some evidence was found for neighbourhood security, transportation options and aesthetics.

To our knowledge, this is the first study to synthesize and compare age-friendly community models focusing on urban design features. Nevertheless, several limitations should be considered when interpreting our findings. Age-friendly community models used different methods to identify attributes of an age-friendly community. Some models were based both on qualitative and quantitative research, while one model was based exclusively on literature review. Also, several models used focus group meetings to collect data, making a selective presentation of information and choosing extracts that may reflect the author's own perspectives and points of view. Accordingly, an identification of recurrent attributes using models that were based on methodologies with widely varying levels of rigor may contaminate the results. Also, although the analysis of age-friendly community models differentiates physical aspects mentioned in assessed models from physical aspects included as categories or in assessment tools, no weighting factors reflecting the importance

of the characteristic within the model were considered. Limitations are also present in reviewed empirical evidence. Effect sizes of associations between built environment features and older adults' health and well-being tended to be small to moderate, most outcomes were obtained through self-report, and the majority of studies were cross-sectional, hindering causal inferences due to residential self-selection bias (residents' choice of the neighbourhood).

An important contribution of this review was to highlight the importance of particular neighbourhood physical attributes to enable older adults to successfully age in place. Physical characteristics of an age-friendly neighbourhood should be included in assessment tools and in urban design recommendations.

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Part D. New Paradigms for Ageing Cities

Designing a new planning approach

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This article is part of the EVIDENCE research project – *Re-inventing analysis, design and decision support systems for planning*. Based on the current debate, on the Portuguese planning system, and on the results achieved by the latter on our cities, the EVIDENCE project proposes the definition of a view, a methodology, and a set of techniques for analysis and planning. This goal is supported on previous work developed at CITTA: the *Plan-Process-Results* / PPR methodology and the *Structural Accessibility Layer* / SAL technique. In addition to SAL, this research project proposes one technique for morphological analysis - *Morpho*. The EVIDENCE project has five main goals: i) the establishment of a sound linkage between an evidence-based planning and a performance-based regulation through their common need for evaluation; ii) the development of PPR as a methodology for planning and for planning-evaluation; iii) the development of techniques drawn on urban accessibility and urban morphology – SAL and MORPHO; iv) the definition of effective forms for integrating the acquired knowledge into the *Planos Directores Municipais* / PDM; and finally, v) the provision of a sound contribution for the construction of a more diverse, accessible, and inclusive built environment.

Keywords: evidence-based, performance-based regulation, evaluation in planning, urban accessibility, urban morphology.

1. Introduction

This paper draws on the EVIDENCE research project ('Re-inventing analysis, design and decision support systems for planning'), a 3-year project funded by the National Foundation for Science and Technology/FCT that is being developed at the Research Centre for Territory Transports and Environment / CITTA.

A number of weaknesses have been identified in the dominant planning paradigm of the last decades. As a reaction, an evidence-based planning and a performance-based regulation have been steadily establishing since the end of the 1990s, particularly in the UK. The first of these approaches introduces, in the debate, a new perspective on the relationships between evidence and decision making, evidence and action, on the use and on the role of analysis and research, and finally, on the spatial dimension of planning. Bearing in mind the negative aspects of extreme forms of regulation and of deregulation, the second approach proposes a new type of regulation based on the achievement of fundamental objectives defined throughout the planning process.

These two approaches, theoretically and methodologically linked, have an obvious need for monitoring and evaluation of the cyclical planning activity. While in an initial stage, in the emergence of the rational paradigm, planning evaluation focused exclusively on the plan making stage, the recent proposals in this field of knowledge have been focusing on the planning process and development control, and on the results produced on territories and societies, enabling, as such, the design of evaluation methodologies with an effective cyclical dimension.

Based on the current scientific debate, on the Portuguese planning system, and on the results achieved by the latter on our cities and communities, the EVIDENCE research project proposes the

definition of a view, a methodology, and a set of techniques of analysis and planning. This ambitious goal is supported on previous work developed at CITTA: the structuring of the Plan-Process-Results/PPR evaluation methodology (Oliveira, 2011) and the definition of one of the techniques for analysis, design and decision support – the Structural Accessibility Layer/SAL (Silva and Pinho, 2011). In addition to SAL, this research project proposes another planning support tool, focused on the evaluation of urban form – Morpho (Oliveira, 2012). The development of EVIDENCE involves, besides the 'usual' tasks of a research project, performing a set or workshops in close collaboration with the professionals of the planning departments of two local authorities, from Lisbon and Oporto.

The EVIDENCE project has five fundamental objectives. The first objective is the establishment of a sound linkage between an evidence-based planning and a performance-based regulation (with a clear focus on the planning objectives) through their common need for evaluation. The second is the development of PPR as a methodology for planning and for planning-evaluation. The third is the development of techniques drawn on urban accessibility and urban morphology – SAL and MORPHO. The fourth is the definition of effective forms for integrating the acquired knowledge into the so-called *Planos Directores Municipais* / PDM (Municipal Master Plans). Finally, the last objective of this project is the provision of a sound contribution for the construction of a more diverse, accessible, and inclusive built environment.

The paper presents an overview of the current state of development of the research of the EVIDENCE project. The paper starts with a short discussion of the main theoretical background underlying this research: *evidence based planning* and *performance-based regulation* (sections 2.1 and 2.2). This theoretical discussion is complemented by a methodological discussion regarding evaluation, urban morphology and urban accessibility in planning (sections 2.3 to 2.5). Following, a view and method for planning is presented (section 3). Methodological aspects of this section will be rendered concrete in the following section presenting the two techniques for planning (SAL and Morpho) used as examples for testing the proposed view and method for planning (section 4). The final section presents the next steps of this research project, discussion, expected outcomes and preliminary results.

2. Theoretical and methodological framework

2.1. Evidence-based planning

The debate on the evidence-base can be traced back, more recently, to Lindblom's policy making as the science of "muddling through" (Lindblom, 1959) and, more distantly, to the Enlightenment, and to Plato's philosopher kings (Lord and Hincks, 2010). In reality, the evidence-base (EB) is as old as science and as old as policy-making; this is as true for medicine as for urban and regional planning, although levels of application vary from field to field, over time and according to context.

Differences have revolved around the conceptions and types of evidence (Table 1), EB practice and policy, and matching development models. The definition of evidence should be broad providing that thoroughness is preserved (Figure 1), while for the sake of this project we will be focusing predominantly on research evidence (in its diverse types). EB policy and practice include policies and practices that are based, or at least informed, by such evidence. The models of policy and practice development vary according to the weight that evidence has/should have in this process

and our preference does not give exclusivity to one, even though in perfect circumstances the enlightenment poses itself as the ideal model.

Although the terms ‘evidence-based’ or ‘research-based’ policy and practice are used as catch-all terms, ‘evidence-influenced’ or ‘evidence-informed’ and ‘pool’ may be more accurate descriptions (Davies and Nutley, 2002 referred to by Walter, Nutley et al., 2005; Chalmers, 2005; Boaz, Grayson et al., 2008), because evidence is insufficient and fluid. The literature emphasises issues about putting knowledge to action (management, translation, brokerage, etc.), the theory-practice interface, the gap between policy and practice, and diffusion of innovations (Saunders, 2005; Court and Young, 2006; Sin, 2008; O’Brien, Clayton et al., 2008; Best and Holmes, 2010; Ward, House et al., 2009; Holmes and Harris, 2010; Eccles, 2009). Several authors identify characteristics of evidence that influence whether it is used (Shaxson 2005) and propose means for getting evidence into practice (Davies, 2004).

Although the expression of evidence-based planning is not the most common, the idea of it is (LeGates, Tate et al., 2009; Hoch, 2009; March, 2010; Straatemeier, Bertolini et al., 2010). It is at the European (Faludi, 2009; Nunes, Adams et al., 2009; Böhme and Schön, 2006) and at the national (France – Bovar and Peyrony, 2006; Netherlands – Van der Wouden et al., 2006; UK – Lord and Hincks, 2010) planning levels of some countries that the concept has gained impetus. There are a few approaches in some planning policy and practice sub-fields: housing (Maclennan and More, 1999), transport (Terry, 1999), urban/spatial planning and design (Forsyth, 2007; Stonor, 2006), evaluation EC integrated impact assessments, BIDs (Peel and Lloyd, 2008), etc.

The work of Kryzek et al. (2009) is the most comprehensive regarding EB practice in urban planning and policy, making a review of claims and critics of EB practice, the dimensions of research and practice in planning; the strengths and limits of evidence in planning practice and research (Table 2), and key challenges assessing evidence in EB practice in planning; but many others refer to the implementation gap.

Summarizing, there seems to be several advantages in evidence-based planning, namely it: i) provides a more rational, rigorous and systematic approach; ii) bridges the gap between traditional practice and formal research; iii) contributes to “knowledge economy”; iv) helps to modernise local and national government; v) provides pragmatic solutions; vi) produces better outcomes; vii) gives coherence to the policy cycle; and finally, viii) helps taking well informed decisions about policies, programmes and projects by putting the best available evidence from research at the centre of policy development and implementation.

Table 3 Types of evidence

'Research'	Broadly defined Davies (2004): impact evidence implementation evidence descriptive analytical evidence attitudinal evidence statistical modelling economic evidence ethical evidence	An approach that helps people make well informed decisions about policies, programmes and projects by putting the best available evidence from research at the centre of policy development and implementation (Davies, Nutley et al. 1999)
'Not only ... But also'	A range of other factors: individual experience, expert opinion, consultation, political judgement, convictions, norms and values systematic reviews [realist synthesis (Pawson 2001; Boaz, Ashby et al. 2002; Pawson 2002); brief reviews (Abrami, Borokhovski et al. 2010)] single studies pilot studies and case studies experts' evidence internet evidence	A means integrating individual experience and expertise with the best available external evidence from systematic research (Davies, 1999)

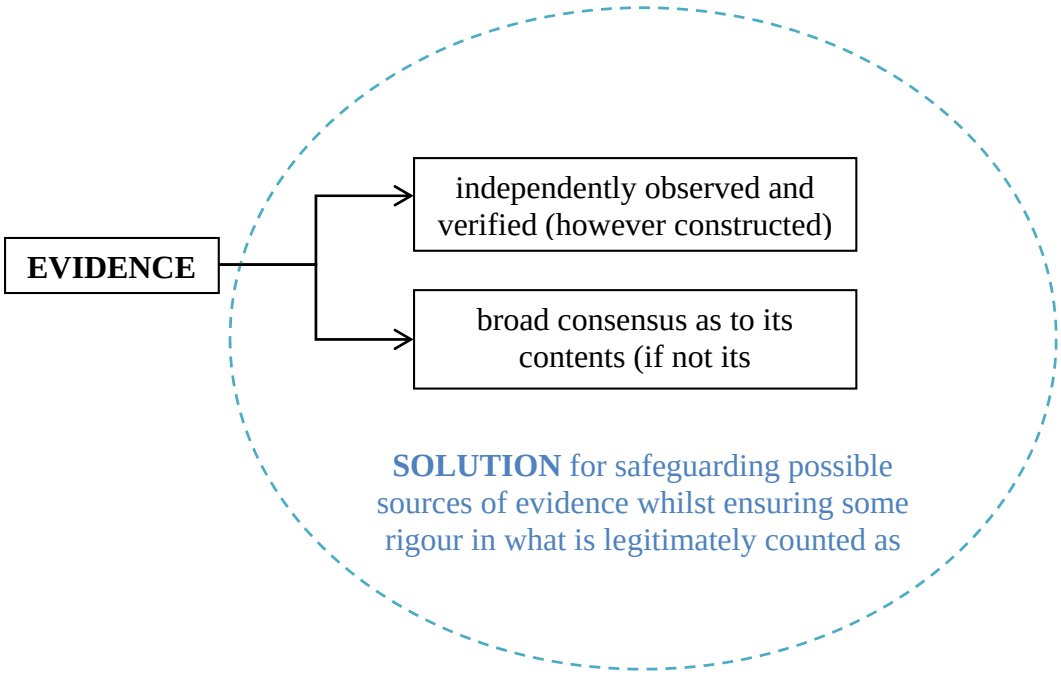

Figure 1 Project's conception of evidence.
(Adapted from Davies, Nutley and Smith (2000); and Wyatt (2002))

Table 4 Strengths and limits of evidence in planning practice and research. (Source: Kryzek et al. (2009)).

Source	Strengths	Limitations
Anecdote and personal experience	Specific, personal, rich; can tap into the experiences of disempowered groups and reflect local concerns and situations	Difficult to transfer, immediacy may obscure alternative instances
Professional experience	Reflects multiple experiences, reflective practice, and growing expertise	May not be systematically assessed; uneven coverage of available information
Focused case studies or precedents (not peer reviewed)	In-depth understanding of a single setting, usually examining multiple dimensions and drawing out relevant lessons	Usually a single example in a single setting; may be difficult to transfer to new situations
Peer reviewed empirical studies (formal research)	Systematic, tested for contribution to knowledge—may be qualitative or quantitative	Typically context-specific (confined to a small number of situations, places, or datasets); not available for all important questions
Peer reviewed theoretical analyses (formal research)	Provide an overall framework for an issue; may be based on empirical work bringing it together into a coherent whole	May be largely speculative designed for testing and experimentation rather than as a basis for action
Systematic review / report by a national research council	Provides an overview of the available rigorously collected evidence, on balance	Difficult to undertake on a comprehensive scale; relies on available studies; not available in all subject areas due to lack of research on some questions

2.2. Performance-based regulation for development control

Performance-Based Regulation (PBR) has been used in many regulatory sectors as an alternative to prescriptive regulation (Foliente and Pham 1998; Hattis 1999; Bukowski, Hirano and Rackliffe 2001; OECD Reviews of Regulatory Reform 2002; Deighton-Smith 2006; May 2003, 2010). While traditional prescriptive regulatory regimes regulate specific decisions or measures (e.g. maximum height for new buildings) PBR introduces an alternative regulatory regime focused on bringing about objectives, i.e., defining regulation of the level of achievement of objectives identifying how specific decisions or actions contribute to the general objectives. Within the latter, regulated entities have the possibility to choose the way to reach the desired level of performance (objectives), providing new and more cost-effective solutions instead of being forced to use specific solutions with unknown contributions to the general objective. PBR, in its different conceptions, has been adopted in United States, Australia, New Zealand, as well as in a number of other countries, in many issues such as land-use regulation, building regulation, environmental regulation, to name just a few. PBR is expected to reduce regulatory rigidity and compliance, while promoting innovation and reducing costs. However, there are authors who advocate different concepts and approaches in the context of regulatory regimes which can be mandatory, prescriptive and flexible (Foliente and Pham 1998; Hattis 1999; Gunningham and Darren 1999; Bukowski, Hirano, and Rackliffe 2001; OECD Reviews of Regulatory Reform 2002; Coglianese and Lazer 2003; Deighton-Smith 2006, 2008; Baldwin and Black 2007; Gunningham 2009; May 2003, 2010). Despite growing interest in performance-based regulatory regimes, there has been relatively little study on how performance-based regulation works in practice (Coglianese, Nash and Olmstead 2002; Bukowski et al. 2003; Deighton-Smith 2006; Di Leonardo et al. 2004; May 2010).

Implementation of PBR requires meaningful performance standards. Performance standards must provide the flexibility to conduct traditional and cultural practices in providing suitable alternatives to achieve the social goals embodied in local regulations. They can also be designated as measures of purpose. Following Coglianese, Nash and Olmstead (2002) there are different ways in which performance-based standards can be distinguished, such as: (1) the particularity of the regulation; (2) its levels of particular performance; (3) the scope of the primary purpose of the regulation and the logic of the necessary phases to reach the ultimate goal and; (4) the type of standard to solve a particular problem. According to the different ways of discerning performance standards, some authors approve to set specific categories in order to facilitate better decision-making. In defining the specific type of performance standard to be adopted, it is necessary to observe under what conditions the standard is applied (Bergero et al. 2001; Bukowski, Hirano and Rackliffe 2001; Bukowski 2003; May 2010; Mumford 2010).

Thus, performance standards can be expressed in quantitative or qualitative terms. A way of making this distinction is through performance assessment. The basic distinction is whether performance can be directly observed and measured, or whether it requires other forms of valuation. Hence, Coglianese, Nash and Olmstead (2002) differentiate performance standards in specificity, measurability and feasibility. Besides, performance standards will be appropriate in some, and perhaps even many, regulatory contexts. However, each preference will have the uncertainty associated with it. The definition of goals or objectives can be overcome by the maximum participation of different sectors (such as private groups and public entities) in order to prevent the implications and to maximize decision-making (Coglianese, Nash and Olmstead 2002; Gunningham 2009; Pisano et al. 2010).

New approaches to urban planning goals are constantly progressing and developing founded on principles from other research fields. The concept of performance-based planning has also been used to promote the integration of performance standards using other indicators and design codes of the local planning level (Faludi 2000; Rivolin 2008; Neumann and Markow 2004; Baker 2006; Heckman James et al. 2011; Parolek, Parolek, and Crawford 2008). In particular, as a way to override the prescriptive zoning, performance standards are proposed, for instance, based on load carrying capacity, threshold of safety and environmental capacity which can help to manage community's development. Some authors suggest an alternative framework for local planning's improvement (Staley and Claeys, 2005; Talen 2005, Baker et al., 2006; Sitkowski and Ohm 2006). They argue that the current approach is a closed-system framework in which innovations and change can be adopted only if they are anticipated in the local comprehensive plan or if a political majority can be convinced to support the proposal. It is the responsibility of local governments to minimize impacts on some communities. The main idea of flexible planning is to explain the fact that more complex an urban system becomes, the less useful (public) planning will be and more abstract rules are needed to improve a group and/or individual actions (Moroni 2010).

In short, the implementation of performance-based planning faces major challenges in predicting flexibility into decision-making's practice. The complexity in measuring and evaluating those constraints (in which performance standards can be applied) are referred as an additional complement of regulatory system in development control.

2.3. Evaluation in planning

Despite historical roots that extend to the 17th century, systematic evaluation research is relatively modern. The application of evaluation methods coincides with its growth and refinement, and with ideological, political and demographic changes that have occurred throughout the 20th century. The emergence and status of social sciences in universities and the increased support for social research were crucial in this process (Rossi et al, 1999).

Evaluation is an activity underlying many different fields of knowledge and professional practices. In the absence of a general and consensual vision on the evolution of evaluation theory, many authors converge on the acceptance of a shift from a positivist to a constructivist paradigm. Some describe this evolution in four generations' (Guba and Lincoln, 1989; Khakee, 1998, 2003) – Table 3. In recent years, this simplistic vision of positivist generations has been criticized, and more consensual positions adopted (Patton, 2002; Knaap, 2004), moving away from the constructivist paradigm (Pawson and Tilley, 1997). Each of these successive generations has represented a step forward, both in substance and in sophistication, and has led to an 'evaluation' that can better grasp the real world.

The relationships between evaluation and the activity under assessment; the role of the evaluator; the design of an evaluation methodology; and the presentation of evaluation results and their use by decision-makers and stakeholders are considered key issues in evaluation.

The EVIDENCE project focuses on the evaluation of one of these fields, planning. Its environmental dimension – both natural and built – is favoured, in detriment of social and economic issues. Planning-evaluation literature provides many classifications. Talen (1996) identifies four types of evaluation: i) evaluation prior to plan implementation, including the evaluation of alternative plans, and the analysis of planning documents; ii) evaluation of planning practice, comprising studies of planners' behaviour, and the description of the impact of the planning activity and of the plans; iii) policy implementation analysis; and finally, iv) evaluation of the implementation of plans, including both non-quantitative and quantitative assessments.

Three different types of planning-evaluation are particularly relevant, the first with an emphasis on plan making and ex-ante assessment, the second and the third with a focus on plan implementation together with, respectively, performance-based and conformance-based evaluation. Recognizing the complexity and uncertainty of planning – following the trend of the field of evaluation – a number of integrated approaches have been proposed (Alexander and Faludi, 1989; Alexander, 2000; Donaghy and Hopkins, 2006; Hoch, 2007; Oliveira and Pinho, 2009, 2010).

Generally speaking, there seems to be a gap between evaluation theory and practice, whose extension mainly depends on the activity under assessment and on cultural and legal specificities. According to each activity and to each country under analysis we will find different gaps, different causes for the gaps, different implications resulting from them, and different possibilities to bridge them. Despite these differences, we can say that the application of theories, concepts and methods from the academic world into evaluation practice involves a balancing act between competing forces.

Table 5 Four evaluation generations (Source: Guba and Lincoln (1989))

Evaluation generation	Application	Role of the evaluator
1st generation	Measurement of individual attributes	Technician
2nd generation	Description of programmes, objectives	Descriptor
3rd generation	Judgement on the contextual values	Judge
4th generation	Negotiation of claims, concerns and issues	Mediator

2.4. Urban morphology and planning

Urban morphology has emerged in Germany, in the end of the nineteenth century. Apart from a few authors who were actually able to create a tradition of continuity of their work (such as the German geographer Conzen and the Italian architect Muratori), it has since been developed somehow in scattered ways in several countries in Europe and overseas. Urban morphology can be associated with different fields of knowledge such as geography, architecture or urban planning. This led to the co-existence of different approaches, theories, concepts, methods and techniques.

Although it would be expectable that urban morphology was one of the disciplines feeding planning, they exist in largely separate worlds. This is to some extent institutionalized, and organizations are often either largely to do with research and scholarship, or mainly concerned with public or private practice. The mutual isolation is broken by occasional events, such as government planning officials joining the steering committees of research projects, guest lectures, the enlisting of academics in advisory roles, and researchers becoming involved in planning practice and development projects (Whitehand, 2007b). In addition, it seems evident that the different models and approaches provided by planning theory in recent decades, despite their usefulness in relation to other professional issues, have not helped in coping with the morphological dimension of cities.

Within urban morphology some critical points can be identified: the practical difficulties in dealing with the physical scale and complexity of large cities and conurbations; the difficulties of comparing studies of urban form (Whitehand, 2009a) developed in different cultural settings (Conzen, 2009) or involving the use of different approaches (Kropf, 2009); the difficulties of both filling existing gaps in urban morphology and bridging boundaries between different fields of knowledge (Whitehand, 2010); and finally, the difficulties of moving from morphological explanation and description to planning prescription (Whitehand, 2009b).

Batty (2010) and Fainstein (2005) argue that planning sees cities not in terms of their physical or social layout or structure, but as ways of negotiating, resolving conflict, engendering developments of various kinds through collaboration, and of how developments are funded. Bramley and Kirk (2005) question if planning does make a difference to urban form rather than simply passively respond to demand.

Against this background, within different approaches to urban morphology, the application of theories, concepts, and methods of analysis on urban form into planning practice, is currently acknowledged as a major challenge (Whitehand, 2009b).

2.5. Urban Accessibility and planning

Although accessibility is generally recognized as a potential planning support instrument, in practice its use in planning practice is very limited although the concept of accessibility has certainly gained its place in strategic planning and planning goals.

In spite of the importance of the accessibility concept for the current planning context no universally used definition can be found in the literature. According to Gould (1969, p.64; cited in Ingram, 1971; 101) 'Accessibility is a slippery notion one of those common terms that everyone uses until faced with the problem of defining and measuring it'. In contrast to the notion of mobility, commonly related to the 'ease of movement', accessibility is commonly related to the 'ease of reach of desired opportunities' (Levine & Grab, 2002). Accessibility has a far more ambiguous notion than mobility, implying a range of aspects such as, the distribution of potential destinations; the magnitude, quality and character of activities; the performance of the transportation system; the characteristics of the individuals; and the times at which the individuals are able to participate in activities (Handy and Niemeier, 1997; Liu and Zhu, 2004). Authors such as Geurs & Eck, 2001 argue that the definition of the concept of accessibility depends on the objective for which it is intended.

Although accessibility concerns have always been linked to urban planning, its role has gained increased importance in the last decades. First, due to the recognition of the need to integrate land use and transport planning. Several authors such as Halden et al. (2000), Bertolini et al. (2005) and Straatemeier (2006) believe that accessibility measures provide a useful framework for the design of integrated land use and transport policies. Finally, Straatemeier and Bertolini (2008) believe accessibility measures have the potential to deal with current limitations in the development of integrated land use and transport policies. They argue that accessibility has the potential to address the need for a common language between land use and transport, for a link of transport planning to broader policy concerns and for more emphasis on the policy design phase. Second, due to the recognition of the need for a shift of paradigm from mobility-based to accessibility- based urban planning, implying shifting the focus from the means to the ends, i.e., form the infrastructure system and its performance to the traveller and the fulfilment of his/hers expectations or needs. This paradigm shift has become ever more pressing in the context of social inclusion (e.g., aging societies).

Nevertheless, regardless of the potential for integrating accessibility concerns into urban planning, more particular urban land use planning, such integration has seldom been put into practice. A review of European directives shows a recent shift in European policy towards a increased relevance for accessibility-based planning practices. However, this shift is but taking its first steps with regard to the potential contribution of accessibility to planning goals and practices. Current European directives have, for now, limited accessibility to the reduction of barriers for the mobility impaired or to the coverage of public transport. Some European Countries, such as Germany and the UK have taken the lead on the integration of accessibility into urban planning through the development of national accessibility performance indicators and standards (DfT, 2006; Gerlach, 2012). Nevertheless, even within these examples, accessibility is sometimes regarded from specific dimension such as, barriers of mobility impaired, and sometimes reduced to mobility concerns (such as travel speed or time). Different formats of Local Transport Plan have been developed in several

European countries (following European directives towards the development of such plans and also as a response to the need for more formal planning for urban mobility). With two separate plans for land use and transport planning, integration of these sectors is now facing new challenges. Within this context, issues have been raised on the most adequate setting for the accessibility debate regarding its conceptual propensity for revealing the mutually influencing relationship of land use and transports. Challenges are even more notorious by the emergence of accessibility plans in other countries (e.g. “Local Plan for the Promotion of Accessibility”, in Portugal; “School Accessibility Plan”, in United Kingdom; “Municipal Accessibility Plan”, in Canada; “Transport Management Accessibility Plan”, in Australia, “Neighbourhood Accessibility Plan”, in New Zealand, and others). In practice, some of these are no different for Local Transport Plans; others limit its scope of analysis to the overcoming of barriers of the mobility impaired.

3. A view and a methodology for planning

The Plan-Process-Results /PPR is a methodology for evaluating planning and plan implementation, and is the main product of a PhD thesis presented at the University of Oporto in 2008 and recently published (Oliveira, 2011). PPR focuses on the implementation of plan proposals, on their consequent results ‘on the ground’, and on the related planning practice. The methodology should be applied throughout the planning cycle, particularly in the implementation phase. Its evaluation results are expected to contribute to promote an effective planning dynamic, informing changes in or reviews of the planning products and processes under assessment. PPR application prior to plan implementation has some limitations, and other methodologies can be applied in a complementary way.

PPR has a strong physical dimension, particularly evident in the evaluation criteria related to a conformance view of planning and planning-evaluation. This methodology highlights the role of the plan, the process and the results, but also of a set of key elements in the spatial development process – the city users (both residents and workers), the local politicians, the planning framework, and other plans prepared for the city. The evaluation criteria emerge from the main relationships between these elements.

The EVIDENCE project aims at providing a framework for analysis and prescription in planning. This will be done (drawing on the PPR methodology) through the incorporation of a view for planning, of a methodology for planning and planning-evaluation, and of a number of techniques to support the evaluation and design criteria included in this methodology.

The enhancement of the conceptual framework involves the development of the PPR methodology in three different ways: i) it will explore the design ability of PPR in complement with its evaluative dimension, already tested and successfully applied; ii) it will provide PPR a more comprehensive character by including other dimensions that were less developed in its original form; and finally, iii) it will provide new techniques for the assessment and prescription of the evaluation, and design criteria.

This framework aims at constructing the capacity to effectively influence the production and implementation of a new generation of municipal plans in Portugal. Table 4 lists a set of aspects that

we believe must be more clearly incorporated in the current procedure of plan making (particularly the PDM) in Portugal.

Table 6 Exploring PPR design ability

i)	the internal coherence of the different parts of the plan (objectives, rights of way and planning restrictions, land uses, urban systems, priority areas for operational planning and management);
ii)	the plan relevance to the city needs and ambitions;
iii)	the interpretation of the planning system, by the plan;
iv)	the external coherence of the plan (in relation to other plans for the same territory);
v)	the public participation in plan making and implementation;
vi)	the plan utilization throughout the decision making process;
vii)	the commitment of human and financial resources;
viii)	the effectiveness (plan-results); and finally,
ix)	the direction, provided by the plan, to the urban development process.

4. Techniques for planning

4.1. Structural Accessibility Layer

The Structural Accessibility Layer (SAL) provides a geographical representation of comparative accessibility levels by types of transport modes to different types of travel generating opportunities (Silva, 2008). Being based on the concept of Structural Accessibility (Silva and Pinho, 2010), the SAL aims to assess how urban structure constraints travel choices. This tool measures the ability to reach the main travel generating activities from a given origin, i.e. it analyses how urban structure enables or disables people to fulfil every-day travel needs and what choices they have to do so. Thus structural accessibility reveals which travel choices are made available to inhabitants by the urban structure, in what could be referred to as potential travel behaviour. The SAL includes two main accessibility-based measures: the diversity of activity index (DivAct) and the comparative accessibility measure (or accessibility clusters).

The diversity of activity index is an aggregate measure of accessibility to several activities. It measures the accessibility level by each transport mode, non-motorized (NM), public transport (PT) and car (CAR), counting the number of activity types that one can reach from a given origin (weighted by the average use frequency of such activity), within the number of activity types most relevant for travel demand generation. The results of the diversity of activity index range from 0 (no accessible activities) to 1 (all considered activities are accessible). These are then geographically represented at a high level of spatial disaggregation. In addition, average values of diversity of activity (weighted by population) are also provided for the entire region.

The results of the diversity of activity index are then used to develop the comparative analysis of accessibilities by transport modes, identifying the mode choices made available to inhabitants by local land use and transport conditions. The different combinations of accessibility levels by transport modes are grouped into 7 accessibility clusters, according to the mode (or modes) choice which is considered to be favoured by land use and transport conditions:

- Cluster I - Favourable conditions for the use of NM modes (high accessibility levels available only by NM modes)

- Cluster II - Favourable conditions for the use of NM modes and PT (high accessibility levels available by NM modes and PT)
- Cluster III - Favourable conditions for the use of all modes (high accessibility levels available by all modes)
- Cluster IV - Favourable conditions for the use of NM modes and car (high accessibility levels available by NM modes and by CAR)
- Cluster V - Favourable conditions for the use of PT (high accessibility levels available only by PT)
- Cluster VI - Favourable conditions for the use of PT and car (high accessibility levels available by PT and CAR)
- Cluster VII - Favourable conditions for the use of the car (high accessibility levels available only by the CAR)

The use of a particular transport mode is considered to be favoured by the urban structure when accessibility levels by that particular transport mode are perceived to be high, i.e. when an acceptable range of activities can be reached making its use competitive in comparison to the other modes. The threshold of perceived high accessibility is defined locally for each transport mode and should be based on the potential use frequency of activities considered unnecessary at local level for the perception of high accessibility levels. For a more detailed description of the SAL see Silva (2008).

4.2. Morpho

Morpho was recently proposed in the debate as a method for evaluating urban form (Oliveira, 2012). Morpho is framed by four general principles. The first is that Morpho should deal exclusively with the physical dimension of cities. Although it acknowledges that the form and structure of cities are influenced by social and economic drivers, it only reflects them in an indirect way. The second principle is that Morpho should select a reduced set of physical elements to describe and explain the city in morphological terms: the street system, the plot system, and the building system. The third principle is that Morpho should quantitatively evaluate the morphological basis of a given area, framed by a concept of ‘urbanity’. This means that the performance of the urban forms of that area would be expressed by a degree of urbanity as part of a continuous of rural-to-urban gradient. Urbanity is something that the built environment delivers through the main elements of urban form – the system of streets, the system of plots, and the system of buildings. In general, a high degree of urbanity would mean high accessibility, high density, high diversity and high physical continuity of these elements. The last principle is that Morpho should provide a sound basis for integrated research and for planning practice. This evaluation can be both synchronic and diachronic, monitoring the evolution of urban form over the years.

The application of Morpho to a particular urban area includes four different steps. First, it involves a reflection on the suitability of the methodology to the specific case study, in terms of the objectives of the evaluation process and of the criteria and techniques. This phase also involves analyzing the available data, both cartographic and statistical, for a full characterization of the

morphological basis. Also, adjustments in the methodology may happen according to data available. Morpho enables evaluating the urban form at different scales – the street, the neighborhood and the city – allowing for the identification of its main strengths and weaknesses, and providing guidance on how to mitigate the latter.

The second step corresponds to the measurement of seven evaluation criteria. Morpho provides an evaluation criterion for each of the three elements of this 'morphological core' taken in isolation; one evaluation criterion for each relationship between each pair of elements; and finally, one criterion linking urban form with function. The seven criteria are as follows: i) topological accessibility of the street system (similar to Space Syntax); ii) the topological accessibility of plots, expressing the diversity of agents; iii) the age of buildings, expressing the importance of 'time' in the process of city building; iv) the dimension of urban blocks, expressing the relationship between the street system and the plot system; v) the alignment of buildings – expressing the relationship between the plot system and the building system; vi) the relationship between street width and building height; and finally, vii) the building use. The evaluation of each of these criteria involves the production of a number of tables and maps, expressing different performances and exhibiting different degrees of urbanity within the object of analysis.

The third step involves gathering the evaluation results in a matrix, where a benchmarking exercise is carried out. Here a comparison is established between local (or context-based) and global values.

Finally, the last step comprehends the proposal for the utilization of the assessment results. It is important to bear in mind that despite the complexity and accuracy of a model it is always a representation, different from reality. As such, the utilization of Morpho, and of the results that it may provide, should always be reflective and critical. Carefully applied, Morpho can be used by local authority planners, to provide base information for municipal planning practice and for guidance of private development.

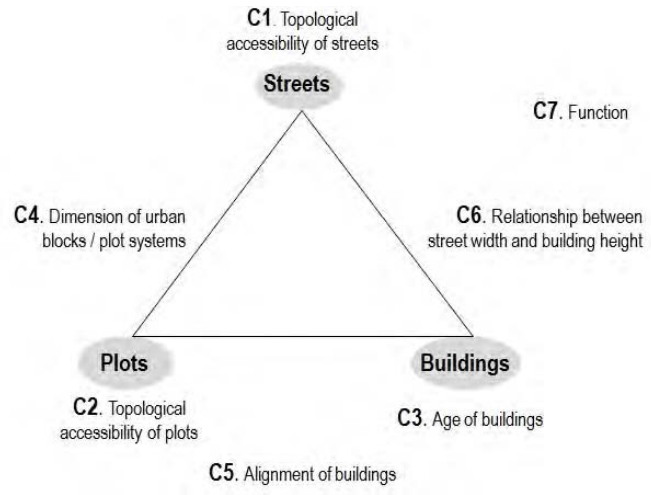

Figure 2 Morpho evaluation criteria

5. Future steps

This research project is currently developing local workshops with planning practitioners. Discussion meetings have been set up where the view and methodology for planning presented in section 3 has been introduced to local planning practitioners and then debated. These workshops will also evaluate the usefulness of planning techniques in improving the relevance and the coherence of planning proposals.

The project, and the dissemination of its results, is expected to generate discussion on the Portuguese planning system (and of other similar planning systems) and on the need for a new planning approach, more flexible and with a clear focus on objectives. In addition, it will provide guidance for the PPR framework to be used in planning systems aiming at promoting a culture of evaluation. At an operational level, the project will be able to propose two techniques, SAL and Morpho, to support analysis, design and decision in planning.

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Elderly population and urban ageing: A global problem of the last decades' urban trends

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During the last decades, urban planning has faced several challenges and experienced different trends in order to adapt to the changing challenges of the urbanization process. These trends are mainly based on decisions made by policy makers, planners and other urban actors, which are mostly represented by the governance. Remarkable trends like globalization and smart cities are now being influenced by a new arousing circumstance: the increase of senior citizens and the corresponding need for an age-friendly design.

The relevance of adopting the ageing trends into the governance decisions is a mandatory field for the prospective of the city life, especially in the big global cities, where their citizens (especially elderly people) find difficulties to cope with several problems related with the urban growth, being mobility one of the most relevant fields to be addressed.

Transit oriented urban developments have proven to be one of the most promising trends to form inclusive communities by creating residential and commercial areas designed to ease access to public transports. This trend enables to create multi-centre communities and so, shortening both displacement time and distances.

This paper analyses the relationship between urban ageing and transit-oriented developments (TOD) in four steps:

- **Mobility needs for an urban quality of life;**
- **Ageing city and the metropolitan mobility problem;**
- **The TOD systems as solution for the city ageing;**
- **The study cases of the different TOD implementations.**

Keywords: City ageing, demographic changes, quality of life, TOD, monocentric model

1. Mobility Needs For An Urban Solution

In order to understand the mobility concept in an urban context, it must be taken into account that it means more than the need for physical movement. In nowadays society, the capacity to access and use any kind of transport network or a combination of them (even by foot, public transport or private means of transportation), is a real necessity in order to satisfy a certain quality of life and maintain a level of autonomy and independence.

Over the last century, several high speed and flexible transport systems have been created, making possible to achieve long distance travels either for trading or/and for leisure. In an urban context, the expansion of new road infrastructures, among other means of public transports, has accelerated the functional and spatial separation between the occupational, the commercial and the private spheres of live. At the same time, a new trend to relocate residential areas in the city outwards has arisen, causing both a greater dependency upon the public means of transportation and a greater demand of individual transport. As a consequence, the urban planning processes have migrated mostly towards a car user oriented model. The following graph shows the personal motorization rate in the European community over the last decade (this indicator is defined as the number of passenger cars per 1 000 inhabitants; a passenger car is a road motor vehicle, other than a motorcycle, intended for the carriage of passengers and designed to seat no more than nine persons).. The next graph (Figure 1) shows a clear increase in the private transport dependency.

MOTORIZATION RATE (Cars per 1000 inhabitants)
EU- 27 countries

Year	Motorization rate	Year	Motorization rate
1991	334	2001	437
1992	348	2002	444
1993	360	2003	446
1994	368	2004	448
1995	375	2005	450
1996	384	2006	455
1997	388	2007	463
1998	401	2008	470
1999	412	2009	473
2000	423		

Source: Eurostat

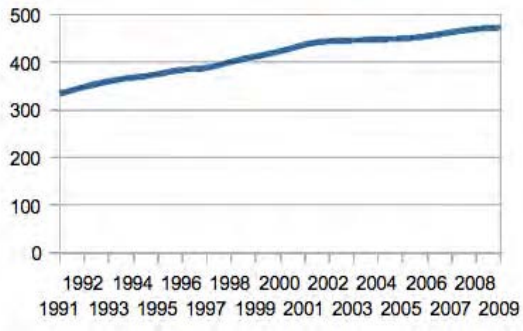

Figure 1. Motorization rate increment during the last decades in the Europe-27 countries.

Transport time and costs have a great influence on the configuration of the city growth, as shown in the monocentric urban planning model purposed by William Alonso in 1964. According to his model, households choose locations at a certain distance from the city centre or central business district (CBD) by means of maximizing utility they get from the joint consumption of a spatial good (land lot or house) and a composite good (all other goods) under their budget constraint (income less transportation costs). So, in simple words, the further a location is from the centre, the cheaper the land or house will be, but the transport needs and costs become more critical. The price gradient is proportional to the displacement cost so, as the transport cost becomes more expensive (the case of the private transport over the public one), the pricing increases more significantly in nearby CBD areas.

Only if a city fulfils the following three conditions it will grow as an ideal monocentric city:

- Every single working post is located in the CBD, every single area around it is a simple residential area.
- The transport network of the city is completely radial.
- The transport network has an infinite amount of axis, starting at the CBD and connecting every single neighbourhood around it.

Even if it is clear enough that this is only an idealization and that now real city would ever follow up this model, it still has several capacities in the urban planning field:

- It is a simple way to explain fairly well the density distribution in a city;
- It is a simple tool to represent an urban development under an economical perspective;
- It is a nice tool to measure the growing process of the city.

Thanks to these capabilities, this model, even in its simplicity, still plays an important role in explaining the urban planning process and there have been several attempts to improve it by trying to take several other factors into account. For instance, in 1986, Steen built up a double-gradient model based on the fact that no city builds up an infinite number of radial city roads, so even the places located in the same CBD distance may have a different transport experience, if one is located near a main radial road and the other is not. In Boarnet (2002), the independence between the city growth

and the employment generation is questioned, revealing an endogenous relation between these two facts. More recent works, like He (2010), still use this model to analyse and empirically test the Chinese urban land market.

Along this paper, this monocentric model will be used as a test pattern in order to compare the results with other urban growth models.

2.- Ageing City And The Metropolitan Mobility Problem

During the last decades, Europe has been suffering a serious demographic change. Improvements in living standards and the establishment and improvement in health systems across Europe have led to a continuous increase in life expectancy at birth. Indeed, life expectancy at birth in the EU-27 increased over the last 50 years by about ten years. Even in the last ten years, life expectancy has increased 1,5 years for women and 1,9 years for men. This effect has caused an increasing share of older persons and a declining share of working age persons in the total population. In the past two decades, the share of the working age population in the EU-27 increased by 0,3 percentage points, while the share of the older population increased by 3,7 percentage points; as a result, the top of the EU-27 age pyramid for 2010 became larger as compared with 1990, and according to recent data, this trend seems to have a continuity for the next 50 years. In 2010, the old-age dependency ratio in Europe was 25'9%. This ratio expresses the relative size of older population related to the working age population so it means that in 2010 there was a person aged 65 or older for every four persons of working age.

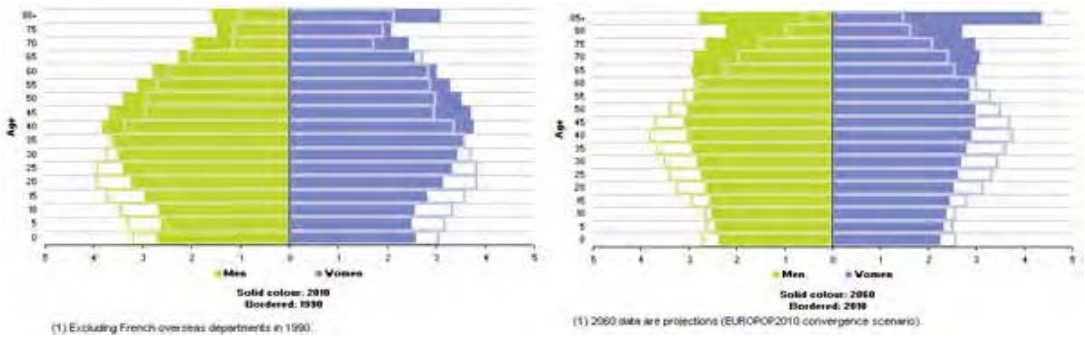

Figure 2. Demographic changes during last decades and expected evolution. Source: Eurostat.

At the same time, the increasing quality on health service has caused this ageing population to be healthier than they used to be and so, to be capable of enjoying a better quality of life than previous generations. During the previous decades, when elderly began to suffer dependency and were unable to take care of themselves, they used to be confined into a long-term care facility until death. However, the improvement in life quality gave raise a mentality change, enabling the care for the individual to prevail over the basic life care. Nowadays, as a rule, elderly persons increasingly want to keep their place in society and continue to be useful, to give advice and to pass on their professional expertise.

Indeed, because of the changes in family structures, dependent elderly persons are more frequently finding themselves living alone. As an example, at the beginning of the 1980s, in Belgium, less than 30% of the elderly lived alone; at the beginning of the 1990s, this figure was around 40% (Jacobzone, 1999). Accordingly, the support provided by other household members has reduced. In addition, the increase of the proportion of women having an occupation contributes to reducing the number of potential caregivers for the dependent elderly. The preference for staying at home results from the fact that it is often less expensive than institutionalisation, at least for those with a low level of dependency. But it also stems from a preference asserted by the elderly themselves. For many of them, entering an institution is synonymous with loss of freedom of movement and loss of familiar company, or even a place where one is waiting to die (Tester et al., 2003). On the other hand, living at home is often the choice most desired by the elderly because it allows them to preserve the environment and social network already established. Mette (2005) offers a complete state of the art on this subject.

Yet, staying at home can lead to adverse consequences, such as isolation (Gilroy et al., 2004). As an example, it might be difficult to continue to visit friends or pursue social activities. Nevertheless, as has already been shown (Gabriel & Bowling, 2004; Sharf et al., 2004; Strain et al., 2002), social activities, keeping active and busy, and meeting other people are important for retaining an interest in life, avoiding depression and, consequently, contribute for wellbeing.

In the context of the Fifth Framework Programme, the European Commission founded an interdisciplinary project called MOBILATE, in order to analyse the out-of-home mobility of older adults in both urban and rural regions of five European countries. A full reference about this project can be found on Mollenkopf (2005). One of the key elements researched in this project is the relation between elderly and the outdoor leisure. The research shown that most of older people like to perform out of doors time-fixed leisure activities, as work does not longer serve them as a time-scheduling occupation. Beyond this positive psychological effect, the study focused on establishing some kind of correlation between several variables like health, age, gender, living area (urban or rural), transport accessibility, etc. that could explain how elder people act towards leisure activities.

The research shown several strong correlations:

- A clear correlation between health and the variety of outdoor activities was stated: people with rather poor health tend to engage in indoor activities, whereas healthier people shown a much more variety of outdoor activities.
- A similar conclusion is also shown regarding transport facilities. The study shows a clear correlation between the mobility access (mainly by means of private transports as cars or bicycles) and the satisfaction obtained by the realization of outdoors leisure activities.
- People living in urban areas were also more satisfied with outdoor activities than those in rural areas. In some countries like Hungary the difference was even more evident, being satisfaction among the rural inhabitant rather low.

Even if correlation of variables does not necessarily mean a cause-effect relationship, the conclusions led by the paper can quite easily be explained under a causality point of view. Access to transport facilities, both private and public ones, eases the realization of outdoor activities by means of reducing the time consumption related to them. So, enabling an easy access to several means of

transportation helps elderly to perform outdoor activities. On the other hand, the realization of those activities, help them to age in a more active and healthy way and so, enjoy even furthermore their leisure time. The correlation between the rural areas and the dissatisfaction in performing outdoor activities can therefore be explained as a mirror of transport deficiency on those areas. Therefore, it can be stated that in order to ensure a proper life quality for elderly people, transport accessibility plays a key role as a major element to empower active ageing.

However, according to the monocentric urban model explained above, housing and labour markets are closely linked. Individuals need to live within easy reach of their work place. For those in employment, commuting costs, transportation infrastructure and journey time restrict the choice of residence; households seeking relief from high costs of housing may move to areas with less costly housing but find themselves further away from public transportation, facing a significant increase in transport costs and commute times. Almost the same can be stated for the elderly population; the demand of accessible outdoors activities means a demand of transport-accessible housing which, under a market perspective, means higher housing costs; and this is not always affordable for the old-aged.

The report from the European Centre for Social Welfare Policy and Research, Zaidi (2010) shows, in figures, the real state of poverty in Europe's elder population. Understanding individual poverty-struggling as a person living in a household where disposable income is below the 60% threshold of the national median income, figures from the European Union Statistics on Income and Living Conditions (EU-SILC) 2008 dataset reveal that Europeans aged 65 years and over face a higher poverty risk rate compared to the total average population. Based on this estimation, 10 of the 27 EU Member States recorded lower-than-average poverty risk rates for older people (16% or less), a total of 9 EU countries registered close-to-average poverty risk rates (18%-23%) and the remaining 8 countries recorded higher-than-average poverty risk rates (greater than 25%). Results vary considerably for the 27 EU Member States, with older people facing the highest poverty risk rate in Latvia (51%) and the lowest risk rate in Hungary (4%). Furthermore, the statistics show that the risk of poverty for older European women is on average 6% higher than the rate for older European men (22% and 16%, respectively). The figures indicate that for the majority of EU countries the situation of the poverty risk rates for older citizens is established and has suffered no significant changes over the last years. However, this is not just a European dimension problem. The next table (Table 2), shows the result of the last OECD summary on social, employment and migration working review (Förster 2005).

Under these circumstances, it seems quite clear that the monocentric city-model established along the last decades, is not suitable for an elderly population. With significant poverty risk rates for older people in Europe and housing costs being mainly determined by the accessibility easiness, the chances and capabilities for an over 65 years old person to acquire transport accessible housing that could benefit their quality of life are quite low. In order to cope with this problem, a new urban model should be established and promoted in new city developments.

POVERTY EVOLUTION IN SENIOR CITIZENS (65 AND OVER) IN OCDE COUNTRIES				
Country	Mid-1970s	Mid-1980s	Mid-1990s	2000
AUS		19,3%	16,1%	23,6%
AUT		15,1%	14,9%	9,2%
BEL			13,8%	
CAN		10,8%	2,9%	4,3%
CZE		9,4%	8,5%	2,1%
DEN		12,0%	5,1%	6,1%
FIN	28,3%	10,7%	7,5%	10,4%
FRA		16,6%	8,4%	9,9%
GER		12,8%	10,7%	10,2%
GRC	35,2%	26,7%	29,2%	24,3%
HUN		14,3%	7,3%	5,2%
IRL		5,8%	16,7%	35,5%
ITA		16,3%	15,2%	15,3%
JPN		23,0%	22,9%	21,1%
LUX		10,0%	4,9%	6,1%
MEX		28,0%	32,7%	28,4%
NLD	1,0%	1,2%	1,9%	1,6%
NZL		1,1%	1,0%	0,4%
NOR		22,3%	19,1%	12,4%
POL			4,3%	4,3%
POR		34,9%	30,3%	29,2%
SPA		6,4%	8,5%	14,4%
SWE		5,2%	3,5%	7,8%
SWI				11,2%
TUR		20,5%	23,1%	16,4%
UK	19,7%	8,9%	11,6%	14,4%
USA	26,3%	21,9%	20,6%	24,6%
OECD (24)		*14,7%*	*13,5%*	*13,9%*
Source: OECD Social, Employment and Migration Working Paper No. 22				

Table 2. Evolution of poverty among senior citizens. Source: OECD Social, Employment and Migration Working Paper No. 22.

3.- TOD systems as a solution for city ageing

Monocentric urban design presented in the introduction of this paper is roughly based on a unique city centre and several (mostly radial and circular) transit network developments that enable connections between every single point in the city and the centre. Since 1950, development patterns became increasingly auto-centred following the monocentric model. New neighbourhoods were located along highway routes, and transit systems provided to drivers, creating “park and ride” routes to suburban commuters, and enclosing commuter and light rail stations with large parking lots. This kind of city growth model leads to three complementary effects that make the city an uneasy place for mobility dependent people:

- It is a displacement-based model, meaning that every person must displace from their housing zone towards the centre in order to fulfil basic needs like work, shopping or receiving medical care.
- Because of the first effect, there is a high transport dependency, promoting the use of private transports, especially in those areas that are far away from the centre.
- Transit costs have a direct effect on housing costs, so lower rent housing areas are located further from the centre. As a consequence, individuals with lower incomes will be allocated away from the centre. However, those low-income individuals, among them senior citizens should be considered, have even a greater dependency upon transport. Furthermore, for these areas transport costs are higher (both in a monetary and timely sense) than for the areas located near the centre.

As a consequence of these effects and after decades of sprawling metropolitan development, many suburban residents have been left with arduous, costly commutes and many low-income urban communities isolated from jobs, transit, and services. It can be considered that the monocentric model should be improved in order to improve the quality of life of people living in the most remote urban areas.

In contrast to this, a transit-oriented development (TOD) can almost be defined as the completely opposite approach towards a city development. In a TOD model, several neighbourhoods are defined as city centres or transit network nodes. In most cases, a public transport stop is located as a node centre, closely surrounded by a high-density development and progressively spreading toward lower density development outwards the centre. Each node is developed within an appropriate walking distance (400 to 800 meters) radius from the transit stop.

Even if the transit-proximate development just described is necessary to fulfil a Transit Oriented Development, some complementary characteristics must be taken into account. TOD integrates transportation into the neighbourhood to achieve a number of different objectives. By facilitating public transportation use, TOD can reduce dependence on fossil fuels, lower residents' transportation costs, promote walking and health, ease traffic congestion, and improve environmental quality. TOD can also be a catalyst for revitalization, bringing new retail and residential investment into the community, connecting residents to jobs and services located throughout the region, and providing economic investment, ownership and other housing opportunities to low-income residents.

According to Dittman (2004), a complete Transit Oriented Development should fulfil the following conditions:

- Location efficiency: it consists of a conscious placement of homes near the transit nodes, encouraging in this way the usage of public means of transportation. In a region that is dependent on owning a car, individuals with limited resources are in a serious risk of exclusion. It must be taken into account that in many developed countries, owning a car is the second greatest expense after the housing cost. That is why the location of housing zones plays a key role in the achievement of an efficient and equitable region.
- Rich mix of choices: A well designed neighbourhood offers a wide variety of activities within a walking distance, for those who do not drive (like young and elderly), people who do not have cars or people who do not rely on cars to get around. Providing a mix of uses within neighbourhoods help them to become more convenient and affordable as several errands can be attended in one trip without the use of a car.
- Value capture: Value capture is often seen as a strategy that can help recover part of the cost of new transit infrastructure or station area improvements, which can then serve as the basis for new TOD. TOD can also help to encourage value appreciation, which in return can generate increased public revenues. For instance, a correctly designed TOD will appreciate the nearby housing areas by encouraging the usage of mass transport means, reducing the suburban sprawl improving the environmental conditions, increasing accessibility to work at affordable housing costs and reducing transport costs to workers. Besides, as a densification process is involved, the land value is also increased. A complete description of this characteristic may be found on Nyathi (2012)

- Place making: A TOD should evolve into mostly pedestrian oriented areas, which means that different places, especially transit nodes, should be safe, comfortable and attractive. Physical connections must be made, creating convenient pedestrian connections, enabling short, direct and continuous walking routes between the main activities within the transit node. Pedestrian routes should be at street level, avoiding minimal stairs and different levels. Besides, vehicles and pedestrian functions should be separated, minimizing the possible points of conflict.
- Resolution of tension between node and place: A tension exists between the role of a transit station or stop as a “node” in a regional transportation network and the station’s role as a “place” in a neighbourhood. As a generator of trips, a transit stop attracts activity and is a desirable place in which to live, open a shop or locate a workplace. At the same time, it is an interface/interchange point serving a specific function in a regional network, which is in turn part of the metropolitan economy, composed of employment centres and residential areas. For this reasoning, the transit node must deal both with transport and development needs.

But the synergy between economic, land use, transportation, environment, housing, and equity goals made possible with TOD is not automatically achieved. Thus, far many projects marketed as TODs are not fundamentally different from traditional residential suburban developments: they are not well integrated with the station or the surrounding community, they include excessive parking, and they are neither mixed-use nor mixed-income.

Even fewer TODs attain social equity goals. TOD is unconventional, complicated, and expensive to develop, and the demand for housing near transit is expected to exceed the number of homes that can be built in TODs. These trends increase the likelihood that TOD housing will be unaffordable to low-income households. Properties within a five- to ten-minutes walking to a transit station already sell for 20 to 25 per cent more than comparable properties further away. Investments in new or enhanced transit stations in low-income neighbourhoods can spark rapid appreciation in the costs of land and housing in the community — leading to gentrification and to the displacement of lower-income residents.

4.- Case Studies

Along the last decades, several cities around the world have grown conscious of the necessary change in urban planning policies and have began to develop a TOD based urban growth. In (Newman, 2000a, 2000b), several of these success cases are explained. Few of them has been selected as the most representative cases to focus the problems related with a TOD and how they have successfully been solved.

4.1.- Zurich

In the 70's Zurich began a public transport service reconversion process. At this point, a choice was made in favour of expanding the old tram system and upgrading the services to the citizens instead of building an underground system and leaving the streets for the car. As a consequence, the tram system gained popularity as the citizens rarely had to wait for more than six minutes. The transit time was also reduced as both tram and bus systems were given absolute priority at traffic signals. As

trams became fashionable, public attention was directed to other activities like pedestrian malls and outdoors cafés, so this kind of amenities began to gain space over roads and parking lots.

In the 1980s, transit offer was dramatically increased once more by the development of a complete S-Bahn system, with several high quality double-decker train sets. At the same time, several large shopping centres were developed, both under and around the stations. All around Zurich, several land-use planning processes and industrial developments responded to the great improvement in the traffic services, and so, several urban villages were tightly integrated around the S-Bahn system.

In order to promote the use of the traffic system effectiveness, several marketing and information campaigns were promoted. For example, special purpose transit system maps were introduced to show people how to get to restaurants, sports facilities, cultural attractions, and so on. Another promotion campaign was the introduction of Rainbow tickets or Environmental travel cards, aiming to appeal people's environmental consciousness. Also, one of the key aspects of the public transport in Zurich is that it is oriented as a “transport-to-all”, policy, with special care towards young children who are too young to drive, elderly and handicapped people.

Thanks to this transit-oriented development, Zurich has become a non-car oriented city. As a consequence, car use for the journey-to-work rate has fallen in Zurich, whereas the use of public transport has increased.

4.2.-Copenhagen

Copenhagen had a transit-proximate development, which included areas like Ballerup at the end of one of the S-tog lines (a local electrical train service). There, several community facilities, apartments, office complex and even a shopping centre were built around the station. Several pedestrian boulevards, a bus feeder station and a great provision of bikes were also located by the station.

However, this transit proximate development alone was not enough to discourage the usage of private means of transport. At the 60's a trend for isolated homes and car driving began to catch up, so several policies where taken into action to boost the use of public transport. Central parking areas began to be reduced at a 3% per year pace, at the same time that more streets were pedestrianized and more attractive landscapes and activities were introduced in them. Consequently, the demand for single detached homes began to decline at a high rate.

Copenhagen is also one of the world's best bicycle cities. One third of the city goes to work on a bike. Like many European cities, Copenhagen had a high percentage of bicycle use early this century, but unlike other cities it has not removed bicycling as it modernised and became wealthy. Car usage grew and threatened the more humble bikes, but in the 60's, at the same time as the processes above were beginning to happen, Copenhagen decided to maintain its bikes. In order to promote their usage, the city began to invest in cycleways and traffic management. Although Copenhagen has only 300 kms of separated bikeways (less than Amsterdam and other Dutch cities), the city has created safety and priority for cyclists in a really effective way: by means of blue strips at every intersection, giving priority to the cyclist over turning vehicles and by an education program that generated a great culture of respect for the cyclists. The latest innovation in Copenhagen is the City

Bike program in which colourful bikes are provided free after a deposit. These bikes are paid for by commercial advertising and are maintained by the City of Copenhagen with assistance from the prison system which collects and repairs damaged bikes overnight.

Another way to encourage the bicycle use, besides restricting the car usage, is the implementation of a bicycle transit network that works for a diversity of users. Green routes that link school, parks and residential areas are invaluable for children and recreational biking; whereas, an urban network following the main streets works great for adults on their daily errands. Another key element for the success is the necessary adaptation towards specific needs of different kinds of users. This way, special three-wheeled or electrical bikes are provided for senior citizens which provide the driver with a massively increase mobility radius.

There is of course a close link between the policies to reurbanise and revitalise the inner city of Copenhagen and the policies to avoid building major infrastructures for vehicle access and to favour alternative modes. This link shows that sustainability can be a meaningful policy as the city has done very well economically, as well as maintaining the level of car use in the inner city for 20 years. This policy has been consistent with community interests.

Copenhagen has of course been subjected to all the pressures for suburbanisation and car use. It has developed some car dependent areas and some that tend to evolve in that way. But overall, it has not allowed itself to be dominated by car-based thinking.

4.3.- Toronto

For decades, Toronto has been performing a transit-oriented development, becoming the most successful North American city in shaping a significant role for transit. From 1960 to 1990, the metropolitan Toronto transit usage grew up 127%, achieving the 350 trips per capita, which represents the same European levels of transit ridership.

The first great decision in order to make Toronto a TOD city was the cancellation of the Spadina Expressway on 1971. This project was a major north-south expressway route through old suburbs into the central city. Opposition groups protested, on the factors of noise, pollution, destruction of homes and the expected increase of traffic that the roadway would cause. The protesters included neighbourhood residents, as well as urban planners, economists and architects. After the Spadina decision, Toronto's government began to emphasize transit-oriented possibilities. A Spadina subway was built based on the existing subway lines dating back to 1950s. A close cooperation between the Toronto Transit Commission (TTC) and land developers led into mutual benefits obtained by the 22 transit oriented sub-centres that grew up around the subway line.

Toronto changed in less than 30 years from a city that was becoming increasingly car-based, to one that is now substantially based around a transit network, certainly in Metro Toronto with its 2.3 million people. As a result, it has been able to revitalise the downtown area and to develop a density in Metro Toronto (41 persons per ha) that is closer to European levels. Even the greater Toronto area has a density of 26 persons per ha, which is almost double the average US and Australian metropolitan densities. Significant transit improvements are still occurring nowadays, like the opening in 1997 of the Spadina Avenue light rail line, which replaced a great number of diesel buses and the construction of the east-west Sheppard subway.

In most automobile-dependent cities, the car drains a city centre of its life, disperses it and makes conditions very difficult for an effective transit system. Metro Toronto's 22 smaller sub-cities, together with a healthy downtown which has even managed to reduce parking supply by 11% between 1980 and 1990, provide the basis for a viable transit system. There are plenty of lower density suburbs around these sub-cities, but each has a local centre providing many services nearby, and it is only needed a short distance for residents to go to a good transit service whenever they need longer trips. Thus, the city centre and the sub-centres are complementary.

5.- Conclusions

Through the article, the traditional car-oriented city development has been compared against the new transit oriented development urban planning procedure in order to analyse the benefits of the last trend, with special care for the benefits towards the elderly population.

In the traditional expansive model, cities tend to grow in a radial form from the city centre, creating disperse and detached residential areas. Besides, the housing prices are established based upon the distance towards the centre confining low rents in further areas. These low rents must cope with the transport pricing problem and are usually dependent on the car usage.

Elderly population may be at risk in this city development model. Considering that elderly receive on average lower incomes, it is quite difficult for them to find affordable housing near the city where the amenities are located. Furthermore, several senior citizens are not car users, being their housing dislocation a most serious difficulty to perform the everyday errands. Besides, the distance and difficulties to get to the centre are main barriers for these senior citizens to take part in several leisure activities that are a key issue in order to guaranty a certain quality of life and to keep healthy, active and independent ways of living.

In opposition to the traditional monocentric development, the transit-oriented development is presented. In this urban model, transit network is the spine defining the city evolution as a multicentric city. Every transit node acts as a centre, concentrating high density and mix of activities within a walking distance radius. This fact associated to the boost of several policies to promote the usage of public means of transportation, allows for a new non-car oriented city development. In this configuration, most of the activities are on a short walking distance or easily reachable by public transport.

Transit-oriented developments, urban villages, and new town centres are becoming increasingly popular as the nation's demographics change. They respond to people's changing needs and priorities.

Today, seniors, couples without small children, but also other demographic groups are increasingly choosing smaller, more compact housing in neighbourhoods where shops and services are within walking distance and where high-quality transit services are available. It is expected that these groups will represent the vast majority (80 percent) of people attracted to transit-oriented developments in the next years.

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Population Ageing and Aged Care in Hollow Villages: A Perspective from Urban-Rural Restructuring in China

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China is undergoing population ageing rapidly in recent years along with fertility reduction following its family planning policy and increasing life expectancy. One of the most distinct features in China's population ageing is the obvious differentiation between the urban and the rural areas – the ageing rate in the rural areas is much higher and its aged care problem is more severe than in the urban areas. Besides the increase in the number and proportion of the elderly, the increasing ageing rate in rural China is also caused by the large scale rural-to-urban migration, which has extracted much of the young labor and left the elderly behind. The rural population is as weak as the hollow of a tree, so the phenomenon is called hollow village. Hollow villages are undergoing rapid and dramatic demographic transformation as well as socio-economic restructuring. Given the poor situation of care-support in rural China, the aged care system should seek more social welfare provision while retaining family support. Among all the possible measures, a development strategy based on urban-rural cohesion is regarded as the most effective way of conquering the various challenges in rural aged care.

Keywords: Population Ageing; Aged Care; Hollow Villages; Urban-Rural Cohesion

1. Introduction

This paper examines the interconnection of two phenomena – population ageing and rural-urban restructuring – in contemporary China. These are important processes in themselves, but the particular interest of this paper is in how they combine to present numerous challenges to the aged care of the rural elderly. Many issues surrounding the topic are only just emerging and have thus received little attention in policy and academic research. However, there is strong evidence that the aged care of the rural elderly, especially of the rural *remained* elderly – those with at least one child leaving the rural and working in the urban, will have great influence on the economic and social development in China (Banister, 2010; Chen, 2011; England, 2005).

This paper presents a review of population ageing in rural China along with the large scale rural-to-urban migration. It then addresses the aged care situation of the rural remained elderly and focuses on the typical geographic phenomenon – hollow villages. In such villages, population decrease and economic decaying go hand in hand; both are rapid and, at present, often essentially unplanned or uncontrolled (Liu et al, 2011). The paper is therefore concerned with highlighting emerging issues that have implications for aged care policies and practices in these rapidly changing rural areas. Sample investigation on aged care in hollow villages in this paper is based on questionnaires of the rural remained elderly in Linquan County, Anhui Province. The paper also proposes suggestive approaches to aged welfare delivery for the rural remained elderly.

2. Population ageing in rural China

Over the last decade, population ageing has emerged as an increasingly important policy concern in China. Elderly Chinese (defined as aged 60 or older, unless special indication) amounted to 185

million and constituted 13.7% of the total population at the end of 2011, and this is expected to rise to 16% by 2015 and to double by 2030 (SC, 2011). Although China's ageing rate is nearly half of the developed countries, the number of the elderly has already surpassed that of all European countries combined (CRCA, 2007) and is roughly equivalent to 60% of the total population of the USA. The proportion of the elderly aged 65 and older, in China, rose from 4.9% to 7.0% in 18 years, while in Japan it rose from 4.8% to 7.1% in 20 years, in Sweden from 5.2% to 8.4% in 40 years. It is estimated that the proportion will rise from 7% to 14% in 25 years in China (Xie, 2004), while France, US, Germany, UK and some other developed countries take generally 45 to 120 years to fulfill this transition.

Rapid population ageing in China has been driven primarily by two factors: fertility reduction, following the family planning policy (especially the one-child policy) and increasing life expectancy (Bartlett and Philips, 1997; Joseph and Philips, 1999). As a consequence, largely but not solely, of increasingly strict population policy, China reduced its birth rate from 36.8‰ in 1960s to 18.2‰ in 1981 and to 12.1‰ in 2008 (NBSC, 2009). This reduction was facilitated by declines in both the economic and social value attached to large families as well as by increasingly strong family planning programs and the often controversial one-child policy. Over the same time period, life expectancy at birth increased by more than one quarter. As a consequence of social improvements, better nutrition and health care, life expectancies at birth now stand at nearly 71.4 years for male and 74.8 years for female in China (World Bank WDI Database).

Population ageing in China varies between the urban and rural areas. The ageing rate in the rural is much higher than in the urban. According to a set of statistics by Chen's research group (Chen, 2011), by the end of 2009, there were 167 million people aged 60 years and older in China, among which 105 million were the rural elderly. The number of rural elderly was 1.69 times of that of urban elderly. The ageing rate in the urban was 7.97%, while it was 18.3% in the rural. The ageing rate in the rural was 2.3 times of that in the urban. It has been estimated that population ageing in rural China will enter a 'quickening phase' from 2011 to 2020, there will be a 'super-ageing' stage from 2021 to 2033, and the ageing rate will keep higher from 2034 to 2060.

Furthermore, the growth in the number of the very old has exerted more challenges to population ageing in rural China. There were 9 million people aged 80 years and older in rural China in 2000, accounting for 9.8% of the total rural elderly (60 and older) at that time; the number increased to 11 million and the proportion rose to 11.3% in 2009 (Chen, 2011). It is estimated that the proportion of the elderly aged 80 years and older to the total elderly population in rural China will reach 22% in 2045 (Chen, 2011). The increasing ageing rate of the very old implies the growth in the number of disabled elderly who need more delicate aged care. Statistics show that the completely disabled elderly in rural China increased from 6.45 million in 2000 to 7.46 million in 2006 and the partly disabled elderly increased from 12 million to 15.2 million; however, the social aged care institutions accommodate less than 1/12 of the disabled elderly (CRCA, 2007).

3. Out-migration of rural young labors

Besides the increase in the number and proportion of older people in society, the increasing ageing rate in rural China also owes a lot to the large scale rural-to-urban migration, which has extracted

much young labor and left the elderly remained. In the two decades after 1978, about 174 million people have moved from rural areas to urban areas, creating the history's largest flow of migration in the world. The number was higher than the total population of many large countries at that time, for example, Brazil had 166 million inhabitants and Russian had 147 million in 1998. This historically unprecedented migration constitutes 75% of the total increase in urban population in China during that period (Zhang and Song, 2003).

There are a lot of factors driving this large scale migration. Continued natural increases in the rural population and increases in productivity in agriculture have resulted in a very large surplus of labor in the rural areas. Although the township and village enterprises have helped to absorb significant amounts of the surplus labor and to raise wages in rural areas, they have not provided enough jobs and the rural wages have not kept pace with urban wages. As a result, the rural-urban income gap has been very large for many years, with per capita incomes in rural areas being roughly one half of that in urban areas (Seeborg etc, 2000). The *expected* income differential provides a great motivator of rural-to-urban migration (Todaro, 1969). Meanwhile, the agricultural market reform rewarded every *household* rather than the team or individual as the unit of production. It changed the incentive structure in a way that lowered the opportunity cost of migration while raising rural incomes in the family. Therefore, the rural surplus labor was freed from each household. At the same time, a *dual* economic structure has existed in China for a long time: a traditional rural sector with zero marginal labor productivity and a modern urban industrial sector with high productivity. Rural-urban migration is a natural and output-gain process in which surplus labor is withdrawn from the rural sector to provide needed manpower for urban industrial growth (Lewis, 1955; Jorgenson, 1961; Kelley etc, 1972; Ranis and Fei, 1964). Urbanization thus augments national income through short-run efficiency gains due to shifts of labor from low to high marginal productivity employment and through long-run growth effects due to higher accumulation rates in urban sectors.

Unlike migration in earlier periods of Chinese history and most internal or international migration in the rest of the world, China's current migration lacks a sense of long-term commitment. Most of the rural migrants move as individual and temporary instead of familial and perpetual migration. This is primarily because the rural migrants confront many difficulties such as obtaining housing and other benefits in cities. They are also hampered by some institutional barriers such as residence requirements. In contrast, they have land property rights in the rural. Therefore, most of the young people and their families clearly regard this out-migration as temporary (Bartlett and Phillips, 1997). Among those who have migrated to Shanghai, for instance, most of them are either single or married but living in Shanghai alone, without the company of spouse and family: 35% never get married, and out of the 64% who are currently married, only one out of every five has a spouse also in Shanghai; the average household size among migrants is only half that of city residents (Wang and Zuo, 1997). Moreover, young adults are the main migrant group. Statistics show that people aged between 20 and 34 years accounted for 47% of the total migrants in Shanghai in 2010, and those at working ages (15-50 for male and 15-54 for female) accounted for 87.3% (SMBS, 2011). This indicates that while a large proportion of people at working ages migrate from the rural to the urban, those left behind are basically the elderly aged 60 years and older.

The extent of rural-to-urban migration in China over the coming years will determine how many elderly are left without family social services protection. The greater the rural-urban migration, the more likely there will be substantial population of elderly left in rural areas who are not receiving support from their children. It is widely accepted that at present there are nearly 200 million surplus labors in rural China, accounting for approximately 40% of the total rural labor force, although some scholars argued that at most 107 million rural labors remain in surplus, accounting for 22% of the total labor force in rural areas and that more than half of the surplus labor are over 40 years old (Cai and Wang, 2008). No matter what the exact number is, if there is no sufficient economic development near the areas where these people live, they could over time travel into the cities in the coastal and northeastern areas where China is experiencing its highest level of development.

4. Hollow villages

With population ageing in rural China and out-migration of rural young labors, the rural areas are undergoing dramatic demographic transformation. The young labors spend most of their time working and living in the city and seldom return to the rural except during unemployment seasons or great festivals. Investigations in Linquan County show that 71.67% of the migrated rural labors spend more than nine months in the urban. The elderly, the women and the children who are not strong enough to survive in competitive cities are left in the rural. The rural population is as weak as the hollow of a tree, so the phenomenon is called hollow village. People who have at least one child, or one spouse, or parents leaving the rural and working in the urban are called rural remained population. According to some statistics, the rural remained population in China is 185 million at present, accounting for 13.7% of China's total population. Among the rural remained population, there are 40 million elderly (60 years and older), 47 million women (under 60 years), and 58 million children (Tang, 2011). The ageing rate of the rural remained population is as high as 21.6%. The number of rural remained elderly accounts for 37% of the total rural elderly.

The changing demographic structure in hollow villages has induced many social and economic problems. There is a great loss of human capital in the rural when the relatively higher educated young labors have been extracted to the urban. Some hollow villages are even paralyzed in daily management because it is difficult to find anybody assuming the responsibility. Without qualified labors, most of the rural remained population is not capable of participating in forestry, animal husbandry, fisheries or other advanced agricultural industries. Neither can they manipulate the new technology or advanced skills. What they are mainly engaged in is just basic farming. Moreover, a significant amount of arable land have been improperly farmed or even left barren. For example, the rice can be planted twice throughout the year in some places; but it is planted only once due to lack of enough labor force. According to the investigation in Linquan County, 18.33% of the families leave one third of their arable land barren, 10.56% leave two thirds barren and 10.56% leave nearly all barren; only 60.56% of the investigated families can guarantee timely farming. Thus, the agricultural productivity has been reduced a lot. With the retreat of human capital from the rural, some other capital in agricultural-related industries has been hollowed out as well. This has absolutely hampered agricultural modernization and industrial advancement. The rural economy is decaying consequently. A negative circle exists in the formation of hollow villages.

The decaying economy in hollow villages has limited the ability of local communities to step in to assist caring families and especially older people without families. The provision of aged care is mostly based on family. However, the family structure in hollow villages has become more complex than ever before. This change can be along gender lines but also according to age. In the former, men are deployed to take advantage of lucrative non-farm jobs, spending most of their time outside home, while women tend to assume the major responsibility for family food production while also retaining their responsibilities for domestic labor and care-giving. Family care for the young and old people is largely 'women's work' (Croll and Huang, 1997). Wives, daughters, and daughters-in-law are expected to provide most of the aged care. In the latter, younger women join their male age-peers in entering more lucrative, non-agricultural employment locally or become more involved in rural out-migration, either following their husbands or as work seekers in their own right. The elderly and the children are relatively fixed population in the family and they look after each other.

5. Aged care of the rural remained elderly

The present research makes an investigation on the aged care of 240 rural remained elderly in Linquan County, Anhui Province, which is famous for its labor output. 180 valid questionnaires have been received. Among those, 113 (62.78%) of the investigated elderly are male and 67 (37.22%) are female. Concerning their age (Table 1), there are 127 people (70.56%) between 60 and 69 years old; 43 (23.89%) between 70 and 79 years old; 10 (5.56%) aged 80 years and older. Considering their living companion (Table 2), 25 (13.89%) live alone; 25 (13.89%) live only with the spouse; 16 (8.89%) live only with the grandchildren; 88 (48.89%) live with the spouse and the grandchildren; 14 (7.78%) live with their children's family; 12 (6.67%) live with the spouse and their children's family. The educational level of the investigated elderly is quite low in general (Table 3). 80 (44.44%) are illiterate; 68 (37.78%) are primary school graduates; 27 (13.89%) are middle school graduates; only 7 (3.89%) are high or advanced school graduates. The investigation found that the rural remained elderly get insufficient economic support, their medical needs are hardly met, they lack of daily care, and they feel tedious and lonely in leisure time.

Table 1. Age of the investigated elderly

	60-69	70-79	80 and older	total
number	127	43	10	180
percentage	70.56%	23.89%	5.56%	100%

Table 2. Living companion of the investigated elderly

	alone	only with spouse	only with grandchildren	with spouse and grandchildren	with children's family	with spouse and children's family	total
number	25	25	16	88	14	12	180
percentage	13.89%	13.89%	8.89%	48.89%	7.78%	6.67%	100%

Table 3. Educational level of the investigated elderly

	illiterate	primary school	middle school	high or advanced school	total
number	80	68	27	7	180
percentage	44.44%	37.78%	13.89%	3.89%	100%

5.1 Insufficient economic support

The primary income source of the rural remained elderly is children maintenance, accounting for 49.44%; the second source is self and spouse earning, accounting for 36.11%; all the other sources such as old-age insurance, government support, relatives' and friends' bestowal account for 14.44% in total (Table 4). Their annual maintenance from children varies (Table 5). 11.11% of the elderly get over 3000 yuan from their children annually, 15.58% get 2000-3000 yuan, 24.44% get 1000-2000 yuan, 32.78% get 500-1000 yuan, 16.11% get less than 500 yuan. However, there is no obvious improvement on the children's annual maintenance to the remained elderly after their rural-to-urban migration (Table 6). Only 43.89% of the remained elderly got more maintenance, 51.11% got more or less the same, 5% got less. Without sufficient maintenance from the children, the elderly have to work and earn by themselves. Investigations show that 44.44% of the elderly work as the main labor force in the family, 38.89% work as assistant labor force, only 16.67% don't work as labor force (Table 7).

Table 4. Income source of the investigated elderly

	children maintenance	self and spouse earning	old-age insurance	government support	relatives' and friends' bestowal	others	total
number	89	65	3	4	2	17	180
percentage	49.4%	36.11%	1.67%	2.22%	1.11%	9.44%	100%

Table 5. Annual maintenance from children of the investigated elderly

	over 3000 yuan	2000-3000 yuan	1000-2000 yuan	500-1000 yuan	less than 500 yuan	total
number	20	28	44	59	29	180
percentage	11.11%	15.58%	24.44%	32.78%	16.11%	100%

Table 6. Comparison of the children maintenance before and after their rural-to-urban migration

	increased	not changed	decreased	total
number	79	92	9	180
percentage	43.89%	51.11%	5%	100%

Table 7. Work intensity of the investigated elderly

	main labor force	assistant labor force	don't work as labor force	total
number	80	70	30	180
percentage	44.44%	38.89%	16.67%	100%

5.2 Unmet medical needs

The health status of the rural remained elderly is not so optimistic (Table 8). Investigations show that only 17.22% of the elderly are healthy, 53.33% indisposed, 21.67% chronic, and 7.78% are seriously sick. However, more than half of them have negative attitudes toward their disease (Table 9). 14.44% of the elderly are indifferent to their disease, 46.67% take only simple diagnosis, 36.11% have timely therapy, and 2.78% deal with their disease randomly. When asked about the treatment difficulty, 12.78% of the elderly said they can't afford the disease treatment, 40% can afford but feel it is too expensive, 16.67% feel the difficulty in finding companion when taking disease treatment, 6.67% are not satisfied with the health care facilities, and 23.89% have other difficulties such as no time, complex procedures, poor communication and so on (Table 10).

Table 8. Health status of the investigated elderly

	healthy	indisposed	chronic	seriously sick	total
number	31	96	39	14	180
percentage	17.22%	53.33%	21.67%	7.78%	100%

Table 9. Attitude of the investigated elderly toward their disease

	indifference	simple diagnosis	timely therapy	randomly treatment	total
number	26	84	65	5	180
percentage	14.44%	46.67%	36.11%	2.78%	100%

Table 10. Treatment difficulty of the investigated elderly

	unaffordable	affordable but too expensive	no companion	insufficient health care facilities	others	total
number	23	72	30	12	43	180
percentage	12.78%	40%	16.67%	6.67%	23.89%	100%

5.3 Lack of daily care

The self-care ability of the remained elderly is divided into five categories – good, medium, sufficient, unsatisfied, poor. Investigations show that 20.56% of the elderly are good at taking care of themselves, 27.22% are medium, 45% acceptable, 6.67% unsatisfied, 0.56% poor (Table 11). Concerning who takes care of the rural remained elderly (Table 12), 9.44% of the investigated are taken care by their children, 35.56% by their spouse, 13.78% by themselves, 14.44% by their grandchildren, 2.78% by others. Because a large number of young children are left at home while their parents go to the urban areas to work, the elderly have to assume the responsibility of taking care of their grandchildren. 20% of the investigated elderly feel arduous in taking care of their grandchildren, 46.11% feel acceptable, 11.67% feel competent, and only 22.22% are not involved in taking care of grandchildren (Table 13).

Table 11. Self-care ability of the investigated elderly

	good	medium	acceptable	unsatisfied	poor	total
number	37	49	81	12	1	180
percentage	20.56%	27.22%	45%	6.67%	0.56%	100%

Table 12. People taking care of the investigated elderly

	children	spouse	self	grandchildren	others	total
number	17	64	68	26	5	180
percentage	9.44%	35.56%	13.78%	14.44%	2.78%	100%

Table 13. Responsibility of the investigated elderly in taking care of their grandchildren

	arduous	acceptable	competent	not involved	total
number	36	83	21	40	180
percentage	20%	46.11%	11.67%	22.22%	100%

5.4 Tedious and lonely leisure time

Investigations point out that the leisure time of the rural remained elderly is quite boring (Table 14). 30.56% of them spend the leisure time on TV or radio, 24.44% on chatting, 9.44% on chess or cards, 35.56% have other activities. More than three quarters of the investigated have the feeling of loneliness – 12.78% of the elderly often have the feeling, 54.44% sometimes have the feeling and only 32.78% never feel lonely (Table 15).

Table 14. Leisure time arrangement of the investigated elderly

	TV or radio	chatting	chess or cards	others	total
number	55	44	17	64	180
percentage	30.56%	24.44%	9.44%	35.56%	100%

Table 15. The feeling of loneliness of the investigated elderly

	often	sometimes	never	total
number	22	98	59	180
percentage	12.78%	54.44%	32.78%	100%

6. Suggestive approaches to aged welfare provision in rural China

Investigations found that families still assume much of the responsibility of aged care in hollow villages and in rural China. The important tradition that the family should be responsible for providing care is widely held in China. And it is reinforced by the Family Law (NPC, 1980) which states that spouses, parents, children and grandchildren are legally required to support their relatives who are in financial need. The Family Law is therefore trying to make the tradition of family care obligatory. Persons who do not take care of their elderly parents might thus be criticized or even penalized. However, the economic ability of rural families in undertaking aged care is still quite weak. When

developed countries entered ageing society, their GDP per capita was over 5 000 dollars in general, some even over 10 000 dollars. But when China entered ageing society in 1999, its GDP per capita was only 840 dollars. Even now it is still less than 4000 dollars. In rural China, the average income per capita was just about 900 dollars in 2010 (NBSC, 2011). Without enough social support on aged care, it is a burden too heavy for the rural families. Moreover, relying on family care is not realistic when the family is absent or unable to fulfill such tasks and such reliance is increasingly likely to be problematic. Not only will the family planning policy reduce the number of potential family care-givers, but also rural-to-urban migration as noted above can lead to physical separation between parents and children. The aged care system should seek more social welfare provision while retaining family support.

Official state care has already been provided for those elderly, disabled and younger (under 16 years old) in the rural areas. However, there is a strict requirement on such people. Only those who have no family, no means of living and no-one to take care of them can apply for the state care (SC, 2006). A strict supervision of state care to such people, of course, guarantees those eligible and restricts the abuse and misuse of authority. It makes sense politically, given the few resources available and the decline in collective provision, with the retreat of the state from being the sole provider of social services. But on the other hand, it reduces the opportunity of those in need to get social care support.

The rural social security system has also stepped up in recent years. 10% of the rural elderly was covered by the endowment insurance system in 2009, and it is expected to cover all until 2020 (SC, 2009). Until the first quarter of 2011, the coverage had already been expanded to nearly half. But the amount of financial support is far from satisfactory. Each elderly can get pensions as much as 55 yuan per month (660 yuan per year), but they can get more if they contribute with more endowment. However, the average annual consumption of the rural family was 3993 yuan per person according to statistics in 2009 (NBS, 2011). The amount of pension is far from enough to support the daily life of the rural elderly. Actually, for the rural elderly, the most serious challenge is not daily life expense, but medical care. Although the rural cooperative medical insurance has covered the majority of the rural areas and it can wipe out up to 60% of the medical expense in general and can compensate as much as six times of the average annual income in rural areas (MH, 2011), in case of serious disease or long-term hospitalization, however, this compensation is just a small fraction. Therefore, the social security system should keep up improving not only in its scope but also in the amount of financial support.

In fact, there is great potential to get financial support from within the rural system if people make full, and proper, use of rural resources. For example, even though many of the rural remained population feel exhausted in the laboring work, a large scale of rural land is still inefficiently in use. Therefore, it makes sense to reallocate land use right effectively for optimum-scale farm management. Then the rural household can get some revenue from leasing the land use right, and they can also spare more time in taking lucrative jobs or taking care of the family.

Physical support for the rural elderly is also as important as financial support, especially for the rural remained elderly that are suffering separation from their children. Besides the aged care sanitariums, some rural cooperative programs can be encouraged either formally or informally. Some

quasi-families could be established based on mutual selection among the rural remained elderly, women and children. As it is typical in many developing and transitional economies, women are expected to assume much of the responsibility in taking care of the family (Joseph and Philips, 1999). But they frequently find the long hours and hard work, simultaneously required by both agriculture and domestic labor, exhausting. If the government could provide some wages to those women in the kind of quasi-families, women would be relieved from exhausting labor work and could spend more time in taking care of the elderly and the children. Some semi-corporations could also be established by gathering the remained elderly to participate in some capable works. On the one hand, they could make some profit , and on the other hand, they could enrich their leisure time and facilitate mutual concern.

For last, but most importantly, a development strategy with priority to the rural and based on urban-rural cohesion could be the most effective way of conquering the various challenges in rural aged care. The rural areas have contributed, and even sacrificed a lot, to urban development in China's history. As early as in the preliminary stage of industrialization, a large quantity of products and labors were accumulated from the rural through unified purchase and sale, the household registration system, the commune organizational system and some other institutional measures. Statistics show that the state had drawn more than 700 billion yuan from the rural to support urban development between 1957 and 1977 (Xu, 2007). After the reform and opening up in 1978, a large scale of land was expropriated from the rural at very low prices, or even at no cost, to support the fast urban construction and expansion. It is estimated that the contribution of rural *land* through state *expropriation* has already been up to 2000 billion yuan (Xu, 2007). Not to mention the *labor* contribution of the rural. The long-term differentiated policies and institutions between urban and rural areas have widens the gap of urban-rural disparity. Now, when the negative effect of urban-rural disparity has come up, it's inevitable to pay back the 'debt', to give the priority to rural development based on urban-rural cohesion and even sacrificing the urban development speed if it's necessary. In fact, the enduring lagging behind rural development would indeed restrict or has already restricted the urban development.

7. Conclusions

China is undergoing general population ageing rapidly in recent years and in particular higher ageing rates in the rural areas in comparison to the urban ones. Besides the increase in the number and proportion of the elderly, hollow villages in rural China are also a passive ageing society due to the large scale rural-to-urban migration, which has extracted much young labor and left the elderly behind. Moreover, with the increasing pollution and worsened living conditions in cities, more and more elderly are moving back from the urban to the rural territories after retirement seeking for amenity and comfort. An urban-to-rural migration, as seen in many other countries, is being popular gradually in China. The two reverse migration – rural-to-urban migration of the young and urban-to-rural migration of the elderly – combines together to make the population ageing more complex in rural China. Given the poor situation of aged care in rural China, the aged care system should seek more social welfare provision while retaining family support. A development strategy based on urban-rural cohesion could be the most effective way of improving aged care situation in rural China.

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Old, poor and alone: from the solitary city to the solidary city

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The census data from 2011 confirmed the continuation of a trend that has been dragged on since the late '80s: the city centres although recognized as anchors of identity and memory, are at present, areas of depopulation, ageing and function's loss. The orthodox approach to the problem has been short sighted and proactive, aiming to reverse these symptoms to its opposite. The results have been consensual, and the Census has been confirming this phenomenon.

Without recognizing the near and further causes behind this process it is not possible to find a sustained solution. Consequences stand out in the urban and socio-urban dimension: declining of the physical conditions of buildings and public space (Castro, 2002; Gonçalves, 2006), weakening of social bonds and neighborhood networks (Cardoso et al., 2001).

This problem is not faced in the same way, since their signals, which are different in time and space, welcome very different or even radically different readings. Richard Florida (2008), for instance, in his 'Who's your city?' stresses that in the north-American case the return of the old generations to the cities is a natural movement explained by different needs, arising from family life cycles. When a family shrinks or fragments, the needs of goods and local services increase and when income raises the centres appear as one of the most seductive places to live. New friendship networks and contacts appear as important Knots, whether weak or strong, at this stage of individual and familiar life weakness. Centres appear as the ideal areas for establishing these new relationships. The recognition of interest in urban centres neighbourhoods, where it is possible to find all this, has consequences for residents and urban dynamics. This attraction can lead to a reformulation of property values, increasing the risk of gentrification of the resident population. In Europe this movement displays a contradictory vision with the one that comes from the other side of the Atlantic. Here, in most cases, resident community is old but with low or middle-low income. It reveals great dependency on grants or pensions. They are not a recent group in these central neighbourhoods of the large and medium cities, and this makes them the guardians of the stark identity and sense of place of this areas. But it also turns them into a metaphor of the poor, old and disqualified city. However it is recognized to the central neighbourhoods, an enormous potential as areas of opportunity and proximity to be explored as stages of collective life (Guerra, 2003). Opportunity is, as well, in the real estate market, in the existing buildings typologies, in the wide range of equipments available, in the pedestrian urban space and in infrastructures (Guerra, 2001; Rodrigues, 2010; Bourdin, 2011). Although this communication is part of a wider research project it seeks to raise questions in order to help the development of a methodology designed to support new urban policies. This methodology is organized in two parts: (i) the first part aims to demonstrate the severity, depth and extension of this reality, to invest in its causes and to report some of their consequences; and (ii) the second part, the methodological resources focus on the speculative reflection fictionalizing a city of neighbourhoods, of rebuilt social bonds, animating the city, revitalizing public spaces and developing the re-function of these neighbourhoods in the offer of goods and common services.

Keywords: population ageing, solidary city, solitary city.

1. Introduction

A continuing trend that has been dragging on since the late 80's was confirmed by the 2011 Census: city centres, while recognized as anchors of identity and memory, are also areas of depopulation, ageing and defunctionalization. The classical attitude has been, in a clearly proactive and not very reflective way, to revert each one of these symptoms into its opposite. The results have been those that are known, to which the Census have made a loud but timely advertising.

Without recognizing the nearer and farther causes of a process that appears consolidated, it is not possible to intervene in a conscious and sustained way in them and their consequences. Those consequences in the socio-urban area include the weakening of social ties and, by extension, of what

our knowledge of neighbourhoods and communities has defined as neighbourhood networks and solidarity (Cardoso *et al*., 2001). And, in what concerns the urbanism, there has been an emptying and physical decline of buildings and public space (Castro, 2002; Gonçalves, 2006).

The problem is not perceived in the same way everywhere or everytime. This happens because their signs differ in time and space, thus generating very different interpretations. Florida (2008), for example, on his *Who's your city*, emphasizes that, in the North American case, the return of the older generations to the cities is a natural movement that can be explained by different needs in one of the family's life cycles.

When the family breaks up or shrinks, the need for goods and local services increases. If the family's level of income allows it, the city centres are some of the most attractive places to live in because they minimize travel costs (regarding both the money and the time needed to commute).

The additional – but equally important – advantage is that population searches not only for climate, recreation or function amenities, but also for new networks of friends and contacts. This search challenges the well-known tendency that individuals and families face: the fading of both weak and strong social ties.

The acknowledgement of interest in urban neighbourhoods, where you can find all this, has obvious consequences not only for the residents but also for the functional and urban dynamics. However, this attraction can lead to a reformulation of property values, increasing or worsening the risk of elitism.

In the European case this movement is not yet visible today and it may present an image that contradicts the one arrived from across the Atlantic, since in many cases the resident community is elderly and has a low or middle-low income or even a strong dependency on subsidies or pensions.

The elderly are also, in most cases, a recent group in these central neighbourhoods of large and medium cities. This makes them not only the guardians of the identity and sense of community that is recognized there, but it simultaneously turns them into a metaphor for the poor, sad and disqualified City. However, almost paradoxically, central neighbourhoods are seen as having a huge potentiality as opportunity and proximity areas to explore. This potential is related to the celebration of the city as a stage for collective life (Guerra, 2003), with "friendly" building and housing typologies, real estate availabilities, a range of equipment available, pedestrian potentiality and a good amount of infrastructures installed (Guerra, 2001; Rodrigues, 2010; Bourdin, 2011).

Although this communication is part of a research project still at an embryonic state, we aim to raise important questions in order to facilitate the design of the best methodological device to find answers, or at least guidelines that can contribute to the renewal of an urban agenda. Hence, for now, the methodology used for this case is organized in two separate parts:

i. One is intended to demonstrate the severity, depth and extent of this reality, assess their causes and report some of the consequences;
ii. In a second part, the methodological resources focus on a speculative reflection about a fictionalized city. This city of neighbourhoods has rebuilt and densified its social ties, livening up the city, revitalizing public spaces and promoting the re-functionalization of those neighbourhoods.

As a final reflection we aim to emphasize the idea that interventions of urban form can ultimately be seen as merely reactionary interventions, if they extend the agony of communities and territories. That would happen when there is an insistence in voluntarism solutions of urban design, sometimes marked by an inability or disinterest to explain and understand them. The only existing concern is the arrogant perspective of formulating new paradigms for the city.

Conversely, it is considered that before such low reflection initiatives there should be a field of counter-intuitive ideas (content interventions), a support matrix for a new project for a socio-urban future. Interestingly, it could take many of the current conditions and avoid the need to design new paradigms for the ageing City.

From these views and reflections will result a range of strength lines that may contribute to rethink urban policies not only when these policies discuss the elderly people and their everyday lives but also when it comes to address their role in celebrating the city and its traditional neighbourhoods as a solidary space (as opposed to the idea of solitary spaces).

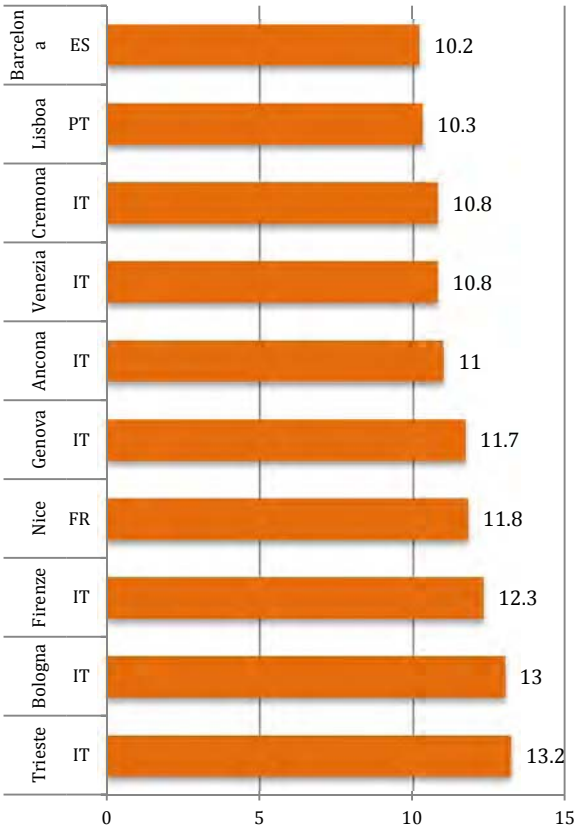

Figure 1 - Age structure of some European capital cities, 2002 (Source: Eurostat, 2004)

2. Poverty, ageing and loneliness

Lisbon is an interesting case to portray the trends described in literature regarding the problem of ageing in urban areas. This is not an isolated case in Portugal (Machado, 2004). Actually, almost all medium-sized cities have already observed the same problem. But Lisbon presents an expression that's hard to find in the rest of country (it has the largest concentration of this population segment in

Portugal). About a decade ago, Lisbon already had higher proportions of elderly individuals than other European capital cities.

The purpose of this communication is not to "flog a dead horse", since much has been said about this subject. Thus, we don't want to highlight the negative side of the elderly city, what we want is to seek the advantages of the existence of that elderly population. It seems similar and it is. The subtle difference is, on the one hand, the search for a greater diversity of statutes inside that age group and, on the other hand, to give them visibility to act as engines for a second life within the city centre.

Therefore it's worth to wander through some variables and indicators that, while allowing the recognition of the problem and its intensity, also provide reflection clues for the elaboration and polarization of the social capital and for the formulation of guidelines for the deeper analysis of the current paradigm.

Also, in order to avoid dispersion in the analysis, we chose to work with "Freguesias"[1] territorial units for which we gathered information from the 2001 and 2011 Census. These "freguesias" match the Lisbon "core": Castelo, Encarnação, Madalena, Mártires, Sacramento, Santa Justa, Santiago, Santo Estevão, São Cristóvão e São Lourenço, São Miguel, São Nicolau, Sé and Socorro.

Figure 2 - Parishes of the Lisbon "core"

In these parishes the dynamics are not always the expected as it can be seen by the slight increase in population (in absolute values) in four of the parishes. However, that did not stop the

[1] Similar to parishes.

decrease from 17,373 inhabitants in 2001 to 15,213 in 2011. In relative terms this represents a variation of -12.43%.

We must not forget that this decrease of 2160 individuals is a balance between outputs (deaths and changes of residence) and inputs (births and changes of residence), and it reveals more than an arithmetic expression. In fact, the analysis of this value is tempted to use the codes of economy (noting the difficulty in generating productive investment and related jobs), urban planning (watching more dwellings getting empty and the urban structure being non-competitive) and demography (watching lower demographic dynamics which is traditionally translated by the acceleration of the double-sided ageing).

To overcome the risk of "data overdose" it is worth to highlight the cases of Castelo, Encarnação, Santiago and S. Estevão where, in the last census decade, the population declined over 25% (in Castelo this decline was equal to almost half of its 2001 inhabitants).

Table 1 - Demographic evolution of the Lisbon "core" parishes (Source: INE, 2001 and 2011)

	2001	**2011**	**Variation 2001_11**	**Variation 2001_11**
	Number	**Number**	**Number**	**%**
Portugal	10255526	10561614	306088	3.0%
Continental Portugal	9774169	10047083	272914	2.8%
Lisboa	**564657**	**547631**	**-17026**	**-3.0%**
Castelo	587	355	-232	-39.5%
Encarnação	3182	2252	-930	-29.2%
Madalena	380	393	13	3.4%
Mártires	341	372	31	9.1%
Sacramento	880	742	-138	-15.7%
Santa Justa	700	891	191	27.3%
Santiago	857	619	-238	-27.8%
Santo Estêvão	2047	1511	-536	-26.2%
São Cristóvão e São Lourenço	1612	1341	-271	-16.8%
São Miguel	1777	1531	-246	-13.8%
São Nicolau	1175	1231	56	4.8%
Sé	1160	910	-250	-21.6%
Socorro	2675	3065	390	14.6%

Here appears the first element counter intuitive. The regression framework described before seems to have affected mainly the elderly. The potential sustainability index (PSI) (P15-64/P65, +) has generally increased in the "centre of the centre", in some cases coinciding with the parishes that gained population such as Santa Justa, Madalena and S. Nicolau where the "jump" was from 2 to 4. That is, there are now four times more people aged 15 to 64 years old than those aged 65 years and over.

However, in other less spectacular situations there also occur increases of this PSI in a demographics recession framework, such as in Encarnação.

Table 2 - Potencial Sustainability Index (Source: INE, 2001 and 2011)

	Potencial Sustainability Index	
	2001	2011
Lisboa	**3**	**...**
Castelo	2	2
Encarnação	2	3
Madalena	2	4
Mártires	3	4
Sacramento	3	3
Santa Justa	2	4
Santiago	2	2
Santo Estêvão	2	2
São Cristóvão e São Lourenço	2	3
São Miguel	2	2
São Nicolau	2	4
Sé	2	3
Socorro	2	3

The number of active individuals by elderly person is then an indicator that assesses the weight of different age groups in a specific territory and that, in our study area, underwent a general increase. We should not consider, however, that this is due to general dynamics and not to intrinsic conditions that occur in these parishes. Indeed, the evolution of this indicator, measured from the 70's until 2010 (e.g. Figure 2), is clear about the trend towards a lower ratio.

Figure 3 - Evolution of PSI in Portugal, 1970-2010 (Source: INE, PORDATA)

We then understand that the decline in population is not widespread. It appears to mainly affect older people and to resist individuals of working age. We will speculate about these a little further on. For now, it is worth to consolidate the expression that may have been shaken by the previous comments: the ageing of the demographic landscape in these parishes is not an illusion nor is it blurring in time.

The ageing index found in the previous year is very enlightening about the fact that all parishes (except one) largely exceed the Lisbon city average (187.3). In the parish of Santiago there are six seniors for every young person up to 14 years of age. In the parish of Castelo this proportion is of four to one. In S. Cristóvão e S. Lourenço it is more than 3 to one. The elderly are the rule. The youth is the exception.

Table 3 - Ageing Index in the Lisbon "core", 2011 (Source: INE, 2011)

	Ageing Index
Lisboa	**187.3**
Castelo	400
Encarnação	263.2
Madalena	131.4
Mártires	205.6
Sacramento	177.7
Santa Justa	197.6
Santiago	600
São Cristóvão e São Lourenço	336.2
São Nicolau	282.6
Sé	216
Socorro	196.8

We must recall that in these 13 parishes that we named as the Lisbon "core" – and despite some subtle variations – the population decreases. Those who seem to contribute to this reduction are the elderly but also young people and children, that explains the high ageing index in most of the parishes. As a note of contrast comes the PSI, through which there seems to be a group that resists the decay: the working age population.

The urban Portugal has not had the habit of coexistence between the demographic weakening through ageing and the maintenance process of working age demographic resources. Thus, it is worth to add to the reflection the contribution of foreign and immigrant populations.

Although this specific data is only available for 2001, the average weight of this foreign population was 3.4% in Lisbon. Only in two parishes of the Lisbon "core" (Santiago and Castelo) that proportion is slightly below average. In the other 11 parishes the foreign individuals are of a relevant percentage (they can reach 10% in Mártires and Madalena) that gives them high visibility. So, the PSI has increased "against the stream" of the general trend.

With a demographic decline associated directly or indirectly to other declines, as we shall see, there is a devaluation of property that is attractive to population with receptivity to the idea of community and proximity to a city centre with good accessibility.

With these arrivals and departures we can understand that there is a growth on cultural diversity without substantial worsening of the feeling of insecurity. A "new" data reinforces this idea: the feminization of the "core". When referring to the elderly we must accept that we speak of a predominantly female group because their average life expectancy is higher than that of men.

Table 4 - Immigrant concentration in the Lisbon "core" (Source: INE, 2011)

	Foreigners	
	nº	**%**
Lisboa	**18968**	**3.4%**
Castelo	14	2.4%
Encarnação	141	4.4%
Madalena	35	9.2%
Mártires	37	10.9%
Sacramento	56	6.4%
Santa Justa	41	5.9%
Santiago	21	2.5%
Santo Estêvão	70	3.4%
São Cristóvão e São Lourenço	142	8.8%
São Miguel	79	4.4%
São Nicolau	82	7.0%
Sé	89	7.7%
Socorro	200	7.5%

Looking at the table below, where all parishes – except four of them – have more female residents, do not get the idea that there was a strong attraction of women to this area. There was simply a marital dissolution caused by the death of the spouse.

Table 5 - Ratio of Masculinity, 2001 and 2011 (Source: INE, 2011)

	Ratio of Masculinity	
	2001	*2011*
Lisboa	**84**	**85**
Castelo	77	80
Encarnação	85	89
Madalena	93	91
Mártires	89	96
Sacramento	85	94
Santa Justa	89	126
Santiago	77	72
Santo Estêvão	80	85
São Cristóvão e São Lourenço	86	101
São Miguel	86	83
São Nicolau	82	139
Sé	78	92
Socorro	85	113

But this reference to the feminization of the Lisbon city centre was mentioned because even though this group is sensitive (or more sensitive) to insecurity, since the process has been gradual, it seems that the women group has not been affected.

Moreover, to complete and integrate these comments with the previous ones, it is important to observe the trajectory of this indicator between 2001 and 2011: there was a decrease of the proportion of women. In the absence of more detailed data it seems reasonable to assume that the blurring of this image, though still evident, can relate with the increase in immigrant population, traditionally consisting of more men than women.

The approach proposed in this paper promised to discuss ageing, poverty and loneliness. The first topic is, we believe, clearly explained. As for the second one, the difficulty increases, as there are no data on income for this level of spatial disaggregation. Thus, we chose a proxy variable of income and social class considered especially adequate for the spatial scope considered (the Lisbon "core"): the qualifications of the inhabitants.

And with this variable comes the third surprise. Residents in 2011 in these 13 parishs have, in about half the cases, illiteracy rates above the city's average. In the intermediate qualifications - 1st cycle, 2nd cycle, 3rd cycle and high school - there isn't such a clear distinction (perhaps high school is slightly closer to the first description). There is therefore an important weight of those who have not completed any level of education, and also a vacuum of some relevance of those who have completed the secondary level.

With university education, we have another counterintuitive note. Lisbon has an average of 27% of residents with this kind of qualifications, but in its "core" this average is exceeded in four parishes (Madalena, Mártires, Sacramento and Sé). In Encarnação the percentage is equal to the Lisbon average and in S. Nicolau, Santiago and S. Cristovão e S. Lourenço the values are around 20%. Only in Castelo, Socorro, S. Miguel and Santa Justa the amount of people with university education is clearly more residual (around 10%).

In all parishes chosen for analysis, the number of inhabitants with the 3rd cycle of basic education or less is always equal to or greater than 40%, with the exception of two parishes, in which the number of inhabitants with 3rd cycle education or more corresponds to over half of those parishes' residents. This can be an indicator of the social status and income (and should be associated to age, retirements, and pensions earned).

The positive sign seems to come from the parishes of Madalena, Mártires, and Sacramento, where one third of the residents said to have university education, in addition to other parishes, where the number is not as spectacular, but it's still interesting. Could it be a sign of demographic inflection happening, whose kick-off was given by the migratory community?

Some additional data, although lacking an update, seem to point in that direction, as it happens regarding the increase of residents with more socially valued professions (CNP1 and CNP2) between 1991 and 2001. In all parishes there are significant jumps reflecting increases that, in some cases, more than double the initial situation. Attention should be given, in the following figure, to the parishes of S. Miguel, Sacramento, Madalena and Castelo. The case of Mártires even surpasses the average of the city.

Table 6 - Degree of education of the residents, 2011 (Source: INE, 2011)

	None	Basic - 1º cycle	Basic - 2º cycle	Basic - 3º cycle	High School	Post-high School	University
Lisboa	**15%**	**19%**	**9%**	**13%**	**14%**	**2%**	**27%**
Castelo	13%	34%	11%	14%	13%	1%	13%
Encarnação	14%	24%	8%	12%	13%	2%	27%
Madalena	18%	12%	6%	12%	13%	2%	36%
Mártires	13%	11%	6%	10%	13%	2%	44%
Sacramento	13%	19%	9%	10%	16%	2%	32%
Santa Justa	22%	21%	10%	17%	17%	3%	10%
Santiago	11%	29%	9%	13%	15%	3%	21%
Santo Estêvão	15%	29%	10%	14%	13%	2%	17%
São Cristóvão e São Lourenço	16%	28%	9%	13%	13%	2%	19%
São Miguel	18%	35%	10%	14%	9%	1%	13%
São Nicolau	13%	15%	7%	15%	24%	3%	23%
Sé	19%	17%	10%	10%	13%	1%	28%
Socorro	21%	27%	11%	16%	14%	1%	10%

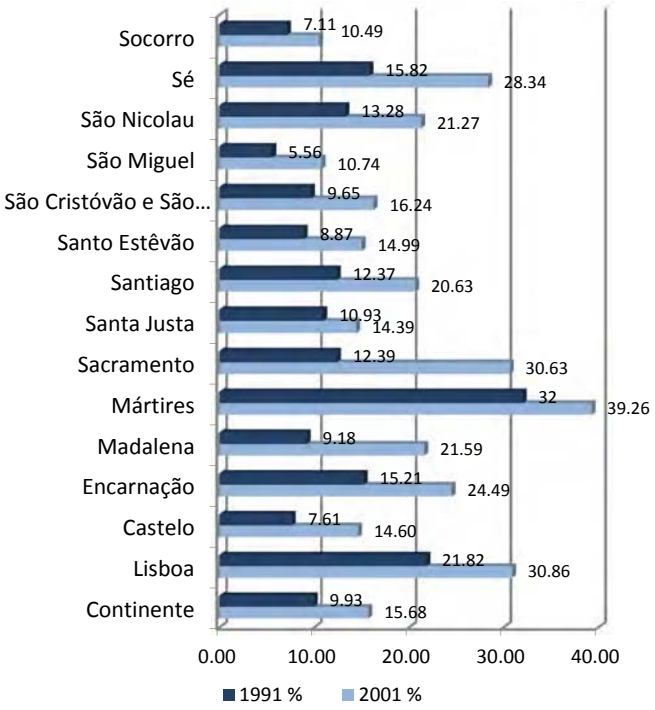

Figure 4 - Proportion of the more socially valued professions (CNP1, CNP2), 1991 and 2001 (Source: INE, 2011)

Finally, the loneliness. The 2011 population census shines a very clear light on this reality not too different from what the media points out dramatically, or that some documentaries show in an infinitely more delicate way (e.g. "The bathhouse"[2]).

In 65% (2/3) of the cases the elderly live alone. In the Lisbon "core", the only parishes where this number doesn't reach half of the elderly population are S. Nicolau and Mártires. But in Santa Engrácia, almost ¾ of the elderly live alone. Living alone doesn't necessarily reflect the existence of loneliness; in the case of Lisbon and in these parishes in particular, it's a plausible indicator because it illustrates the lack of familiar or affective ties and also weaker friendship and even neighbourhood ties.

Table 7 - Families with elderly people in the Lisbon "core", 2011 (Source: INE, 2011)

	People over 65 years of age		**Housing units of usual residence in which all residents are over 65 years of age**		
	Total	**Living without other persons**	**Total**	**With 1 person over 65 years of age**	**With 2 persons or more over 65 years of age**
Lisboa	**100.0%**	**64.8%**	**100.0%**	**59.0%**	**41.0%**
Castelo	100.0%	68.3%	100.0%	70.9%	29.1%
Encarnação	100.0%	66.8%	100.0%	67.2%	32.8%
Madalena	100.0%	55.2%	100.0%	66.7%	33.3%
Mártires	100.0%	39.2%	100.0%	66.7%	33.3%
Sacramento	100.0%	58.3%	100.0%	72.5%	27.5%
Santa Catarina	100.0%	62.5%	100.0%	68.4%	31.6%
Santa Engrácia	100.0%	73.8%	100.0%	59.5%	40.5%
Santa Justa	100.0%	50.0%	100.0%	79.7%	20.3%
Santiago	100.0%	69.0%	100.0%	65.5%	34.5%
São Cristóvão e São Lourenço	100.0%	62.0%	100.0%	71.9%	28.1%
São Nicolau	100.0%	46.1%	100.0%	64.6%	35.4%
Sé	100.0%	60.2%	100.0%	60.0%	40.0%
Socorro	100.0%	68.5%	100.0%	65.4%	34.6%

The "core" is thus marked by poverty, loneliness and old age. But it is also, even if subtly, marked by dynamics that often escape the clutches of the conventional statistics. These dynamics are related to immigration, to the new urban-nomads (very skilled people often attending post-graduate courses) or to a slow but persistent gentrification that seems to invade part of those territories.

[2] Watch in http://www.youtube.com/watch?v=EJyUzGZkEiM

So far, the three worlds – the elderly poor, the “new rich” and the ordinary survivors – almost never cross paths, but we know that only from that intersection can result a true social and urban cohesion nowadays.

3. Free in a prison

The prison is the buildings and the households. It is the five-story building without elevator. It is the home with fragile plumbing and dangerous electrical installation. It is the absence of heating or piped gas. In Lisbon, 59% of the households solely inhabited by elderly people consist of only one person. It is shocking to realise that all parishes of the "core" have a higher ratio of older persons living alone than that of the Lisbon city.

In Santa Justa, in 80% of existing housing the elderly live alone. In Castelo, S. Cristovão, S. Lourenço, Sacramento and Santa Catarina the percentage is around 70%. Thus, the elderly people often live alone in buildings whose conditions imprison them. And this is a condition that once again distinguishes them from the new settlers linked to the phenomenon of gentrification in the centre.

Table 8 - Age structure of the buildings in the Lisbon “core” (Source: INE, 2011)

	Total	**Before 1919**	**From 1919 to 1945**	**From 1946 to 1970**	**From 1970 to 2001**
Lisboa	**100.0%**	**10.3%**	**17.3%**	**38.6%**	**33.8%**
Castelo	100.0%	57.9%	1.1%	0.0%	41.0%
Encarnação	100.0%	75.9%	10.8%	2.5%	10.7%
Madalena	100.0%	80.1%	0.0%	0.0%	19.9%
Mártires	100.0%	65.7%	0.0%	0.0%	34.3%
Sacramento	100.0%	13.4%	21.2%	16.7%	48.7%
Santa Justa	100.0%	31.6%	26.6%	35.0%	6.8%
Santiago	100.0%	72.8%	25.8%	1.3%	0.2%
Santo Estêvão	100.0%	35.8%	57.4%	6.0%	0.9%
São Cristóvão e São Lourenço	100.0%	46.8%	20.7%	3.2%	29.2%
São Miguel	100.0%	73.6%	13.1%	1.4%	12.0%
São Nicolau	100.0%	50.5%	11.9%	12.7%	25.0%
Sé	100.0%	46.5%	15.0%	3.7%	34.9%
Socorro	100.0%	21.2%	20.2%	15.2%	43.5%

Looking at the table above helps us perceive how the "core" is far from the transformation that occurred in the rest of the city. In that, only 27% of the buildings were built before 1945. In other words, almost three quarters of the buildings are from the second half of the twentieth century and the first decade of this century. This "modernity" brings a residential quality that the previous period did not allow for several reasons.

In the parishes studied, as expected, the reality is very different. In Sacramento and Socorro the percentage of the buildings built prior to 1945 is 35% and 41% respectively. It is very significant.

But in Santiago this proportion reaches 99% and in S. Estevão 93%. In all the other parishes the proportion is close to 60% or higher.

It is now very easy to note that a state of ageing associated to housing built many decades ago, in addition to the absence of a strong intervention for architectural qualification (e.g. installation of elevators and heating conditions) and regeneration, (e.g. structures and networks), exposes the hard reality of this part of the city. Even though in the 90's and the following years, some constructions have been built for a new population, that was not enough to eliminate the landscape described - human and architectural.

The current financial crisis does not allow to predict the future trend, but it may be pertinent to add that, although only one quarter of the buildings in the city of Lisbon has garage, in the "core" (with the exception of Mártires) no parish surpasses the 10% mark: the dominating values are between 2 and 5%. Therefore, there is a limitation in the interest of families with private cars and indifference towards public transport. This happens not only because of the current financial conditions, but also because of the difficulty in rehabilitating and attracting bank financing. We should think of this fact as a reflexive trump card.

Table 9 - Parking or Garage (Source: INE, 2011)

	With parking or garage	Without parking nor garage
Lisboa	**25.0%**	**75.0%**
Castelo	3.7%	96.3%
Encarnação	9.5%	90.5%
Madalena	2.9%	97.1%
Mártires	29.4%	70.6%
Sacramento	9.0%	91.0%
Santa Catarina	8.6%	91.4%
Santa Engrácia	9.4%	90.6%
Santa Justa	3.7%	96.3%
Santiago	4.7%	95.3%
Santo Estêvão	4.3%	95.7%
São Cristóvão e São Lourenço	3.3%	96.7%
São Miguel	2.0%	98.0%
São Nicolau	2.1%	97.9%
São Paulo	4.1%	95.9%
Sé	6.3%	93.7%
Socorro	2.9%	97.1%

Finally, we should look at the possibility that the current architectural situation could change not on the outside but on the inside. Although in this case the possibilities are not exciting either.

Again with the exception of Mártires, all parishes show a strong predominance of dwellings being rented, subrented and "other situations". In the city of Lisbon this occupation regime slightly exceeds 42%, but in the "core" reality is hardly lower than 60% and often reaches 70% or 80%.

In other words, with the dominance of rental, rehabilitation is the responsibility of the owner. Between the already exposed idea of building antiquity and old rentals (with their corresponding low values), it is clear that there is a depletion of the capacity of change through this route.

Table 10 - Occupation regime, 2011 (Source: INE, 2011)

	Total	**Owner or co-owner**	**Renter or sub renter**	**Other situations**
Lisboa	**100%**	**52%**	**42%**	**6%**
Castelo	100%	12%	84%	5%
Encarnação	100%	37%	58%	6%
Madalena	100%	33%	63%	4%
Mártires	100%	54%	40%	6%
Sacramento	100%	36%	58%	6%
Santa Justa	100%	19%	77%	4%
Santiago	100%	20%	74%	6%
Santo Estêvão	100%	25%	71%	4%
São Cristóvão e São Lourenço	100%	27%	68%	5%
São Miguel	100%	15%	82%	2%
São Nicolau	100%	30%	67%	4%
Sé	100%	35%	59%	7%
Socorro	100%	20%	76%	3%

4. Unequal dynamics

Between the poor elderly people and the “new rich”, there seems to be no room for anything else. Actually, it is assumed that even in a context of recession during which it is hard to see beyond the crisis, we can just look around us to uncover subtle movements that could lead to a change. But what change is this? This is the question.

The proposal here is not to try to understand the final configuration of change, but steadily identifying some of its parts and their contours. To do this, there should be further reading about this transformation process, and eventually a development of some support contributors to the qualification process by considering the following reading notes:

1. Present population

   Assessing the intensity of urban life, generated daily as a result of existing activities and booster of a vibrant and dynamic urban image.

2. Temporary population

   Immigration (legal or illegal), Erasmus students and new urban-nomads contribute to an interesting population dynamics that boosts an attractive urban environment.

3. Urban Renewal

   The 8% of vacant housing as opposed to only 3% of occupied dwellings in this "core" make this area an opportunity source, despite the need for heavy investments on the buildings.

4. Accessibility

   Despite the visible effort in the qualification of public space, we have yet to evaluate new interventions to make the city more "friendly", not only to the elderly, but also to anyone who (temporarily or chronically) suffers from reduced mobility.

5. Real Estate

   The current image of part of these territories reflects in low property values and a significantly vacant residential area.

6. Gentrification

   There is now a wide variety of movements towards the "core" but that is still insufficiently studied because in most cases it escapes the meshes of official statistics.

7. Leisure

   Culture and recreation have proven to be one of the most effective tools to catalyse change. It is therefore important to know the reasons on which leisure is operated and which actors are more mobilized in these dynamics.

8. Proximity Services

   The existence of a specific market (seniors, Erasmus, ...) enables new employment and business opportunities, thus it is important to see if they exist or if they are already being exploited.

9. Support equipment

   The attractiveness of these areas results also from pre-existing equipment and infrastructures and we must therefore give them visibility.

10. The elderly as an urban catalyst

    The elderly in their socio-economic diversity can be a great urban leverage engine. Besides, this part of the city can be constituted as a serious opportunity for life qualification of this demographic segment.

5. Conclusion

There are questions in our understanding of the importance of the ageing population in the city centre, such as the characteristics of low-income families and single elderly people. It is also clear that there is a fragility of existing housing regarding their age and physical limitations.

However, this context for individuals, families, buildings and households is not enough to change the idea that this part of the city is one of the most interesting for the elderly community. As it has been seen, this could be a context for an integrated strategy, an instrument of urban dynamics and qualification.

Assuming that we do not need a new paradigm but the improvement of the existing one, the work that is yet to be done starts from the assumption of this premise. Thus, an appropriate strategy should be developed in order to achieve that, through programs, measures and actions where the private protagonist should be central and the public service would create better

institutional and legal conditions for its proper implementation (piloting and controlling). As an example, read the "Checklist of Essential features of age-friendly cities" (WHO, 2007).

It would have been interesting in this context, to analyse and assess neighbourhood networks, the existence and use of public spaces, the diversity and density of local services and social facilities. It would have been interesting to explore what kind of real estate products are on offer for this age class.

The lonely city is an imperfectly explored paradigm. The solidarity city is the city with dense texture who is not afraid of words like “elderly”, desiring difference and tolerance created by a genuine social and urban cohesion. So, there should be strength to drive this demographic change and the desired urban transformation.

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Accessibility Plans in Response to the Needs of the Elderly

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Cities are currently facing several challenges, which have a severe impact over urban quality of life. It is needed to go beyond the access to basic elements, into areas of social and civic engagement, forging the path into a more complete urban experience. This means the ability to plan, design and transform urban space in order to be useable by all.

The walkable city has been gathering growing support by urban authorities, in par with the on-going environmental concerns and a broader process of inner-city decay. By connecting the urban physical features with the effects over the population, concepts such as universal design, inclusive design, or design for all, emerge. If urban environments are made to take into consideration the needs of all people, then it is expected that they will also be more comfortable to the elderly. Although there has been a growing interest in urban solutions to cope with the needs of the elderly, few have engaged in the creation of integrated approaches, mainly at the aggregation and creation of strategies and approaches.

The urban planning process is much more than plan making, as it involves a strong interaction between social, political and economic spheres. As urban zoning plans seem insufficient, the figure of the accessibility plan emerges as a new kind of instrument. By identifying its most important elements, it is then possible to evaluate the suitability of a plan of this nature to the promotion of a more inclusive urban environment.

Keywords: accessibility plan; inclusive design; age-friendly cities; urban strategy; planning instrument

1. Introduction

Across the world, urban centres are facing several simultaneous challenges. Urban growth, demographic shifts, and a quest for the enhancement of quality of life are all interconnected factors. Social equity, movement freedom and concerns over the use of urban transport and amenities are currently in the thinking of planners and public entities and, in this regard, several efforts have been developed which sought to improve the accessibility conditions of urban centres. It is argued that, ideally, the urban environment should provide users with "an essentially democratic setting, enriching their opportunities by maximizing the degree of decision available" (Bentley et al., 1985; 9).

Still, other challenges arise. The aging of the urban population will present growing burdens throughout the 21st century. Currently, more than 11% of the global population is aged 60 years and over and this number is expected to grow by 2050 (WHO, 2007). By that time, that age group will surpass, for the first time in human history, the one of children (aged 0-14 years). Also, more older people are living in urban centres. In fact, the share of older people in these urban settlements will multiply 16 times, from about 56 million in 1998 to over 908 million in 2050, comprising at the time one fourth of the total urban population in less developed countries. In the European Union, 20 per cent of the population is now 60 years of age or over and, again, with a tendency to double by 2030 (Fabisch, 2003). Still, the built environment has traditionally been designed with the average young, healthy male in mind (Burton and Mitchell, 2006), and this is the main issue to tackle.

Living longer is, in fact, a major indicator of quality of life, but the conditions upon which that life is lived is also a factor of major importance. Ensuring quality of life to all citizens has always been

a great challenge to urban authorities. However, it cannot be judged solely on access to basic elements such as food, water, housing and medical assistance. One also has to take into consideration other elements, such as the possibility to engage in meaningful interaction with the broader community, civic engagement, and the proximity to family and friends. Although this is a given fact to the majority of people, there are still some issues to be considered when dealing with the older sectors of the population. It is important, for instance, to ensure they have an acceptable degree of urban mobility. In general, in the urban accessibility chain, three main components can be identified: "the person, the vehicle and the built environment" (Lavery et al., 1996). Planners can do little to deny the personal barriers as they depend on the medical evaluation and the attitude of the person himself, not wanting to say that they should be ignored. As the vehicle is the responsibility of the transport operator, the built environment becomes the concern of the urban planner.

Issues such as sidewalk absence or degradation, the lack of accessible elements, or the presence of obstacles emphasize the constant quality degradation of the urban environment, and turn urban sectors and amenities out of reach for the entire population. Against this background, cities do not match, in the physical, informational, and communicative point of view, to the real needs of its population (Teles, 2009), making it urgent to plan for the elimination of such barriers, allowing movement to all over proper conditions of comfort and safety. In this sense, a planning approach based on accessibility initiatives ensures legitimacy to land use and urban management instruments, since the targeting of the objectives of planning for improved accessibility also change the focus of study into people, i.e., those who actually will enjoy the benefits introduced in the planning process. Adjustments to the urban environment will then be required, at various levels. In this respect, aspects such as mobility, access, and readability of the urban scenario are crucial. Also, many of these urban environment improvements meant for older people are also considered good urban design, giving a higher credibility to these urban changes.

The emphasis placed on the adequacy of public space shows the intention to combine different scientific approaches into a single aspect of the urban territory. Although there has been a growing interest in the design of urban space focused on the elderly needs, few have still engaged on the creation of integrated approaches, mainly at the creation of new instruments, aimed at the optimization of urban resources and strategies. It is therefore the aim of this paper to find, through a new kind of approach, if it is possible for urban authorities to prepare the cities for this wave of urban ageing.

2. The city and the pedestrian

Taking into account that the pedestrian, through their senses, learns first-hand much of the surrounding environment, urban form has a tendency to attach greater importance to the act of walking (Handy, 1996). The traditional ‘walkable’ city created about 10,000 years ago still exists today, and is characterized by high densities and land use variety, based on a framework of narrow streets arranged in an organic pattern. Many cities have parts that retain these features, from which are examples the historical centres of many old European cities, or newly-built sections which took into account this pedestrian scale (Newman and Kenworthy, 1996).

Handy (1996) explored the central hypotheses to the decision to walk, concluding that individual motivations and limitations formed the basis of the problem. These limitations have been identified as being primarily related to covered distance and, in a secondary role, to elements related to urban environmental quality. Still, the main considerations behind the choice of a particular route are concerned with minimizing time and distance. Agrawal et al. (2008) suggested then that urban planners and others involved in city creation should promote the establishment of direct routes to allow easy access to the main urban functions.

Long before the advent and proliferation of the automobile, most cities and towns had a relatively compact configuration, and almost all of the routes depended solely on the pedestrian mode and other ‘light’ forms of transportation. However, the constant search for faster and more efficient transport, in a society where 'time is money', killed the walkable city, a process identified by Jacobs (1961; 29) as "the erosion of the city by the car". Throughout the twentieth century, "the street has seen successive trials, aimed to their own physical structure as well as establishing connections with the buildings and surrounding areas" (Alves, 2003; 58) and many planners, using different processes and principles, "deprived the street of their traditional role, imposing overloads that led to the fracture point" (ibid.). Modernist planning separated pedestrians from cars, driving them into arid and sterile spaces. Marc Augé (2004) used the term 'non-places' to define these spaces of anonymity in everyday life, weakened, impersonal, and devoid of any personal characteristic.

At the centre of some European cities, the urban structure has been established several centuries ago, and, as such, is not designed to accommodate the currently distinct types of traffic and vehicles. There is usually little room for the coexistence of both, and the car gets, in an overwhelming majority of cases, the advantage in the allocation of the limited available space. Narrow sidewalks are often impossible to widen without limiting car function, destroying buildings, or receding lot boundaries. As a consequence “spaces are being filled with danger, noise, fumes, and rude “50 miles per hour architecture”” (Gehl, 1989; 8).

Thus, the solution passes, in many cases, by eliminating car traffic, leading to the creation of exclusively pedestrian arteries. Despite all the difficulties associated with its creation and implementation, it is undeniable that the creation of pedestrian areas has major direct and indirect benefits to cities and their populations, whether by improving the quality of urban environment and social and economic conditions, or by increasing tourist activity and promoting more efficient means of transport.

‘Walkability’ is a frequently used index to measure the quality of the neighbourhood and is often determined by factors such as residential density, land mix use, street connectivity, aesthetics, amenities, and safety.

According to Southworth (2005), a pedestrian network presents the following attributes:

- Network connectivity, both in a proximity and a more global urban context;
- Connection with other transport modes;
- Varied land uses, especially to satisfy local needs;
- Security, not only from traffic but also from crime;
- Route quality, including width, physical pavement features, signs and lighting;
- Route context, including urban design, visual interest, transparency and explorability.

These features overlap the three key dimensions appointed by Cervero and Kockelman (1997), known by the 3 D's of urban design: density, diversity, and design.

Over the years, several authors have suggested different concepts that attempt to link the physical characteristics of urban space and their effects over the population. Goldsmith (1997, quoted by Hanson, 2004) used for this purpose the notion 'architectural disability' to describe how the physical design, layout, and construction of buildings and places can confront people with barriers and hazards that make the urban environment uncomfortable, inconvenient and unsafe, and may even preclude its use by the people. Imrie (1996, quoted by Bromley et al., 2007) also argues that Western cities are characterized by something that can be described as 'apartheid of the design', where the built environment form is carved within the values of the society.

Lawton (1974), by focusing his studies on the ways over which the urban environment can restrict the options for the elderly, frequently uses the words 'environmental pressure' to describe the impact that buildings, houses and poorly designed places have in everyday living. These words are then understood as a state induced by the need to deal with urban space designed for a younger and healthier population. He adds that small changes in the physical environment can produce a substantial reduction of that same 'environmental pressure'. Thus, for both groups, a well-designed urban space has the potential to be 'therapeutic' (Hanson, 2004).

The process of property development and city growth has also been characterized as a struggle between property developers and investors in order to extract the highest possible benefit (Imrie and Hall, 2001), and where financial issues always speak louder. Given this scenario, Imrie and Hall (2001) identified four current assumptions in the construction industry which prevent the definition of an inclusive urban design that reduces environmental pressure and "architectural disability":

- There is currently not enough demand among people with disabilities to justify the provision of a more accessible urban environment;
- The provision of accessible buildings and environments is prohibitively expensive;
- Meeting wheelchair users' needs is enough to meet the needs of all people with disabilities;
- Accessible environments can be implemented through design specifications and solutions without changes in attitudes, values or practices of the general society.

Another remarkable phenomenon is the one of 'home zones'. This new approach has its roots on a renewed interest in the nature of our residential environments, mainly regarding the possible uses of urban street environments (Biddulph, 2003). Summarily, a home zone is a residential area where the design of the spaces between homes provides shared space for all users, with a 'pacific' coexistence between motor vehicles and other road users, mainly pedestrians, while accommodating the wider needs of residents. This is achieved by acknowledging the needs of pedestrians, adopting approaches to residential layout design, landscaping and engineering, whilst also controlling the speed, but not necessarily the number, of vehicular movements. Their aim is to improve the quality of life in residential streets by making them more user-friendly and attractive for the enjoyment by people, rather than being places dominated by the automobile and therefore designed for traffic crossing and parking. In theory, this approach results in increased security, due to reduced vehicle

speed, a more efficient use of the urban space, greater interaction among residents, and a more appealing visual setback (Biddulph, 2001).

Branching from the two main trends, the ageing of the population and the desire to bring the disabled population into mainstream society, these studies formed the basis for the current focus on "universal design", "inclusive design" or "design for all" (Imrie and Wells, 1993; Imrie and Hall, 2001; Hanson, 2004; Burton and Mitchell, 2006). This means the creation of environments and products that are usable by all without requiring accessories for adaptation or specialized solutions. There are seven principles of Universal Design, which Manley (2001) applied to the scale of the city and the street.

Table 1. Principles of Inclusive Design (Source: Manley, 2001)

Principle	**Implication for the street**
Equitable use	Facilitate equal access to streets, living areas, non-motorized transport, and neighbourhood facilities.
Flexibility in use	Allow for adaptive change and provide path choice on multiple streets.
Simple and intuitive use	Make areas easy to navigate through legible design and provide direct routes for pedestrians.
Perceptible information	Deliver information about the environment through all senses (hearing, sight and tact).
Tolerance for error	Prioritize safety from accidents, crime, etc.
Low physical effort	Rank up pedestrians and cyclists in street design.
Size and space for approach and use	Satisfy minimum space requirements.
Adding to human delight (added by Manley)	Recognize urban design as central to planning process.

Thus, these trends have been promoting a kind of urban design that seeks solutions for spaces of easy use by all citizens, regardless of their gender, age or origin. Regarding this aspect, Burton and Mitchell (2006) developed the original concept of 'Streets For Life', i.e., streets upon which the local community residents establish familiar bonds with the outdoor public space, and consider it pleasurable even when they get older, giving them the conditions to reside at their homes until the end of their life. The key issue behind this concept is accessibility. According to the European concept of accessibility (EC, 2003), it translates to the recognition, acceptance and fostering, at all levels of society, of the human rights, including people with conditioned activity at the highest level of health, comfort, safety and environmental protection. Accessibility is an essential attribute of a sustainable people-centred built environment, and must be considered as a horizontal issue with clear standards and regulatory binding norms issued by the European Community, which entail the construction industry and related enterprises to accept and adopt the principles that shape accessible design. However, critics argue that in many cases it is impossible to provide a "one size fits all" solution, leading inevitably to the exclusion of certain population groups (Hanson, 2004), among which are the elderly.

3 The Elderly and urban space

Western society used to impute a high status to older people, but in recent generations this consideration has been lost (Hughman, 2001). From the last part of the twentieth century onwards, families have ceased to provide for their older relatives, reinforcing their need of autonomy, and presenting a serious social challenge. Most studies of older people are by accident, or the result of design attempts to involve ageing in urban environments (Phillipson, 2004). As a matter of fact, design mustn't be the only consideration in the establishment of links between the elderly and city development. Therefore, several studies started to address the need to connect the broader needs of the elderly with urban space. This relationship is often materialized in concepts such as 'age-friendly cities', or 'active ageing', which regard an interdisciplinary approach to enable people to age actively by (WHO, 2007; 5):

- Recognizing the wide range of capacities and resources among older people;
- Anticipating and responding flexibility to ageing-related needs and preferences;
- Respecting their decisions and lifestyle choices;
- Protecting those who are the most vulnerable;
- Promoting their inclusion in and contribution to all areas of community life.

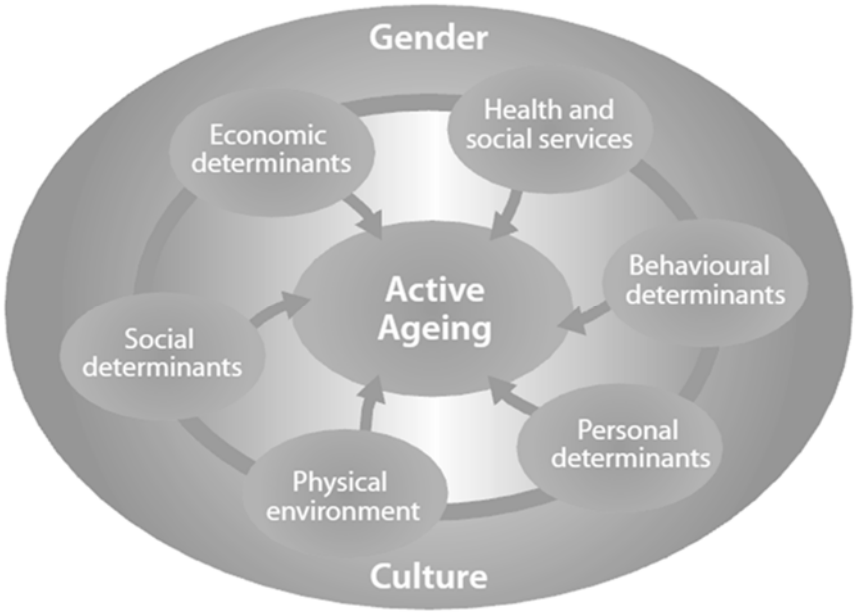

Figure 3. Determinants of Active Ageing (WHO, 2007)

In fact, everyone ages and, in this process, several issues arise. Older people typically experience a decline in their physical condition, which has repercussions in aspects such as reduced stamina and strength, thinning of bones and muscle disorders, loss of balance and stability, and reduced sight and hearing (Burton and Mitchell, 2006). For instance, people in their mid-70s have around half the strength of people in their 20's, and many older people cannot go up or down steep gradients or walk longer than around 10 minutes without stopping for a rest (AIA, 1985). Also, older

people are not a homogeneous group, and individual diversity increases with age. As a result, besides physical decline, it is usual to see a simultaneous decline in mental aspects, affecting aspects, like: navigation and orientation, impaired judgement, reaction time, and ability to interpret changes in the environment (ICMA, 2003). Dementia is a serious problem which forces part of the elderly population to rely entirely on external care, and encompasses a wide range of symptoms such as the loss of memory, speech, perception and the ability to perform complex tasks. Alzheimer's disease is its most known expression. So, if someone with diminished physical capabilities finds the outdoor environment difficult to cope with, one facing a mental decline process is most likely to find it even harder. As we get older, many of our physiological competencies decrease and, for some elderly, so do mental competencies, but not to the usually excessive degree of concern (Lawton, 1974). In fact, social gerontologists have pointed out that most older people are acutely aware of the social and physical changes occurring around them. This is particularly so, for those who tend to remain living in the same house and community for many years (ICMA, 2003; Walker and Hillier, 2007). Many older people live alone, meaning that they need to be able to get fresh air, exercise, go shopping, or meet up with friends. This level of integration into society is essential for their everyday existence, wellbeing, and enjoyment of life (Burton and Mitchell, 2006; 13), allowing the maintenance of social capital. A common theme in the research on elder-friendly communities and cities is the importance of the social and built environment, and the relationship between them (Alley et al., 2007). By making public space usable by people of different ages, genders, and occupations, quality of life is improved and urban living is made more attractive and meaningful.

Part of the explanation for the deterioration of the elderly's quality of life can be explained by the limited, uninteresting lives of many, due to physical problems, poverty, and restricted participation in the outside world (Carr et al., 1992; 125). In fact, several groups of people, among which are the elderly, have always faced, regardless of time or place, phenomena of exclusion from urban space or, furthermore, have been subjected to political and moral censure (Madanipour, 1996; Jackson, 1998; Carmona et al., 2003; Worpole and Knox, 2007). And this is not just explained by specific feelings such as the fear of victimization (Pain, 1997; Carmona et al., 2003; Worpole and Knox, 2007), as for many the public realm presents a wide variety of uncertainties, threats and hazards. For that reason, in order to avoid risking their lives, many stay confined in the realm of their households. Although safe, homes can be claustrophobic and, in many cases, lonely. Not everybody is lucky enough to have someone in their homes, or afford senior residences, a situation that becomes more likely as the ageing process carries on. For these reasons, Pain (1997) argues that the elderly face a high fear of crime but, at the same time, low risks of victimization.

The truth is that, throughout our cities, physical barriers affect and sometimes inhibit public space use (Carmona et al., 2003). So accessibility, mobility, ease of activity, safety and security outside the home, must be taken into consideration while planning urban space for the elderly. Active living is a term that originated in this search, referring to a way of life that integrates physical activity into daily routines (ICMA, 2003). Carstens (1993) defends that the overriding design concept should provide a "prosthetic environment", offering appropriate levels of support, when needed, but also allowing for independence, challenge and learning.

Although ‘New Urbanism’ and other similar trends are strong in defending the need for mixed-use zoning and walkability, features that are essential to the elderly and other citizens with mobility impairments, such as access consideration to urban amenities and services, are not given enough relevance (Alley et al., 2007). Hence, the elderly population also requires special design solutions regarding aspects such as finding a way and direction, legibility directions, spatial preferences, and sensual stimulation, allowing the proper maintenance of community and social connections. In fact, the existence of good connectivity levels between the city’s public spaces provides an added value to the single, and often isolated, components of the urban system. As Carstens (1998) notes, it is important, in designing urban space for the elderly, to “encourage autonomy, independence, and a sense of usefulness by letting residents perform routine tasks themselves” (p.215), reinforcing feelings of individuality and self-esteem.

Burton and Mitchel (2006), regarding their concept of “Streets for Life”, pick seventeen recommendations that form the most relevant design features in the creation of urban space for the elderly. Among the several possible elements, there are: the improvement and adequate maintenance of sidewalks and other pedestrian paths, the creation of areas characterised by mixed-uses, small block sizes and distinctive structures and places of activity.

Other elements unmentioned by these authors are also of importance, such as the evaluation of transportation options, the integration of new development into existing communities, and the use of development incentives and guidelines. Therefore, the application of the concept of inclusive design in the urban context focused on the elderly is then a task of extreme complexity, leading planning to seek the most adequate instruments for that purpose.

4. A new kind of instrument

Although cities can be seen as works of art on a grand scale, where the aesthetic issues are fundamental, the truth is that cities, and our opinion about them, depend on much more than that. Several theories and critical movements guided the planning process throughout the twentieth century (Allmendinger, 2002; Taylor, 2004). The principles of aesthetic formalism dominated the urban planners’ ideas, so that the various urban functions were viewed in terms of enabling the design of an ideal urban form (Taylor, 2004).

It is usual to claim that planning is much more than plan-making as the urban planning process involves a strong interaction of the social, political and disciplinary spheres (Faludi, 1973; Allmendinger, 2002; Taylor, 2004). The search for consensus among multiple interests and the demand for the formulation of appropriate options for each situation make it necessary to have an instrument that guides urban planning. Urban management is governed in most cases through zoning plans. However, these are not mere documents to support urban management, but the preferred planning instrument and the principal mean of transmitting ideas and proposals. Regular urban planning instruments have a role in the definition of the dominant land use types and major infrastructure networks. However, as they fail to provide any guidelines of socio-economic nature, they become mere zoning plans (Carter and Nunes da Silva, 2001). Also, as they only act on the 'macro' scale level, i.e. at the strategic level, they become unsuitable to control the details of the 'micro' scale level, including details of the physical urban environment. The creation of a new type of

instrument, in order to include accessibility and inclusivity principles into the urban strategy, becomes therefore essential.

Physical changes or regulations enacted over public space are the first elements to assess when providing adequate urban space for all, as they are the main 'force' behind an accessibility plan. Special attention has to be made regarding sidewalks. Ideally, they should be wide enough to accommodate canes and wheelchairs, and they should be clear of obstructions from signs, trees, fire hydrants, drainage, and other overhanging elements, such as canopies (Burton and Mitchell, 2006; WHO, 2007). Cycle lines should also be removed from sidewalks and placed onto the pavement, in order to reduced potential risk of collisions. Pavement materials should be nonslip and preferably semi porous, to improve walking conditions under wet weather conditions. Abrupt changes in grade, mainly through the use of steps and high curbs are often difficult to cope with by the elderly and impenetrable obstacles for the physically impaired. Therefore, these elements must be eliminated, or in alternative, more accessible alternative routes should be provided. Still, regular maintenance of sidewalks and other infrastructure is essential to preserve the operability of these actions. Also, its design has to be specially refined, i.e., pedestrian layouts should consider smooth changes of direction to avoid using 'shortcuts', as a way of correcting the rigidity of the designed path (Alves and Ramalho, 2011)

For sidewalks and streetscapes to be of the greatest benefit, however, they need to be connected by traffic crossings that are safe, easy to navigate, and reasonably frequent. This means the necessity to address concerns with curbs, traffic light timing and audible signs, and visibility of the crossings (Burton and Mitchell, 2006; Borst et al., 2008).

Close attention to streetscape amenities, as well as the overall visual appeal of the pedestrian environment (Michael et al., 2006), can improve the walking experience of older adults. Therefore, frequently placed benches and resting areas are essential to making pedestrians feel comfortable when walking and also provide good venues for meeting and socializing (Burton and Mitchell, 2006; WHO, 2007).

Proper maintenance of public space, with special regard to green spaces, i,e., parks and gardens, mainly regarding its cleanliness, is also essential to promote a livable urban environment and, therefore, suitable for the elderly (WHO, 2007). In fact, elderly people appear to find routes surrounded by greenery and vegetation attractive to walk along (Borst et al., 2008). To improve navigation, signage for streets and businesses should be legible for both older drivers and pedestrians (ICMA, 2003), and regarding this matter, careful use of lighting is important, while, at the same time, addresses safety concerns.

Also regarding the safety of pedestrian movement, and at the impossibility of reducing vehicular speeds, some sort of buffering should be applied between traffic and pedestrian corridors.
The last element of the connection, i.e., the entrance to buildings and amenities, must also be provided with proper accessibility conditions (Lavery et al., 1996; Burton and Mitchell, 2006; WHO, 2007), such as ramps, wide doorways and passages, suitable steps with railings, and even elevators when necessary.

It is important to note that each country's legislation and regulations will forge the minimum standards for accessible urban environments, although it is expected that, by taking into

consideration the mobility needs of, for instance, wheelchair users, the equivalent needs of the elderly will be more than sufficed.

Besides these elements, a high number of variables still come into play when considering the elements to include into this new type of urban instrument. First, in terms of integration in the urban structure, the choice of locations in which to intervene is one of the factors that can define the success or failure of the implementation of accessibility measures (Morris and Zisman, 1962). In fact, the elderly, as well as the overall population, tend to value attractive urban environments, and perceive them as more attractive, when shops, business and other relevant activities are present (Michael et al., 2006; Borst et al., 2008).

This feature gains greater relevance with the increase of urban scale, as expected. It is necessary to take into account, among other aspects, the building density, and the concentration of existing services, but also the links to the various interest points of the urban structure through legible and coherent links (Southworth, 2005), as the city's public spaces usually form a network over which the city is apprehended. The main issues here are connectivity and legibility. Still, it is not demanded to an accessibility plan the definition of aspects related to the growth and development of the city, such as the definition of land uses, leaving this task to the traditional planning instruments, i.e., the zoning plans.

Another factor to consider relates to the diversity of mentioned transport modes. The pedestrian mode, while being important to promote a healthier urban environment (Vuchic, 2000), is only feasible in small and medium-distances, as previously mentioned. Many cities have areas that hold intrinsic appropriate features to the pedestrian mode, making everyday travels never longer than five kilometres (Newman and Kenworthy, 1996). However, in larger urban areas, certain travel routes are too long, making it unfeasible to depend solely on pedestrian travel, not only for the elderly but also for people with mobility impairments. Public transport arises then as a complement to those same movements and also as an enabler element of the phenomena of social inclusion, but only if they allow access for all, regardless of their abilities. At more advanced stages of dementia, public transport is simply not an option for the elderly. Still, many elderly residents maintain proper guidance skills, and use public transport to fulfil their daily needs. Therefore, measures to improve urban design and accessibility conditions must also be integrated with existing transport networks, whenever possible to make them more accessible (Carstens, 1993; Southworth, 2005; Michael et al., 2006), by improving the accessibility conditions of stations and vehicles, through consistent and clear information but also through attempts to make it more affordable and reliable.

It is also central to consider the intrinsic urban dynamics that make policies, architectural solutions and materials require frequent updating, in order to maintain its effectiveness. In fact, the ability of adaptation to change can contribute to the success of the plan, making it important to define a timeline for the implementation of the different measures. It is key to underline the importance of these plans in the definition of an integrated intervention strategy, thus avoiding the adoption of isolated measures. This means it is essential to ensure the articulation of the accessibility plans with other planned or in place plans, ensuring the optimization of the available financial and time resources.

In the process of making the urban environment more accessible to all, social cohesion must also be one of the main slogans behind the creation of these plans. Lefebvre, in ‘The Production of Space' (1991), and based on the premise that space is a product and a social construction which affects the practices and social perceptions, supports the ‘right to the city’. This term, advocated by Harvey (2003), represents more than just the individual right of access to resources within the city, but the right to change the city in accordance with the wishes of each individual citizen. The reformulation of social values, in turn, goes against the concept of 'just city', advocated by Susan Fainstein (2001). This social dimension is, however, the one in which the consequences of the plan are more difficult to analyse, given the particularities related to the different user groups that will actually enjoy the space. The public component, which governs the preparation of these plans, shows that the obtained feedback after the execution of the interventions usually reveals flaws in the consideration of other users’ interests. For this reason, community involvement in planning, not only at the individual level but also through organized civil society, is essential as it allows for a better definition of their desires and needs, thus allowing the establishment of more effective measures. Surveys and meetings, as well as the preparation of regular newsletters, in order to inform the public about the development process, are also interesting elements to include. The social and civic participation process, through events and activities, awareness initiatives, and civic training, among others, are some of the most important elements in the promotion of age-friendly environments (WHO, 2007). Only this can ensure the interconnection of policies and measures, maintaining a greater transparency in the planning process and increasing the overall quality of projects (Carter and Nunes da Silva, 2001).

Therefore, urban planning is much more effective as more comprehensive and integrative are the reviews and performances on the urban system. The ideal response to the levels of uncertainty and complexity does not pass by the stratification of analysis and problems. The ability to gather in the decision-making process as much relevant information and as many interpretations and action formulations possible is the best strategy for the creation of a system that informs, in the most conveniently possible way, the range of available options. Recommendations and regulatory requirements are just one of the foundations for the implementation of these plans. In fact, due to the variety of agents capable of intervening in its execution, in which stand out institutions of higher education and research, it is possible to search for innovative technological solutions to solve some of the trickiest situations.

However, economic issues are probably the main factor upon which public interventions are governed by, gaining special attention in situations of economic crisis or recession. Technological innovations can sometimes help in favour of cost savings, as they represent optimized solutions to real identified problems. The inclusion of these plans in the knowledge society is another factor that plays towards its success. The importance of new information technologies is now undeniable, and as such, it is important to set up universal platforms, constantly updated and available to all. Only by understanding the power of the new information technologies (Graham and Marvin, 1999) the information and values that form the basis of these plans can be effectively transmitted. Thus, in summary, a document of this nature must encompass three key dimensions: urban, social and operational/technological.

Table 2. Accessibility plan checklist

DIMENSIONS	FACTORS TO ASSESS
Physical	Design sidewalks with appropriate length allowing the crossing of two wheelchair users
	Elimination of all obstacles on the pedestrian paths
	Use of comfortable materials for pavement surface
	Creation of safe pedestrian crossings with proper accessibility and crossing times
	Urban furniture designed to be comfortable and well-placed
	Creation of regularly placed resting areas
	Elimination of steps or creation of alternative routes fitted with ramps
	Accessible routes to buildings
	Assessment of legibility conditions of urban signage
	Elimination of all cycle lanes over the sidewalk and transfer to the pavement
	Maintenance of proper lighting conditions
Urban	Effective linkage of the city's most relevant parts
	Application of the measures to other urban themes
	Integration with public transport
	Establishment of connections with existing urban development plans
	Integration of places with potential cultural and/or leisure value
Social	Involvement of the population to identify key issues
	Development of partnerships with social institutions
	Effective means of dissemination and public divulgation
Operational/ technological	Identification and optimization of public resources
	Development of focus groups/ task forces to develop the plan
	Differentiation of the short/medium term and long term objectives
	Adoption of innovative and sustainable technologies and solutions for mobility issues
	Integration of Information Technologies
	Integration of monitoring schemes

5. Conclusions

Urbanization is definitely the trend into this new century, as people flea from the rural areas into the urban centres, in search of better living conditions. These better living settings also take their toll over health conditions. Therefore, the problem is that there are not just more people, but they are also living longer. Although the challenges of urban growth and fast ageing faced upon cities may be formidable, there is a need to start in the strongest and most demanding way, in order to minimize the risks of ‘sluggish’ policies and strategies. Clearly, the territory is not solely made by a set of places but also by the set of flows that allow connections between them. Even after the many modernist experiences of urban development, with the aim of streamlining the flow of vehicles in a constant search for efficiency, the pedestrian mode remains fundamental to the basic needs of travel. Still, special attention is required to the physical configuration of the urban environment, to the extent that the various barriers that prevail may have great impact on the everyday life of the elderly and people with disabilities, affecting their ability to freely visit the city and to exercise their right to citizenship. In this sense, the plans for the promotion of accessibility are fundamental to the transformation and revitalization of public space, allowing the removal of barriers and the creation of mechanisms to prevent the perpetuation of discriminatory public spaces.

Authorities must, however, act cautiously in the danger of completely mischaracterize a given space and enhance the generation of conflicts, mainly by causing additional disorientation to the elderly residents, who rely on long term memory and associate it with the space's physical features.
As the elderly constitute a significantly higher parcel of the urban residents in comparison with the disabled population, it is mostly advisable to give a higher relevance to their needs. In the end, if an urban space is good for the elderly, it is as a consequence, a better place for the overall population.
It is likely that the older sectors of society, just like the disabled population, will become increasingly vocal and demanding about the products, services and places they use. They are likely to have considerable health and high expectations for active living, independent and full lives, and will have significant market power to encourage designers and manufacturers to change their practices to address their needs.

An integrated approach centred on the living conditions, not only of older people, but also on the citizens with disabilities and other type of impairments, can result in better cities and societies. Also, when doing so, not only are the needs of the current older population being addressed, but also the needs of future residents. The need therefore is to "create beautiful places (in our towns and cities) that are socially cohesive, avoiding disparity of opportunity and promoting equity and social solidarity" (UrbanTaskForce, 2004; 47).

The accessibility plan can come to the rescue as a new kind of instrument designed to promote the establishment of an accessible, inclusive and more human urban environment. Placed in-between the plan and the project, it can establish guidelines, order and time strategies and promote better interaction between authorities and citizens. Embedded with an enormous potential and a cross transversality between urban departments and facilities, perhaps the most important contribution of an accessibility plan is the ability to combine and guide all the necessary changes to the built environment in order to create more inclusive and liveable cities.

Still, any instrument or speech shouldn't be seen as a 'magic wand' that will provide the desired accessibility. All levels of governance and all sectors of society should have accessibility as their final objective, within its field of action. This requires that each one acquires and develops the need skills to make their environment and services as accessible as possible.

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Urban Accessibility and Planning in an aging society

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All citizens have the right to feel part and participate in society, and in this sense physical mobility is often a necessary condition for inclusion. Nevertheless, not everyone can easily access spatially disperse opportunities nor transport which enable access to these opportunities. Accessibility concepts are increasingly acknowledged as fundamental to understand the functioning of cities and urban regions (Bertolini, 2007; Bertolini, Le Clercq & Kapoen, 2005). In particular, accessibility instruments are able to provide a framework for understanding the reciprocal relationships between land use and mobility (Curtis & Scheurer, 2010). Such a framework has an important potential added value for urban planning practice. However, accessibility is yet sidelined in urban planning, in particular in land use planning and furthermore in formal municipal plans.

This paper discusses the role of the formal planning system, with a focus on municipal Master Plans, in providing accessibility conditions to all, considering the growing importance of this issue within aging societies. This discussion focuses on the Portuguese planning system, in particular on the role of municipal Master Plans in producing accessible cities. The research starts with the review of the European context for accessibility planning, followed by a review of national directives for accessibility planning in Master Plans. This paper also presents a review of the Portuguese planning practice and on how accessibility concepts have been put into practice through municipal Master Plans. This discussion is based on a review of a number of municipal Master Plans identifying accessibility planning objectives and operational directives.

This research shows a clear contrast between accessibility concerns and directive and current planning practice, revealing the limited role accessibility still has in current Portuguese planning practice. The paper discusses the importance of this role focusing on the instruments currently available to municipal Master Plans to operationalize accessibility planning within the current regulatory regime. Finally, the paper will highlight the jeopardies of current practice within aging societies.

Keywords: Accessibility Planning, Planning Instruments, Municipal Plans

1. Introduction / the concept of accessibility

Urban mobility has undergone significant changes over the past few decades. Travel distance and frequency have been increasing and the car has become the main means of travel in most European and North American cities, due to its spatial and temporal flexibility. In general, it fair to say that there has been an unprecedented growth in mobility. However, increased mobility is not a synonymous of increased accessibility. Today, we travel longer distances than before to reach the same activities. It is true that we have more choices for the same activities but the variety of activities accessible to had but a marginal growth. At the same time car-based mobility has significantly changed our cities as well as the offer of alternative modes. Cities have spread, with a first wave of decentralization of households closely followed by the decentralization of activities. Public transport has improved, however the road infrastructure improvements have during a long period been the major political priority with public transport considered as an alternative for those economically or physically excluded from using the car lacking a real comprehensive approach to alternative transport service provision. As a result, increased mobility has, in several cases, also been responsible for reduced accessibility. For instance, when people with limited access to car become more distant from desired activities, which have decentralized to car accessible zones while no alternative public transport modes have been offered or available public transport does not provide desired quality standards (regarding comfort, safety, reliability, physical barriers, etc.). Indeed, the need to shift from a mobility

paradigm to an accessibility paradigm in urban planning practice has been recognised (ex. Handy, 2002). “Accessibility – an old idea in planning literature – offers an alternative to the perverse results of mobility based planning” (Levine and Grengs, 2011).

In spite of the importance of the accessibility concept for the current planning context no universally used definition can be found in the literature. According to Gould (1969, p.64; cited in Ingram, 1971; 101) ‘Accessibility is a slippery notion one of those common terms that everyone uses until faced with the problem of defining and measuring it’. In contrast to the notion of mobility, commonly related to the ‘ease of movement’, which can easily be operationalized, accessibility is commonly related to the ‘ease of reach of desired opportunities’ (Levine & Grab, 2002). Accessibility has a far more ambiguous notion than mobility, implying a range of aspects such as, the distribution of potential destinations; the magnitude, quality and character of activities; the performance of the transportation system; the characteristics of the individuals; and the times at which the individuals are able to participate in activities (Handy and Niemeier, 1997; Liu and Zhu, 2004). Authors such as Geurs & Eck (2001) argue that the definition of the concept of accessibility depends on the objective for which it is intended.

Although there is no one best measure of accessibility there is a general understanding on the main components of accessibility measures. According to Handy and Neimeier (1997) and Stanilov (2003), measures of accessibility generally consist of two parts, the land use component (also named activity, motivational or attraction component) and the transport component (also named resistance or impedance component). The land use component is related to the supply of opportunities. The transport component, like the land use component, is related to the confrontation between the supply and demand, in this case, of the transport system. Other authors include two further components of accessibility measures. Geurs and Eck (2001) and Geurs and Wee (2004) defend the importance of considering temporal and individual components in accessibility measures. The temporal component reflects the times at which the individuals are able to participate in activities as well as the availability of opportunities at different times of the day. The individual component reflects the characteristics of the individuals, including the needs (which are dependent on characteristics, such as age, lifecycle and lifestyle), abilities (related to physical capacity and specific skills) and opportunities (related to income and travel budgets) depending on individual characteristics. Nevertheless, these authors recognize that it would be difficult to consider all four components in accessibility measures since it would imply high levels of complexity; nonetheless it is important to recognize the implications of excluding one or more of these components when using accessibility measures.

When developing accessibility-based planning support instruments, several accessibility traditions are available in the literature. In general Accessibility Instruments may be activity-based (measuring activities/opportunities accessible) or utility-based (measuring the utility of accessing particular activities/opportunities), may be person-based or location based (measuring accessibility of people or of places), and/or may be origin-based or destination-based (measuring accessibility from origins – people or places – or to destinations – people, opportunities or places. Accessibility Instruments may follow one or a combination of these approaches. It may even combine antagonistic approaches, such as combining measures based on origins and measures based on destinations. In addition, the development of an operational accessibility measure, able to support planning, involves

a number of choices from a list of potential features increasing the scientific rigour of the instrument. The following list summarizes several of the choices currently found in the literature:

- To consider or not distance decay (simple activity-based measures not considering distance decay and simply summing activities accessible within a specific time limit are generally called *contour measures* or *isochrones measures* or *cumulative opportunity measures*; simple activity-based measures considering distance decay are generally called *potential measures*);
- To consider or not competition effects (of origins and/or destinations) (simple activity-based measures considering the number of activities of the same type or the size of each establishment in accessibility measures are generally known as *gravity measures*; these measures may or not consider distance decay; another example of measures considering competition effects are inverse balancing factors);
- To consider or not personal or group preferences/constraints (measures including time constraints include the individual component referred to above);
- To consider or not different trip purposes (considering one specific trip purpose or all trip purposes aggregate versus developing analysis of accessibility per different trip purposes);
- To consider or not different transport modes (only one transport mode or all aggregated/integrated choosing fastest/cheapest);
- To consider or not different times of day or days of week/month (measures including time constraints include the temporal component referred to above).

Regardless of the operational accessibility measure used to support planning, the fundamental issue raised by this paper is the need for a shift of paradigm from mobility-based to accessibility- based urban planning. This will imply shifting the focus from the means to the ends, i.e., form the infrastructure system and its performance to the traveller and the fulfilment of his/hers expectations or needs. This paradigm shift becomes even more pressing in the context of aging societies. This paper analyses current urban planning practice with regard to accessibility, aiming to discuss the role of Municipal Master Plans in contributing to accessible cities. For this, the paper will start with a review of state of planning practice in Europe (section 2), followed by a review of the Portuguese regulation and guidance for accessibility planning practice (section 3). Finally, a review of the state of practice of Portuguese accessibility planning will be presented in the last section, analysing the inclusion of accessibility concerns and measures in local planning instruments (Master Plans). Moving from theory to regulation and directives and from these to practice, we aim to discuss how accessibility can make the leap from theory to practice and thus enable the paradigm shift supported by several authors.

2. Accessibility planning practice in Europe

2.1 The European background

In the last decade, the European Community (EC) has been developing a set of relevant policies and legislation, which contributed to improve the condition of the transport sector in Europe. Accessibility has found his way into these strategic documents with concerns on these matter clearly increasing in the last decades, Nevertheless, it is still clearly too early to speak of a paradigm shift in European policy directives towards accessibility planning.

The White Paper on Transport [COM(2011)144] acknowledges the importance of mobility as a key factor both for the health of the internal market and for the quality of life of citizens. It recognizes that, accessibility together with quality and reliability of transport, are important features to be achieved (also due to an ageing population). Aspects such as attractive frequencies, comfort, easy access, reliability of services, and intermodal integration are referred.

The 2007 Green Paper on urban mobility [COM(2007)551] is also an important document on the subject. It has set a new European agenda on urban mobility. Accessibility is clearly an important issue of this paper, being identified as one of the main challenges of urban mobility. Similarly to the 2011 White Paper, the Green Paper focuses on the rights of passengers with reduced mobility as well.

Another important European Strategy is the Action Plan on Urban Mobility [COM(2009)490]. It follows the publication of the Green Paper and presents a set of practical actions on urban mobility to be progressively implemented until 2012. Accessibility is also referred, specifically in Action no. 5: Improving accessibility for persons with reduced mobility, where concerns on the equality of access to urban transport are revealed.

As is clear by the above, accessibility concerns have entered European policy directives but mainly concerned with reducing barriers for people with reduced mobility. In European policy, accessibility is frequently synonym of the reduction of barriers for the mobility impaired. Access is also frequently mentioned when referring to access to public transport. Again, barriers to mobility impaired are a major issue, in addition to public transport coverage. More frequent than not, accessibility is not regarded as the potential of people to reach activities (including issues like barriers or access to public transport), but where the object of analysis is the satisfaction of the ultimate goal for mobility, to access spatially disperse opportunities (at least this is the goal of most travel; exceptions are excess travel or free mobility).

A review of the recent European Research Projects (FP5, FP6 and FP7) revealed that accessibility has often been considered in an unbalanced manner, frequently being regarded and researched from particular dimensions and seldom in a comprehensive way. For instance, the access to public transport systems (namely, access to public transport at interchange points) and in particular physical barriers to access of the mobility impaired have been far more studied than other dimensions of urban accessibility.

2.2 National Contexts in European countries

Although the exact outlook of national directives for accessibility planning of European Countries is unknown, the results of a survey among accessibility-based design support instrument developer's (Hull and Silva, 2012)[1] has shown that in a context of 16 different countries, developers of only three countries were aware of the existence of any particular national directives requiring accessibility assessment for urban planning and/ or transport planning. Developers of 5 further countries recognize the existence of national advice to use accessibility instruments without any particular

[1] This survey was conducted among 22 accessibility instrument developer's involved in the COST Action TU1002 "Accessibility Instruments for Planning Practice in Europe", not aiming to produce a detailed overview of accessibility instruments or of the national planning context. Results presented here must thus be considered with caution.

requirement. These results are indicative of the low penetration accessibility requirements and concerns have had in practice across individual European countries.

From the 1980's on, Accessibility concerns began to spread in some European countries, the USA and Canada. Some measures based on civil law were developed (with the ADA – Americans with Disabilities Act) barring the discrimination against people with special needs and promoting accessibility to buildings and public transport as well access to education and the establishment of inclusive policies (some examples of these plans can be addressed, such as: "Municipal Accessibility Plan", in Canada; and others). From 1990's, the concepts of "Design for all" in Europe and "Universal Design" in the U.S.A. emerged, while the United Kingdom, introduced the concept of "Inclusive Design" based on the conceptual framework of accessibility planning using accessibility indicators as a basis for transport planning. Based on this concept, New Zealand has focused on the development of accessibility indicators in "Metropolitan Plan" and the relationship of these indicators with strategic planning in improving accessibility equity for the communities (Daniel et al., 2010).

Other examples of planning instruments focusing on accessibility are the "School Accessibility Plan" (in U.K.); "Accessibility Action Plan" (in Australia); "Local Transport Plan" (in U.K.), "Municipal Plan for the Promotion of Accessibility" (in Portugal), to name just a few. However, the concepts of accessibility applied in these plans have a weak relationship to the integration of land use and transport, being generally focused on overcoming barriers for the mobility impaired.

Among the pioneers in accessibility planning directives are the United Kingdom and Germany. Accessibility planning in the United Kingdom (UK) is embedded in Local Transport Plans (LTP), prepared by County Local Authorities. Social inclusion is a central part of the rationale behind it. The Department of Transport (DfT, 2004a, 2004b, 2006), in collaboration with Local Transport Authorities, revised the Accessibility Planning Guidance, before settling with the current version, which extensively explains the approach and is directed to transport practitioners, but also to a broader audience (e.g. partners and stakeholders). The DfT provides quite detailed technical guidance on the development and use of accessibility modelling and mapping techniques, as well as Accession (the DfT accessibility planning software), and on data sources of use.

Likewise, accessibility planning in Germany is integrated in Local Public Transport Plans (LPTP), prepared by Regional Planning Authorities. Similarly to the UK, ensuring access to public transport for all citizens is an underlying concern (Schwarze, 2005). The German Guidelines for Integrated Network Design/Richtline für Integrierte Netzgestaltung (RIN), announced by the German Federal Transport Ministry, are a binding planning guidance that presents essential accessibility standards. The German Guidelines orientate the former standards toward the system of central locations recognized as appropriate bases for the spatial components of basic accessibility (Gerlach, 2012). This heavily binding guidance is mostly directed to German authorities and transport planners.

The UK Accessibility Planning process is divided in 5 stages, as seen in Figure 1, encompasses: strategic accessibility assessment; local accessibility assessments; option appraisal; accessibility plan preparation; and performance monitoring and evaluation; and relies strongly on stakeholder involvement and national and local indicators. Authorities should undertake Strategic Accessibility Assessments, which entail Mapping Audits, followed by Local Accessibility Assessments that, in turn, can involve for instance even more detailed mapping audits, and targeted surveys.

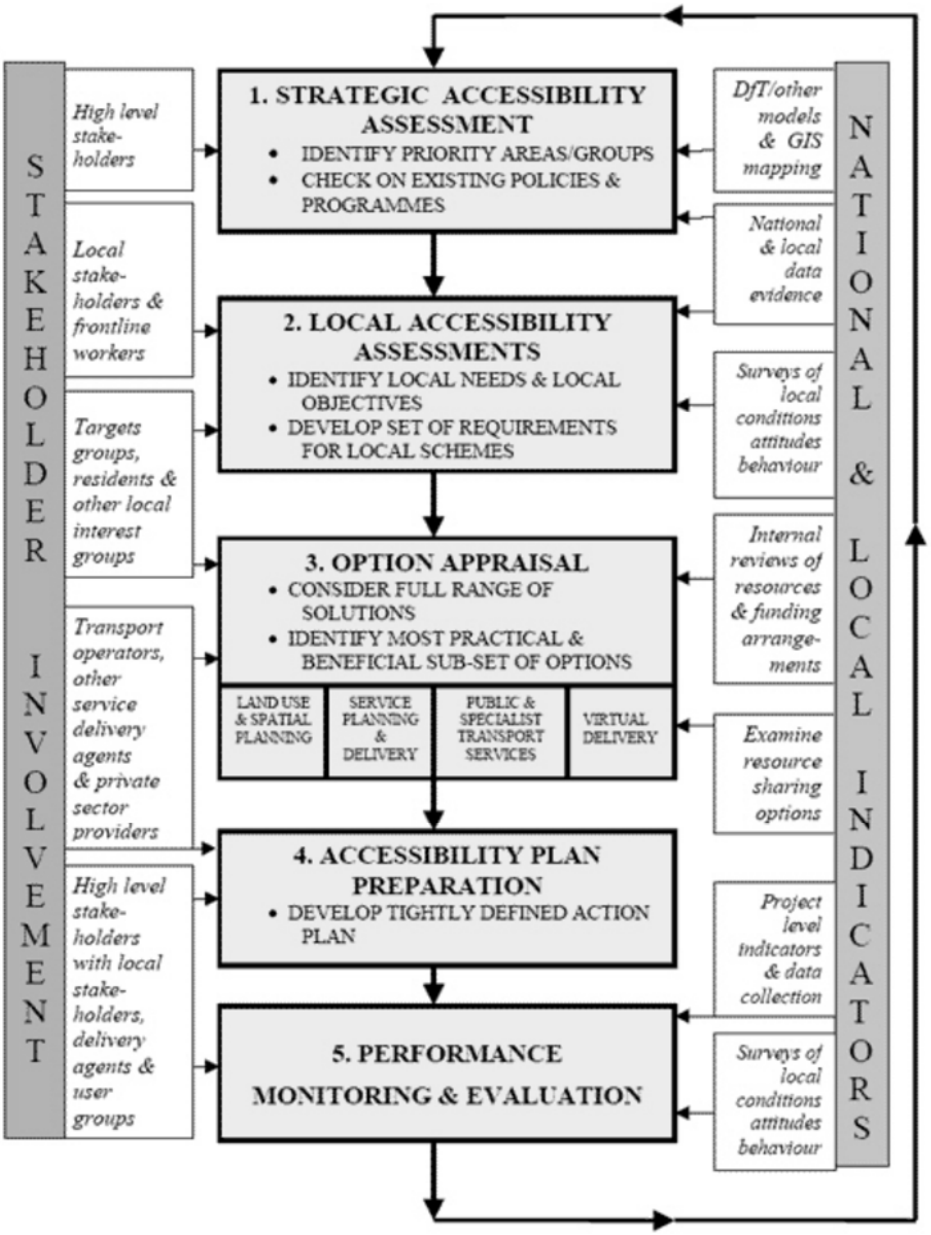

Figure 1 - Main stages of the recommended planning process. (Source: Dft, 2004a)

In Germany, the facilities offered in central locations are a crucial aspect of assuring basic accessibility, which reflect the significance of the centre. Operationally speaking, once levels of centrality are assigned to the cities, the basis for the functional structuring of the transport network is the combination of the above-mentioned system and target values for journey time between central location and residential areas (Gerlach, 2012). According to their level there are a variety of standards regarding the facilities that should be available in central locations (e.g. health), usually given in the spatial planning documents of German states (Gerike et al, 2009).

Table 1 Examples of different types of accessibility measures (Source: Adapted from DfT (2004b, 2006))

Type of accessibility measure (or indicator)		Example
Quantitative	Access	the proportion of the population having access to a bus service with a minimum frequency of four or more services per hour, from a bus stop situated within a 10-minute walk of their home; PTALs index
	Threshold	the proportion or number of older people within a 10 minute walk of the nearest GP; the proportion or number of households with no accesses to car within 1.50 Euro travel cost of their nearest hospital
	Continuous	Bus accessibility to higher education institutions within Greater Manchester during weekday am peak period
	Composite	The Index of Multiple Deprivation (IMD)
	Comparative	the proportion of the pupils of compulsory school age in receipt of free school meals able to access their nearest school within 15 minutes, compared to the equivalent value for all pupils of compulsory school age
Qualitative	E.g. :Survey	Local perception of crime
Core Indicators		
– % of a) pupils of compulsory school age7; b) pupils of compulsory school age in receipt of free school meals within 15 and 30 minutes of a primary school and 20 and 40 minutes of a secondary school by public transport; – % of 16-19 year olds within 30 and 60 minutes of a further education establishment by public transport; – % of a) people of working age (16-74); b) people in receipt of Jobseekers' Allowance within 20 and 40 minutes of work by public transport; – % of a) households b) households without access to a car within 30 and 60 minutes of a hospital by public transport; – % of a) households b) households without access to a car within 15 and 30 minutes of a GP by public transport; and – % of a) households; b) households without access to a car within 15 and 30 minutes of a major centre by public transport.		
Local Indicators		
E.g.: characteristics of specific, defined areas, neighbourhoods or communities, e.g. regeneration areas, deprived communities and the differing needs of rural and urban communities; and alternative transport modes, such as school transport.		

UK's Accessibility measures (or indicators), a vital part of the evidence based planning, are considered to have an important role in: identifying priorities, targeting, ranking and prioritising potential actions, policies and solutions; and monitoring performance and outcomes (DfT, 2006). It is not difficult to find literature on the UK case study (Bishop, 2007; Envall, 2007; Halden, 2011). Three main types of quantitative accessibility measures are suggested: access, threshold and continuous, in an absolute or relative form, and used in combination, as composite and comparative measures. Furthermore, it is highlighted that qualitative measures should be used to reflect other factors affecting individual accessibility, such as safety or travel horizons. A set of core indicators is demanded, which is available at ward level for all territory, and recommended the calculation of supplementary local indicators (Table 1).

The use of accessibility standards is frequent in Local Public Transport Plans (LPTP) in Germany. According to Gerike et al (2009), the German Guidelines demonstrate that it is possible to develop a comprehensive system of standards that is clear and pragmatic, including all transport modes and all spatial levels from a detailed micro level to the macro accessibility of agglomerations.

Based on the North Rhine-Westphalia's LPTP, Schwarze (2005) makes a distinction between used accessibility indicators: simple (e.g. number of public transport stops) and integrated indicators (e.g. weighted average travel time to city centre).

3. National context for urban accessibility planning

Accessibility planning is framed by only a few Portuguese regulations and guides (IMTT, 2011a, 2001b). Naturally, the National Programme for Spatial Planning Policies (PNPOT), as a framework for all Spatial Plans, gives strategic goals for accessibility, namely to structure and to develop support infrastructures and service networks for accessibility and mobility. The National Sustainable Development Strategy (ENDS) has a very strategic and generalist character as well, focusing mainly on the advice of integration of accessibility and land use in planning. Despite its name, the National Plan for Accessibility Promotion (PNPA) is concerned with a different dimension of accessibility, especially related to the rights of citizens with special needs. This is common in European projects and directives. Before 2011, there were not really any directives or national regulations in order to integrate and enhance accessibility in urban and regional planning.

There is still not a national directive for accessibility. Still, the Guide for Accessibility and Mobility in Municipal Spatial Plans (IMTT, 2011c) is a recent Portuguese guidance document (non-binding and with no legal power) that aims to support the elaboration, amendment or revision of these Spatial Plans with regard to accessibility and mobility. This is a working document developed solely by IMTT (National Institute for Mobility and Surface Transport), without the collaboration of the Ministries responsible for transport and land use planning. It focuses on the theme of transport-land use, i.e. on accessibility and urban functions that determine and provide travel of people and goods in space. The Guide is driven by a set of priority issues and aims to raise politicians', policy makers' and technicians' awareness to sustainable mobility at the spatial planning and land management level.

Generally, the Guide recommends that attention should be given to four issues concerning the integration of transport and spatial planning in PMOT:

- Clarification of concepts and terminology to adopt, as well as, objectives with regard to mobility and accessibility conditions. A glossary is provided[2] but no goals are defined;
- Identification of key structuring themes and issues to be addressed relating land use and transport system (see Table 2);
- Identification of types of mobility and transport studies which can be performed in parallel. Attention is given to Mobility Plans;
- Survey of types of information, guidelines, plans and programs which should be particularly considered. Summaries of Regional Spatial Plans and projects such as TRANSLAND, TRANSPLUS and MAX – Successful Travel Awareness Campaign and Mobility Management Strategies are given.

[2] E.g. ACCESSIBILITY: Ease provided to people to reach a destination using a given transport system, dependent on the existence of modal choice, travel cost, travel time, security at all stages of the journey and the compatibility between individual limitations, schedules and physical abilities. SOURCE: ADAPTED FROM OBSERVATOIRES DES PLANS DE DÉPLACEMENTS URBAINS: DE LA MÉTHODE AUX INDICATEURS, CERTU, 2001

Table 2 - Structuring themes in the relation land use/transport (Source: IMTT (2011c, p. 64). Free translation).

Key themes	**Aspects to consider**
Networks	
Pedestrian Bike lanes Road Railway	Morphology and suitability for land uses Continuity Connectivity Hierarchy
Nodes	
	Articulation of networks Different service levels (regional / local) Different service types (modes) Relation with uses Transport interface Urban centralities Activities with supra-local accessibility requirements
Urban corridors	
Streets within cities (avenues) Roadways on the outskirts of cities Roads connecting the urban centres	Leveraging of the relationship accessibility - land use Roads/streets functional hierarchy Integration of public transport Valuation of pedestrian spaces and routes Relation to adjacent areas and uses
Low density areas	
Rural areas Peri-urban areas	Containment and structuring of low density areas Creation of local centralities Low density vs. densification Hierarchy of roads Relation with the surrounding transport networks (interfaces)
Housing areas	
Areas with predominantly residential use “Neighbourhoods”	Residential areas as major sources of travel Terms of accessibility and territorial integration Location of local services and equipment Access to public transport (PT stops and interfaces) Parking Morphology of public space and utilization of pedestrian spaces and routes
Areas of concentration of activities and users	
Business parks Logistics areas Shopping centres Industrial areas and isolated industries	Selection of areas relating location/accessibility Links with transport networks and nodes Access to public transport and parking supply
Large public amenities	
Education and culture Health Sport	Selection of accessibility/location areas Links with transport networks and nodes Access to public transport and parking supply
Traditional urban centres and historical centres	
In medium-sized cities (Historic Centre = City Centre) In complex urban systems (Historic Centre different from the City Centre)	Services’ concentration level (core functions) Functional profile (mixed uses) Adequacy of accessibility conditions Provision of parking (depending on accessibility options) Residential density Morphology of public space and utilization of pedestrian spaces and routes

The design elements advised, by IMTT (2011c), to integrate land use and transports in PMOT include the following categories of spaces: reserved area for infrastructure; special use area; territorial infrastructure; and urban infrastructure. In addition, other sub-categories for transport systems and mobility specific uses are suggested: road network; dedicated lanes; transport interfaces and stops; parking; public spaces; loading and unloading areas. In accordance to the Guide, PMOT classify spaces and establish land settlement, use and programming conditions, but

should not bind use of public space regarding motor traffic or provision of (public or collective) transport services.

According to IMTT, pedestrian movement is as a central issue of sustainable mobility; and pedestrian accessibility should be a central theme in municipal urban planning and management – first, with development and consolidation of residential areas enhancing residents' access to local services, access to public transport networks that integrate the "neighbourhoods" into other levels of the urban system, and social interaction; second, trough functional valuation and urban/ environmental qualification of axes connecting urban spaces, especially housing spaces, and these to centralities, incorporating pedestrian and bicycle routes; third, with integration and urban/ environmental enhancement of public transport, dedicated corridors, and multimodal interfaces, whose functioning and efficiency depend on accessibility conditions and pedestrian circulation.

Table 3 - PMOT's content in terms of accessibility and transport – PROPOSAL (Source: IMTT (2011c, p. 83). Free translation).

PROPOSALS	**REGULATION**	***Type of plan***
1 – Concept 'Accessibilities' associated with the territorial model	**Management criteria** for each level of the road network **Allocation of** public and private **parking**/areas (minimum and maximum)	Municipal Master Plan (PDM)
2 – Hierarchy of municipal road network		
3 – Hierarchy of passenger interfaces		
4 – Program guidelines for possible expansion of networks, nodes and interfaces		
5 – Definition of transports/land use structural corridors		
6 – Relationship with land use and classification		
1 – Definition of street traffic (including number of lanes per channel)	**Allocation of** public and private **parking**/areas (minimum and maximum)	Urban Development Plan (PU)
2 – Structural corridors for (semi)-dedicated modes and uses		
3 – Functional and layout program of nodes and networks and preliminary viability of the more complex intersections		
4 – Passenger and goods interfaces (public)		
5 – Transverse profiles of most representative streets of each hierarchical level		
6 – Provision of public parking		
1 - Design of public spaces of pedestrian and road circulation (motorized or not)	*Compliance with PDM and PU rules*	Detailed Plan (PP)
2 – Functional and layout program of road intersections		
3 - Organization of the layout of public parking		
4 – Definition of road accessibility to parks with over 350 parking places		
5 – Location and design of public transport corridors		
6 – Sizing passenger interfaces		

The measurement of accessibility as a tool for planning is highlighted, asserting that it is important to evaluate accessibility conditions to identify areas with untapped use potential, and saturated areas or poorly served areas, in need of density or use adjustment. Accessibility is defined as an indicator of spatial relations (enabling travel of people and goods, translated into travel

distance, time, or cost) established between two or more points. The role of spatial planning is to research, identify and evaluate high potential accessibility areas and unutilized high accessibility areas, considering other factors as well: social, assessing the risks of possible displacement of resident populations; socio-economic, in case of relocation of businesses; and environmental, assessing implications for the environment, natural resources and property.

Accessibility measurement in terms of distance is the simpler calculation proposed, although considered less rigorous; while accessibility measurement in terms of time is seen as having different complexity levels, depending of the contemplation of influencing factors. Factors identified in the Guide include: effort spent in travelling by foot or bike, depending on topography (ITEP values); waiting time at transport change; frequency of public transport services; time spent looking for parking space; road circulation penalty, resulting from traffic congestion; node, tolls and traffic control systems influence in circulation time. Two types of accessibility measures are proposed by IMTT (2011c): isolines/isochronous maps and network accessibility matrixes (with or without dynamic-historical analysis).

The Guide identifies key themes and aspects to consider in PMOT (Table 4) and makes a content proposal, in opposition to the Law-Decree Nº 380/99 revised by Law-Decrees Nº 316/2007 and 46/2009 (Table 3) and gives a great deal of importance to the analysis, characterization and diagnosis of the transport system (Table 4). Beside the issues to be addressed and the policy criteria found in Table 6, the diagnosis should also frame transport-accessibility and services provided themes in the context of the: conjunction with the guidelines contained in Sector Plans; conjunction with the Regional Spatial Plans; assessment of the accessibility conditions offered by the transport system in its relation to current and potential use of land; evaluation of pedestrian networks and soft modes, and adequacy to the main routes and urban integration conditions, etc.

Table 4 - Analysis, characterization and diagnosis of the Transport System **(**Source: Adapted from IMTT (2011c)).

Issues to be addressed in analysis, characterization	**Policy criteria for diagnosis**
– operation and conservation state of infrastructure; – service levels; – levels of use; – accessibility; – public transport services; – traffic flows generated and management support systems; – types of travel; – types of parking and degree of illegality; – critical accident points; – critical environmental points – noise and air pollution.	– greater or lesser strengthening of the role of public transport; – greater or lesser degree of freedom to be granted to individual transport, motorized or not; – greater or lesser availability of reserve areas for infrastructure dedicated to certain means of public or individual transport; – greater or lesser individual transport zone restriction; – greater or lesser degree of allocation of certain environmental indicators such as air quality, noise, space intrusion, etc. – predominance of accessibility over environmental conditions, or vice versa; – greater or lesser degree of accessibility which includes higher or lower parking restrictions; – provision of central space for more sustainable transport solutions.

4. Planning for Accessibility in Portuguese municipal planning instruments

The integration of transport and land use during the preparation of Municipal (local) Plans is complex since there is a delicate relationship between the various planning instruments such as spatial management Plans, Mobility and Transport Plans and Traffic and Parking Plans. The different conditions of accessibility provided by transport systems and land use systems are seldom interpreted (and evaluated) in local plans.

The Master Plan (so-called *Plano Director Municipal* - PDM) is the main local Portuguese planning instrument. PDMs are mandatory in land management. The municipal plan has a strategic and operational nature that links public and private entities, establishing the spatial structure of the municipality model that relies mainly on the classification of land uses. This plan establishes the principles, standards and regulatory mechanisms for local planning and management practice. Also, it sets the model of spatial structure in accordance with the classification and qualification of land use and defines other operational and management areas, such as the “Operational Units of Planning and Management” (UOPG).

The aim of this section is to assess how accessibility has been made operational for local planning practice, through Master Plans. Thus we have reviewed the Master Plans of eighteen Portuguese district capitals, namely: Aveiro, Beja, Braga, Bragança, Castelo Branco, Coimbra, Évora, Faro, Guarda, Leiria, Lisbon, Portalegre, Oporto, Santarém, Setúbal, Viana do Castelo, Vila Real and Viseu. This reviewed aimed to enlighten if and how accessibility concerns and concepts have been incorporated in local plans, more specifically into land use plans, until now. It is important to point out that all the Master Plans reviewed were developed prior to the development of the guidance document for mobility and accessibility planning in land use plans (discussed in section 3). As stated before, prior to this national guidance, no particular guidance or directives existed specifically focussed on transport/mobility/accessibility planning in land use. Moving from the analysis of directives and regulations to Portuguese planning practice, it is now relevant to identify if, in the absence of national directives or regulation for accessibility planning, local planning instruments have in any way integrated accessibility concerns or concept into land use planning, following the international debate.

The main research question being addressed is: *have current PDMs integrate “planning for accessibility”, and how?* For most of the analysed plans, the answer is not straightforward. Considering the recurrent conceptual mismatch between transports, mobility and accessibility, it is not always clear what concerns are actually framing objectives and explicit measures upheld along these Master Plans. In many situations accessibility concerns are not directly observable, i.e., the objectives are not explicit in the plans. Considering this conceptual mismatch and aiming to avoid being misled by any possible misuses of the concepts, the analysis of the Master Plans focussed on all three concepts, accessibility, mobility and transport, analysing how these concepts and concerns have been integrated into objectives and actions.

Firstly, to determine the degree to which Master Plans reflect the concepts mentioned above, three questions were addressed: (1) What goals and objectives comprise accessibility, mobility and transport orientations?; (2) What types of specific measures are used to achieve these objectives?; (3) Which strategies are included in the Plan?

In addressing question 1, direct and indirect evidence of concerns on accessibility, mobility and transport were observed. Few plans have shown any specific objectives regarding accessibility, mobility or transports (see Table, “implicit objectives”). Indeed, Portuguese land use planning practice is still far disintegrated from transport planning, nor is accessibility recognised as a relevant concern in land use planning so far. Furthermore, most of the plans with specific objectives regarding accessibility, mobility or transports are quite generic in defining these goals. For instance, in the PDM of Lisbon, accessibility concerns are simply referred to as an objective of “improving accessibility”, without specifying the context or particular situations. However, one exception can be admitted as an accessibility concerning and is as follows: “Defining and establishing a special structure for the municipality, the classification of land use, urban perimeters, urban rates and general rules for occupation, use and transformation of the land use, taking into account development objectives, the rational distribution of activities economic, housing shortages, equipment, transport networks and communications infrastructure” (C.M. Santarém, 1995, p.6556; free translation). Mobility objectives found are generally associated to the enhancement of the Transport Systems (e.g. in PDM Porto), traffic capacity and parking problems. Restricting the congestion or improving time distances can also be considered as indirect evidence of the mobility-orientation (e.g. “Increase of internal and external mobility”, in C.M. Vila Real, 1995, p. 13475). The promotion of Public Transport as well as the enhancement of pedestrian and bicycle are interpreted by the construction of new infrastructures and the priority of bus’s lane. In summary, accessibility concerns are generally absent from the PDMs of major Portuguese municipalities. When present, the absence of detail indicates low commitment levels leaving accessibility improvements as good intentions. More specific objectives can be found regarding the improvement of mobility and transport systems. Being easier to understand and quantify it is only natural that they are also more easily incorporated in planning instruments concerned with the integration of land use and transport issues, however, they fail to recognise the importance of re-centring the planning object on people instead of the land use and transport systems.

The same conceptual basis was addressed as answer to question 3. Hence, the projects under development or planned in PDMs (classified as UOPGs) are included in the table of the implicit objectives in so far as it does not clearly explain the relevance of the concepts in accordance with the goals achieved.

In addressing question 2, specific measures used to perform the implicit objectives were collected. The specific measures found in our review can be grouped into the following main types (discussed in detail below):

- Traffic planning;
- Parking;
- Reservations for infrastructure;
- Access to/ connections;
- Completing the road networks;
- Others.

Table 5 - Accessibility concerns in Portuguese Master Plans (PDMs): objectives

	1. What goals and objectives comprise accessibility, mobility and transport orientations?				3. Which strategies are included in the Plan?
Municipality/Geration/Year	Implicit Objectives				
	Acessibility (AO)	Mobility (MO)	Public Transport (PTO)	Pedestrian/Bicycle (PBO)	Implementation and Programming
Aveiro/1ª 1995	—	—	—	—	AO1;TP2;TP6
Beja/ 2ª 2000	—	—	—	—	—
Braga/ 2ª 2001	—	—	—	—	—
Bragança/2ª 2001	—	—	—	—	AO1;TP3;TP5
Castelo Branco/ 1ª 1994	—	—	—	—	—
Coimbra/ 2ª 2000	—	—	√	√	—
Évora/ 2ª 2008	√	√	—	—	—
Faro/ 1ª 1995	—	—	—	—	—
Guarda/ 1ª 1994	—	—	—	—	—
Leiria/ 1ª 1995	—	—	—	—	—
Lisboa/ 1ª 1994	—	—	—	√	AO1;PTO1;PTO2;O.I2
Portalegre/ 2ª 2007	—	—	—	—	—
Porto/2ª 2006	—	√	√	√	AO1;PTO2
Santarém/ 1ª 1995	√	—	—	—	—
Setúbal/ 1ª 1994	—	—	—	—	AO1
Viana do Castelo/ 2ª 2008	—	—	—	—	AO1
Vila Real/ 2ª 2011	—	√	—	—	AO1;C1;TP6;PTO1
Viseu 1ª 1995	—	—	—	—	—

Traffic Planning (TP):
TP1) Road hierarchy
TP2) Size of the roads by hierarchy
TP3) Organization of movement in parking
TP4) Planning of urban logistics (loading and unloading of goods)
TP5) Number of lanes and directions
TP6) Building links between different hierarchy of roads
TP7) Size of the roads

Parking (P):
P1) definition of maximum (Public)
P2) definition of minimum (Public)
P3) definition of maximum (Private)
P4) definition of minimum (Private)

Reservation for Infrastructure (RI):
RI1) Road
RI2) Railway
RI3) Natural area's exception

Access to/Connections (AC):
AC1) Forecasting infrastructure's construction in rural areas
AC2) Forecasting infrastructure's construction in protected areas
AC3) Forecasting new roads' construction in urban areas

Closing of road network (C):
C1) in consolidated areas
C2) in "Land subdivision scheme" (*Loteamentos)*

Other (O):
O.I) Interfaces/Public Transports' Stops:
O.I1) Safety
O.I2) other

Acessibility (AO):
AO1) Improvement of accessibility

Mobility (MO):
AO1) Increase of mobility

Public Transport (PTO):
PTO1) Integration of transport in urban space
PTO2) Compatibility between actual and planned transport's infrastructure

Pedestrian/Bicycle (PBO):
PBO1) Enhancement of pedestrian and bicycle movement

From Table 6 we can quickly observe that the main concerns that have been made operational through specific measures in the analysed PDMs regard traffic management, parking and reservation of space for infrastructure construction It is fair to say that these are the issues of the transport sector traditionally integrated by Portuguese land use plans. Less frequent are the remaining groups where we can find some examples already incorporating some of the concerns behind accessibility planning.

The group of **Traffic Planning** includes measures mainly focus on the hierarchy of the roads and its connections with different levels of classification (and function), road traffic, the reformulation of the directions of traffic (movement), the dimensions and number of lanes, road signs, street traffic and parking regulations for urban freight.

Parking measures are generally seen at the quantitative level defining minimum and maximum numbers of places for different land use typologies. Actually, most plans refer to minimum and not to maximum records. However, some exceptions can be found in land use regulation by setting exact values for parking spaces instead of minimum values: " The proper parking should be ensured inside the plot under the following conditions: one parking place per dwelling with construction area of less than 150m2 ( )" (C.M.Viseu, 1995, p.54; free translation). However, different opinions in the planning practice argue that this problem should be addressed as an instrument of management and control of the individual transport, taking into account the global perspective of what is intended for the mobility of a city and not be merely a matter of regulatory rules.

Reservation for Infrastructures identifies areas to be safeguarded for the construction of road and rail infrastructures.

The group of **Access to/Connections** refers to the construction of roads in urban, rural and protection zones disregarding restrictions to road construction whenever connections or road access to existing buildings are required (e.g. “the construction of roads can be allowed in agricultural and forest zones [ ]”, free translation form PDM of Vila Real). This group of measures already include implicit accessibility concerns although, in practice, the concern is generally car accessibility.

The group of **Completing the road network** generally refers to measures that reflects the rationalization of the traffic flows on existing zones (e.g. city centres) and in areas of new constructions and “*Loteamentos*” (defined as “Land subdivision schemes” by the European Commission in 2000). The plan of Viseu is an example of this situation regarding “the creation of new roads built by private individuals integrated into town planning operations should take into account the possibility of closing or connection of the urban network to avoid deadlock situations” (C.M.Viseu, 1995, p7982; free translation)

The final **Others** includes several issues, such as, multimodality including transport interfaces and public transport access. Although it is mainly focused on the location of public transport stops (depending on the security and the design of the road); the delimitation of different urban functions affecting the interfaces and the (planning) accessibility to reach the desired services and activities, are insignificant. Of the overall sample of plans, only the cities of Lisbon and Oporto refer that the location of PT interfaces "Should be designed not only on the basis of specific traffic studies but also in regard to the adjacent land uses zones.” (e.g. C.M. Lisbon, 1994, p.5936; free translation).

Table 6 - Accessibility concerns in Portuguese Master Plans (PDMs): measures

Municipality/Geration/Year	2. What types of specific measures are used to achieve these objectives?					
	Specific Measures					
	Traffic Planning (TP)	Parking (P)	Reservation for Infraestructure (RI)	Acess to/Connections (AC)	Closing of road network (C)	Other (O)
Aveiro/1ª 1995	—	P2;P4	—	AC1	—	—
Beja/ 2ª 2000	TP1	P2;P4	RI1; RI2	—	—	—
Braga/ 2ª 2001	—	P2;P4	—	—	—	—
Bragança/2ª 2001	TP1;TP5;TP6;TP7	P2;P4	RI3	—	—	—
Castelo Branco/ 1ª 1994	TP1	P2;P4	RI1; RI2	—	—	—
Coimbra/ 2ª 2000	TP1;TP7	P2;P4	—	AC1	—	—
Évora/ 2ª 2008	TP1;TP2;TP3	P2;P4	RI1; RI2	AC1	—	O.I1
Faro/ 1ª 1995	TP1;TP2;TP6	P2;P4	RI1; RI2	—	—	—
Guarda/ 1ª 1994	—	P2;P4	—	AC1	—	—
Leiria/ 1ª 1995	TP1;TP5;TP6;TP7	P2;P4	RI1; RI2	—	—	—
Lisboa/ 1ª 1994	TP1;TP2;TP7	P2;P4	RI1; RI2	—	—	O.I2
Portalegre/ 2ª 2007	TP1;TP7	P2;P4	RI1; RI2	AC1	—	—
Porto/2ª 2006	TP1;TP2	P2;P4	RI1; RI2	AC3	—	O.I2
Santarém/ 1ª 1995	TP1;TP7	P2;P4	—	—	—	—
Setúbal/ 1ª 1994	TP1;TP2;TP3;TP4;TP	P2;P4	RI1; RI2	—	—	O.I1
Viana do Castelo/ 2ª 2008	TP1;TP2	P2;P4	RI1; RI2	—	—	O.I1
Vila Real/ 2ª 2011	TP1;TP2	P2;P4	RI1; RI2	AC1; AC2	—	—
Viseu 1ª 1995	TP1;TP6	P2;P4; UOPG1 =P3	RI1	AC3	C2	—

Traffic Planning (TP):
TP1) Road hierarchy
TP2) Size of the roads by hierarchy
TP3) Organization of movement in parking
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AC3) Forecasting new roads' construction in urban areas

Closing of road network (C):
C1) in consolidated areas
C2) in "Land subdivision scheme" (*Loteamentos)*

Other (O):
O.I) Interfaces/Public Transports' Stops:
O.I1) Safety
O.I2) other

In sum, the table shows several weaknesses with regard to accessibility concerns in Portuguese Master Plans: for one the reduced influence of accessibility concerns and when existing, objectives and specific measures are somehow disarticulated. No influence was found of city size,

relative location within the country, or year of the Master Plan, on these results, making it fair to assume that these results picture the Portuguese reality with regard to the integration of accessibility into land use plans.

The lack of integration between accessibility and land use should require a clear definition of local accessibility aspects in providing useful techniques to integrate land use and accessibility cross-cutting issues in planning practice (clarification of concepts, cooperation and coordination between different sectors, etc.). In this context, it seems to be a misunderstanding of goals, tasks and assignments in practice, which may be related to governance issues and to the role of sectorial fields in the planning process.

6. Discussion

Although accessibility concerns have always been linked to urban planning, its role has gained increased importance in the last decades. First, due to the recognition of the need to integrate land use and transport planning, several authors such as Halden et al. (2000), Bertolini et al. (2005) and Straatemeier (2006) believe that accessibility measures provide a useful framework for the design of integrated land use and transport policies. Second, due to the recognition of the need for a shift of paradigm from mobility-based to accessibility- based urban planning, implying shifting the focus from the means to the ends, i.e., form the infrastructure system and its performance to the traveller and the fulfilment of his/hers expectations or needs. This paradigm shift has become ever more pressing in the context of social inclusion (e.g., aging societies). This paper analyses current urban planning practice with regard to accessibility, aiming to discuss the role of municipal Master Plans in contributing to accessible cities.

Nevertheless, regardless of the potential of integrating accessibility concerns into urban planning, more particular urban land use planning, such integration has seldom been put into practice. A review of European directives shows a recent shift in European policy towards an increased relevance for accessibility-based planning practices. However, this shift is but taking its first steps with regard to the potential contribution of accessibility to planning goals and practices. Current European directives have, for now, limited accessibility to the reduction of barriers for the mobility impaired or to the coverage of public transport. Some European Countries, such as Germany and the UK have taken the lead on the integration of accessibility into urban planning through the development of national accessibility performance indicators and standards (DfT, 2006; Gerlach, 2012). Nevertheless, even within these examples, accessibility is sometimes regarded from a specific dimension such as, barriers of mobility impaired, and sometimes reduced to mobility concerns (such as travel speed or time). Different formats of Local Transport Plans have been developed in several European countries (following European directives towards the development of such plans and also as a response to the need for more formal planning for urban mobility). With two separate plans for land use and transport planning, integration of these sectors is now facing new challenges. Within this context, issues have been raised on the most adequate setting for the accessibility debate regarding its conceptual propensity for revealing the mutually influencing relationship of land use and transports. Challenges are even more ambitious by the emergence of accessibility plans in other countries (e.g. “Local Plan for the Promotion of Accessibility”, in Portugal; “School Accessibility Plan”,

in United Kingdom; “Municipal Accessibility Plan”, in Canada; “Transport Management Accessibility Plan”, in Australia, “Neighbourhood Accessibility Plan”, in New Zealand, and others). In practice, some of these are no different for Local Transport Plans others limit its scope of analysis to the overcoming of barriers of the mobility impaired.

It seems, that although the integration of land use and transport has long been advocated by several scholars and practitioners, recent practice has moved towards the development of two (and sometimes more) complementary urban plans; one for land use and another for transports and mobility (and others, for example, plans for overcoming barriers of the mobility impaired). Although accessibility seems to be considered in both these plans, integration is somehow limited. When analysing in more detail the operationalization of these directives into planning documents for land use planning in Portugal we found very little of them actually taking advantage of the potential of accessibility conceptions and measures. On the one hand this may be a result of the absence of national directives for accessibility planning in Portugal. On the other hand this may result of the difficult operationalization of accessibility concerns and measures for planning instruments. In summary, this research uncovers a number of relevant and pressing research questions for future work within this research field:

- Should land use and transport be managed through separate or integrated planes?
- Should accessibility be an objective integrating land use into transport plans and transports into land use plans, or should it be the object of urban planning in itself justifying the development of accessibility plans?
- How can accessibility concerns and measures be made operational for local planning instruments?

It is thus clear that further discussion and research is required on these research topics.

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Promoting sustainable mobility behaviours of university students: the case of FEUP

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The purpose of this paper is to characterize the mobility patterns of university students and to identify the main factors that influence those patterns. Data was collected through personal questionnaires and field observations, on commuting patterns, individual factors, modal factors and local physical environmental factors. In the last ones, we included distance, public transport network, residential density, sidewalk and equipments availability, highways availability, walking and cycling paths and, finally, students' home accessibility. Participants were a representative sample of students (N = 394) from the Faculty of Engineering of the University of Porto (FEUP), Portugal. We observed that the mobility patterns of FEUP's students are unsustainable, due to their high propensity to use the individual transport (the private car). The results give us new insights on promoting sustainable mobility behaviours, suggesting that distance, density and students' home accessibility are major explanatory factors of such behaviours. We consider that it is essential to find answers to the current problems of displacement of students, in order to promote sustainable mobility, and that such process could be enriched and much more advantageous if ageing people would be considered in its development, as our results on the students' mobility patterns show that it is possible to increase the use of public transport and non-motorized modes, if certain conditions are achieved.

Keywords: Active modes; Porto; Sustainable mobility; University students; Travel patterns

1 Introduction

Transportation systems are a critical element of a strong economy, which contribute directly to building community and enhancing quality of life. Recent awareness of climate change and fuel price crisis has motivated the current debate about sustainable mobility (Hickman and Banister, 2007; Bopp et al., 2011). Sustainable mobility can be summarized as the ability to ensure the displacement of persons and goods, taking into account the society needs, while guaranteeing fundamental values such as environmental integrity, economic efficiency and social equitability. Societies are currently facing unsustainable mobility patterns, due to excessive use of private car as the existing literature shows (e.g. White paper, 2011; Balsas 2003). Mobility patterns based on private car are more harmful to the environment, not only due to high fossil fuel consumption per passenger, but also for the noise, the air pollution and the high rate of soil consumption it implies and finally, because short trips are the most polluting per kilometre (Sanches and Arruda, 2002; Miralles-Guash and Domene, 2010).

The European Commission White Paper report (2011) defends that new transport patterns should emerge. In order to accomplish the above objective claims, a better mobility planning has to be actively encouraged by an efficient framework for transport users and operators. New technologies and the development of adequate infrastructure are required for such. Universities have a central role on finding and promoting new technologies and, new planning tools as well as promoting new behaviours. College students, for their characteristics, are more open-minded to change behaviours, standing as forerunners for society reshaping.

Universities worldwide begin to include sustainability as a strategic priority in their plans and programmes. The increase of accessibility and the dependence on private vehicles reduction are main targets. Transportation demand management (TDM) has an important role on those strategies including measures such as: modal improvements (e.g. car-sharing, safety); pricing incentives/disincentives (e.g. subsidies for public transport, parking policies and fees); physical environment strategies (e.g. increase students housing offer, densities, mixed use development, pedestrian and bicycle friendly development); telecommunications substitutions (internet); technology and efficiently improvement; information and education and participation.

As stated by Miralles-Guash and Domene (2010) successful sustainable transport strategies, stand on a vital network of multiple vectors: a close link to land-use planning, formal governmental backing (through financing, regulations and active support from politicians), a state agency structure organized around integrating transportation with land use and a participatory approach with relationship among new stakeholders; information and communication.

TDM strategies aim to shape traveller behaviours, which are driven by many variables. The selection of the variables to address is fundamental for TDM to be effective. However the literature is not consensual on their identification. An in-depth understanding of the factors influencing the travel patterns and the extent to which these measures can change these conditions is therefore a main problem to address.

Our study aims to assess the degree of sustainability of current student's mobility patterns and to identify the main constraints in achieving it. We have the purpose of discussing possible future actions and incentives to be considered at the Planning level, aiming to address more effectively the mobility demands of the student's population. Under the understanding of our case study we believe other groups, such as ageing people, may benefit of these measures while also contributing for its application.

To present our arguments we expose our theoretical framework, followed by a concise analysis of the local physical environment of our object of analysis, the Faculty of Engineering of the University of Porto (FEUP) Campus. Secondly, we describe the research method, followed by the discussion of the results divided between: Individual factors, Characteristics of transport and Attributes of the local physical environment. The main conclusions of this study close our presentation pointing out to relevant lines for complementary and deepening research with particular emphasis on the physical environment.

2 Travel behaviour, the main factors

According to the literature (Banister, 1994; Næss, 2006), the first empirical studies about travel behaviour were mainly focused on the issue of mode choice, trying to ascertain the preferred mode of transport and understand the reasons for this choice through the concept of *generalized travel costs*. These studies usually include **variables of the trip characteristics − Modal factors,** such as a) travel time factors; b) frequency factors and c) costs factors (Cervero, 2002).

Other variables that can be included in explanatory models are related to **individual characteristics of travellers − Individual factors.** Although not all studies include these factors in their analytical models, and despite the differences between European and North American literature,

it is clear that modal choice is influenced by individual and socio-economic factors. The **Individual factors** can be gender, age, income and car ownership (Cullinane, 2002; Truong et al., 2011), the number of existing vehicles in the household (Sanches and Arruda, 2002; Ewing et al., 2005) as well as socio-economic factors, such as educational level and annual household income (Naess, 2006), the last two are more common in European studies.

The last two decades have been rich in empirical studies focusing on the relationship between **local physical environment** and individual travel mode choice (Rodríguez & Joo, 2004; Pinho et al., 2010). These attributes may vary between: density, diversity of activities, and urban design (Cervero & Kockelman, 1997; Pinho et al., 2010), topography, residential density, presence of walking and cycling paths (Rodríguez & Joo, 2004), neighbourhoods characteristics (Ewing et al. 2005), public transport system and sidewalk availability and quality, highway availability (Boarnet and Crane, 2001; Cervero, 2002; Miralles-Guash and Domene, 2010). Moreover, density is clearly the most studied factor, with several studies finding considerable influence of urban density not only on mode choice but also on travel frequency and travel distance (Næss, 2006, 2011; Pinho et al., 2010). Most of these studies failed to adequately specify these interrelationships in order to assess which environmental factors matter (e.g. Boarnet and Crane, 2001; Cervero, 2002; Næss, 2006, 2011). These studies have an important role in future studies. The main factors that we incorporated in our study are summarized in the next table:

Table 1 - main factors

1. **Modal factors** (trip characteristics)
   a. Travel time
   b. Frequency
   c. Costs
2. **Individual factors (**traveler characteristics)
   a. Age (Cervero, 2002)
   b. Gender (Cullinane et al, 2002)
   c. Status / Occupation STUDENTS (Ewing et al, 2005).
   d. Car onwership (Sanches and Arruda, 2002; Ewing et al, 2005).
   e. Driver's license for car (Naess, 2006)
   f. Arrangements for accommodation (Aláez et al, 1996)
   g. Opinion on measures to be taken for environmental protection /greater sustainability
   h. Review on public transport
   i. Reason for transport choice
3. **Factors related to the local physical environment (**characteristics of the physical environment)
   a. Obstacles on the way home-school
   b. Accessibility in the area of residence (home-school route)
   c. Distance (Naess, 2006)
   d. Population density (number of inhabitants per km2, Rodriguez and Joo, 2004)
   e. Public transport service (Naess, 2006)
   f. Alternative routes (Rodriguez and Joo, 2004)
   g. Parking condition (Ewing e Cervero, 2001)
   h. Mixture of land use / diversity / distribution of activities
   i. Pedestrian infrastructure and cycle paths (Rodriguez and Joo, 2004)
   j. Quality of sidewalk environment (Cervero, 2002)
   k. Traffic jam

Another key aspect concerns the transport modes incorporated in the study, since the exclusion of transport modes in the model analysis can produce false results (Cervero, 2002). Sanches and Arruda (2002) call additional attention to the fact that most models of transportation planning do not include non-motorized transport modes (walking and cycling). These are extremely relevant for being the most environmentally friendly modes of transport, either in terms of noise, fossil

fuels consumption and consumption of ground infrastructure. In addition, the use of active modes, such as walking and cycling, bring major health benefits (improvements in cholesterol and reduced risk of obesity, cardiovascular disease, stroke, and all-cause mortality) because they involve physical activity (Bopp et al., 2011).

3 Main factors influencing college students travel mode choice - attributes of physical environment

Regarding the main factors that influence travel behaviour, there still is a deep gap between studies. Though, in spite of the different authors' approaches we can find some similarities between them.

Most studies concluded that the great majority of the students living near the campus (less than 4km) travel by foot. Conversely, students living further away from the campus are the ones with higher levels of car use (Shannon et al., 2006; Bopp et al., 2011). Distance is relevant. In their study on the University Campus of S. Carlos (S. Paulo, Brazil), Sanches and Arruda (2002) concluded that mix of uses has a positive effect on fostering pedestrian mobility. Rodriguez and Joo (2004) argue that higher sidewalk availability is correlated with a higher propensity to walk. Sidewalks quality and availability is also an important factor to encourage public transport use, since walking is the most frequent way to reach a public transport stop (Sanches and Arruda, 2002; Rodriguez and Joo, 2004).

Several studies suggest that urban centres often have good conditions to walk, offering good quality sidewalks and frequent crosswalks, and central zones have normally higher public transport availability, they also have the high population densities and give users more access to a different number of activities and services. These conditions make the centres privileged places to promote the use of alternative transport modes to the car. In this context, the growing tendency to locate new schools in remote areas, because of higher space availability and lower land costs, may have negative effects on mobility, promoting less sustainable travel patterns (Miralles-Guash and Domene 2010; Bopp et al., 2011; Ewing et al., 2005).

Cullinane (2002) suggests that a good and cheap public transport system can actually change behaviours, giving as examples, the cities of Oxford, Zurich and Freiburg. In fact, public transport subsidies play an important role on mobility policy with effective results (e.g. *Unlimited Access* in EUA and *third-payer system* in Belgian).

4 Study Context

The population of this study is dispersed by a large number of municipalities, mostly part of the Metropolitan Area of Oporto (MAP). Within MAP Greater Oporto encompasses six different municipalities (Gondomar, Maia, Matosinhos, Oporto, Valongo and Vila Nova de Gaia) with independent local administrations, though they are characterized by a large urban continuum, involving a total area of 815km2 and about 1.3 million inhabitants. It reveals high population densities around a central area, the city of Oporto where employment is clearly more centralized. In the last decades population, as well as businesses has been spreading outwards.

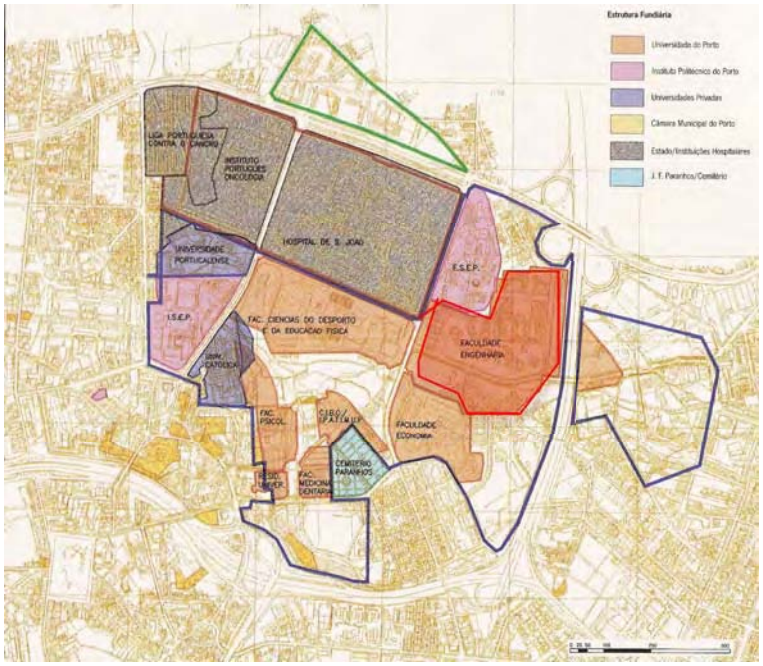

Figure 1 – Land use (11 University bukdings: orange, pink and blue, FEUP is red and 3 Medical School and Research Buildings are brown

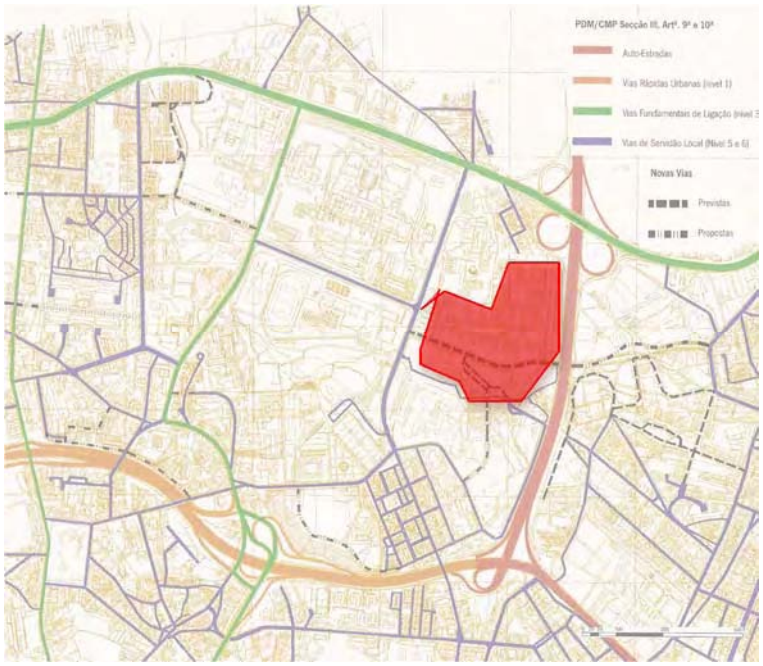

Figure 2 - Road infrastructure around FEUP (red) (source FDC, 1998)

FEUP is included in Polo II, the biggest university campus of Oporto, with eleven faculties and research centres that lie aside with two major health services, São João Hospital, and the Oncology Centre, (Figures 1 and 2). These public services generate a large traffic concentration while they have amongst their usual users ageing people and others groups of reduced mobility demanding specific accessibility conditions.

This area, Polo II, is framed between two ring-road motorways (VCI and *Circunvalação*) and a motorway (Figure1 and 2), which turns them into an important node of entrance to Oporto aside to a major transport activity generator. They are located at Oporto northern limit facing the municipalities of Matosinhos, Maia and Valongo, fact that penalizes them for a clear lack of coordination at municipal planning level. Together these conditions turn a potential centrality into an isolated island with low connectivity to the surrounding area and lack of good walking conditions, and adequate crosswalks.

The Polo II has been de object of several local plans; nevertheless, they have been continuously neglected by the main players. For a long time it was governed, according to the PDM (Oporto Master Plan), by principles of landscape protection and the principles of limited functionality 'educational and cultural services' frequently seen as a handicap, by leaving little room for other basic urban facilities (other services, commerce and housing). (FDC, 1998). With regard to topography, the Polo II integrates a flat territory, with only some slight variations of relief. It was part of a rural area that until recently represented one of the main vacant areas of the city. Currently, this zone is characterised by the presence of large office, educational and health related buildings, located on large plots with low urban permeability.

5 Travel behaviour of ageing people

In the 21st century, a rapidly ageing population represents one of the main challenges for developed countries (e.g. Hjorthola, 2010). In Portugal, the 2011 CENSUS results show that the population over 65 years old presently represents 19% of the total, against only 8% in 1960 (INE, 2011).

There is by now quite a substantial body of literature discussing the impact of an ageing population in developed countries on travel needs and required changes to transport policy. (Schmocker, and Patterson. 2010). According to literature (Hjorthola, 2010; Truong and Somenahalli, 2011) ageing people increasingly reveal an extension of their active life mobility habits after retirement, resulting in growing car use (car ownership and driving licence increase for this group). Many older people consider motorised transport as having potential for increasing theirs independent travel in later age. They are mostly related with a demand for larger movement freedom in their daily routine concerning shopping facilities, health services, leisure activities and social life.

Moreover, when changing their housing conditions, proximity to the referred above services is also a main concern (Truong and Somenahalli, 2011). The key point seems to lay in the walking path from these services to the public transportation network stops. Conversely, ageing people with less personal resources were found to be associated with higher public transport use and lower mobility rates (Mercado et al., 2010). Strategies and investments adjusted to mobility concerns in an ageing society remain unaddressed. Social equity should certainly be attended in such case. In this context, free senior travel or other incentives have an important role in societies.

In summary, older people are not a homogenous group and they also change (age) relatively fast with time. Older people belonging to low income groups rely more on public (and social) transport resources. In many cases it is more economic and effective to provide special transport services than to improve the accessibility of traditional public transport to older people (Su and Bell, 2009).

6 Travel patterns of FEUP's students

6.1 Research Method

For the present study, a personal survey was designed to provide information about the travel patterns, main obstacles, motivations and reasons for mode choice and accessibility in their area of residence. The target population consisted of 5177 students enrolled in anyone of the different study programmes on offer by FEUP, in 2005/06. The process of data collection took place during the month of May 2006. In order to obtain a representative sample, we used the method of random selection of sampling, selecting initially a group of 400 students out of the total 5177 enrolled at FEUP, according to the proposal of Krejici and Morgan (1970, in Almeida & Freire, 2003). A total of 400 students were selected through a stratified sampling method. Stratums were created by degree (among twelve different degrees) and year (first to fifth, including BSc and MSc). We validated 394 questionnaires. One third of the respondents (130) were female and 67% (264) were male, with an average age of 22 years old (minimum 18; maximum 46).

Due to the specificities of the target group – university students - the structure of the questionnaire was in line with the questionnaire of Aláez et al. (1996), concerning college students from Bilbao. With regard to questions of opinion, the work of Cullinane (2002) provided a better understanding of the study population and how questions should be directed. Relying also on the literature about the main factors influencing mobility patterns, we selected a set of questions, divided into three parts, which were represented on the second chapter of this article, synthesized in Table 1. The final questionnaire is summarized in Table 2.

Table 2: Questionnaire in settings

I.	modal breakdown (get to college)
II.	travel time and cost
III.	main obstacles faced on the way home-college
IV.	opinion: main reason for mode choice
V.	accessibility of individuals home's place
VI.	individual factors

We intended to build a short questionnaire that allowed for a rapid collection of relevant information and with an average response not exceeding 5 minutes. Several versions of the questionnaire were tested, in order to ascertain the clarity of the issues, possible problems, time spent in its completion and possible suggestions. The data were collected and analysed using the Statistical Package for the Social Sciences (SPSS). Bi-variate and multivariate analyses were conducted to examine the relationship between variables. In order to determine significant differences between variables, numeric variables were analysed using a T-test or ANOVA and categorical variables we used χ^2 – test.

6.2 Main Results

I. modal breakdown

The private car is the mostly used transport mode among FEUP students, with a share of 48% (30% travel alone, while 18% rideshare). 32% of respondents walk to the faculty (only considering trips over 5 minutes), although only three fifths travel exclusively on foot (18%), while the remaining two

fifths (14%) do it in combination with bus and metro. The bus is used by 12% of the respondents, and 14,2% of students combined the bus with other mode of transport; the metro used by 3%, and 12% used metro combined with other mode of transport; the train by 3%.

II. travel time and cost

The average time of home-college trips is 30 minutes, but the high standard deviation (20,8 minutes) suggests a wide dispersion of results around this reference value. Students travelling by car are those who claim to spend more money on travel, with an average of 60 euros per month. Students travelling by motorcycle spend on average 53 euros per month; and metro and bus users spend an average of 32 and 31 euros per month, respectively.

III. main obstacles faced on the way home-university

Concerning the main obstacles faced by the students in their daily journeys, the existence of traffic jams is referred by 64.2% of the respondents. This obstacle is targeted both by students travelling by private car and by public transport. Difficulty of finding a parking place is the second most cited obstacle, referred by 29.4% of the respondents. Although the FEUP car parking is quite large – with about 950 parking spaces distributed among staff, faculty and students – almost one third of the students revealed to have trouble finding a place to park the car, which is probably a consequence of the large number of students who travel by car alone.

IV. opinion: main reason for mode choice.

Fastness is the most appointed reason for choosing to travel by public transport (46% of the respondents), followed by comfort (28%), travel cost (16%), having no other option (16%), depending on the schedules (11%) and, finally, other reasons, such as living near the college (5%), are the other main reasons for students to use public transport**.**

We observed that people who do not use public transport seem to have a worse opinion about the service than public transport users. In order to assess the degree of satisfaction with the public transport service of both groups (public transport users and non users), we resorted to the Mann-Whitney nonparametric test, with a level of significance of 0.05 (since we used an ordinal scale). Results show that there are statistically significant differences between the two groups, with people who do not use public transport having a worse opinion ($z = -2.2006$, $p = 0.03$).

V. accessibility of their home place to university

Regarding public transport availability, 70% of the respondents claiming to have a bus stop less than 400 meters away (or five minutes walking) of their home. However, only one third of these have access to direct routes to FEUP's area. 23,9% of the students have a metro station less than 400 meters away from their place of residence. However, considering that sidewalks are the most obvious way of reaching a bus stop or a metro station, we realize that most students have poor conditions either to walk to a public transport stop, which is, according to the literature, a fundamental factor to encourage public transport use (Cervero, 2002; Sanches and Arruda, 2002; Rodriguez and Joo, 2004). Only 37% of respondents claimed to benefit from wide and comfortable sidewalks. On the

other hand, about the same percentage of the population under study claims to have at its disposal arterial motorways nearby, promoting the use of private transport (Cervero, 2002).

7. Discussion results, factors influencing modal choice

For this purposes, the different transport modes were grouped into three categories: private transport, public transportation (metro, train and bus), and non-motorized modes (walking and cycling). In this analysis we only included the sample of students using a single mode of transport (80%, 313 out of 394).

Table 3 – Transport mode characteristics, reasons for its choice and obstacles.

		Modal break down	Average time (min)	Average cost (euros)	Reasons for the choice of this mode	Major obstacles found on the journey
a) Private transport (car)		52%	24'	€60	51,2% - fastness 40,9% - comfort	92,1% - traffic jams 62,4% - lack of parking
b) Public transport	bus	21%	37'	€31	34,4% - no other option 31,2% - cost	83,9% - traffic jams 67,9% - low frequency and delays
	metro				41,7% - comfort 25,0% - fastness	33,0% - transfers 25,0% - sidewalk conditions
b) Non-motorized modes		24%	16'	€2	46,7% - fastness 28,0% - cost	65,3% - walking paths/ sidewalk conditions 53,3% - pollution

I. Characteristics of the Transport Mode

The Table summarizes some of the most important data from the survey, related to these transport modes.

We decided to use a nonparametric test, since preliminary analysis showed that the data did not meet the prerequisites for the use of parametric tests.

a) Private transport (car):

The data obtained in our study show that, when compared to other motorized modes, private car is the **fastest** (z=-5.165, p=0,000). As the literature reports, the car is distinguished from other modes of transport due to its specific characteristics: flexibility; enabling door-to-door transport; greater freedom for a wide variety of destinations and activities; social status (due to bad publicity and poor image of public transport); and allowing people to move to considerably longer distances in less time. Despite all these advantages, the levels of accessibility by car depend on traffic conditions and parking space (Nielsen & Jespersen, 2001). Analysing the results regarding the major obstacles faced by students using the car, we conclude that traffic jams (92.1% of the respondents) and difficulties of parking (62.4% of the respondents) are the most often identified obstacles. It is thus understandable that this barrier is not enough for users of private transport to start looking for alternatives.

b) Public transport:

Public transport is the most **time consuming** transport mode, with public transport users taking on average 37 minutes – SD=21.0; 5 minutes (min.) and 100 minutes (max.) – on their way to the college. It's important to note that 'having no other option' was the main reason for the choice of

public transport (23.5% of the respondents). Our results also show that the main obstacles faced by bus users on their trips to college are traffic jams (highlighted by 83.9% of the students); and lack of regularity and punctuality (67.9% of the respondents). Both obstacles seem to be related to travel time, unlike metro.

Although few students use exclusively the metro – and therefore caution is required when analysing the results, survey data show that students indicate more often the following reasons to use the metro: comfort, with 41.7% of the respondents (which corresponds to the second most cited reason by car users) and fastness, 25.0% of the respondents, corresponding to the first reason given by users of the car and non-motorized modes. It seems that, from the students' viewpoint, the metro offers closer advantages to the car and may be a viable alternative to private transportation. The main obstacles identified by students who are moving by metro are, firstly, transfers (33% of the respondents) and, secondly, sidewalks degradation (with 25% of the respondents), a reason also pointed out by users of non-motorized modes. Since public transport users normally also walk very often (namely to reach public transport stops), these users are sensitive to the same characteristics of the physical environment as walking and cycling users (Cervero, 2002).

c) Non-motorized modes:

Concerning non-motorized modes, results show that students travelling by walking or bike are those that take less time in their daily journeys to college, with an average travel time of 16 minutes – SD=5.8; N=75; 5 minutes (min.) and 30 minutes (max.). The main reason given for choosing these modes is fastness, with 35 responses (46.7%)). The second mostly cited reason is cost. 65.3% of the students travelling by non-motorized modes point out the deterioration and lack of continuity of sidewalks as the main obstacle they face in their home-college trips, while 53.3% highlighted noise and visual and atmospheric pollution. Therefore, students travelling by non-motorized modes, despite not suffering from problems related to congestion, they suffer from problems derived in part from congestion, such as noise, air and visual pollution, while they are the ones who are mostly vulnerable to the obstacles of the physical environment (Cervero, 2002; Ewing et al. 2005).

II. Individual factors

The analysis by **gender** revealed that no significant differences were found between genders (χ^2 test). In order to verify whether the respondents' **age** is related to mode choice, we used the Kruskal-Wallis test at a significance level of 0.05. The results showed that car users are, on average, 23 years old (SD=3.92), while 21 years old is the average age for students using public transport (SD= 2.45) and non-motorized modes (SD = 2.65). The results also showed that students using the car are older than the ones using public transportation (z=-4.125, p=0.000) and non-motorized modes (z=-2.555, p=0.011). The great majority of the surveyed students (87%) have a **driving license**. In fact, 72% of students who use public transport, as well as 80% of those travelling by foot. Concerning **car ownership,** about half of the students (50,3%) responded positively. The tendency for car owners to use the car is, not surprisingly, statistically significant ($\chi^2(2)=80.612$, p=0.000). The literature seems to be in agreement on this issue: several authors (Cervero, 2002; Naess, 2003; Sanches and Arruda, 2002; Ewing et al., 2005) argue for the importance of car ownership influencing travel behaviour, namely promoting car use.

In this study, we also wanted to assess the type of **housing regime** of students. Our results show that 58,8% live with their families, and most of these students (68,5%) use the private car. Students living in a rental place 23,4%, use non-motorized modes (66.7%). The vast majority of students residing in rented houses or in university residences live near the college. Some caution in interpreting these results is needed, since the type of accommodation is associated with other factors that may also influence modal choice, such as the distance between the university and the place of residence.

III. Attributes of the local physical environment

Finally, we analyse the factors related to the physical environment that may influence the mobility patterns of FEUP students. The aim is to verify if the specific characteristics of the place (distance, equipment, accessibility and transport network) also influence travel choices. Complementary to the data on the destination – the area around FEUP – we analysed the information concerning the origin, collecting data on the students' place of residence (Figure 4). Once the students of FEUP are spread over a fairly wide area, we tried to cluster the residential areas into several different zones, according to two different criteria: distance between FEUP and the place of residence; and the specific characteristics of the physical environment of the place of residence, including natural obstacles, accessibility to transport and population density, resorting to census data (INE, 2001). Accordingly, we defined the following areas of residence showed in table 4.

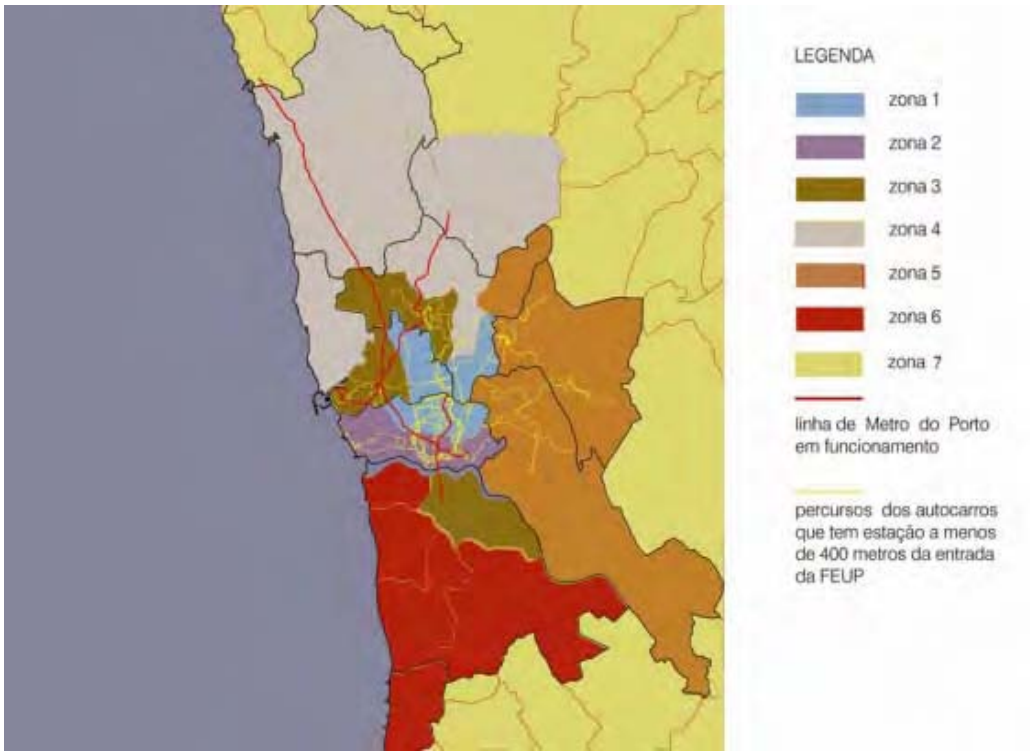

Figure 3: Map with zones of residence

Table 4: Zones of residence (see also Fig. 3)

Zone 1:	33,4% of the students live in this area. It is the closest to the college, has a density of 44,25 inhabitants/ha and it is well served by the public transport system.
Zone 2:	Has the highest population density (79,67 inhabitants/ha) and it has also good accessibility to different transport systems. 14.9% students live here.
Zone 3:	Includes areas outside Oporto. It is served by a varied public transport network and it has a population density of 29,70 inhabitants/ha. 15,5% of the respondents live in these areas, where a trip to FEUP by metro accounts for less than 30 minutes,
Zone 4:	Concentrates the areas outside the city of Oporto that have access to the metro network, although a trip to FEUP takes more than 30 minutes. It has a population density of 6,90 inhabitants/ha and 3,4% of the respondents live here.
Zone 5:	Corresponds to eastern areas outside the city of Oporto, on the north margin of the Douro River. These areas are not served by the metro system and have an average population density of 16,80 inhabitants/ha. 9,1% of the respondents live here.
Zone 6	Areas outside the city of Oporto, to the south side of the Douro River, which have no accessibility to the metro system. This zone has an average population density of 17,00 inhabitants/ha and it holds 12,5% of the respondents.
Zone 7:	Consists of the most distant areas that are not included in any of the other groups. 10,1% of the respondents live in these conditions.

Is distance a factor in travel behaviour?

According to our results, students residing in zone 1 – the areas surrounding the FEUP's area – are the only ones who prefer to use non-motorized modes in their daily commutes, with 46% of the respondents (58 out of 126). As distance between residence and the campus increases, we observe a decrease in the proportion of students using these modes. Therefore, there appears to be an effect of distance on modal choice, with students who live near the college having a greater tendency to travel by non-motorized modes. These results are consistent with the study of Naess (2003), which showed that the distance was an influential factor.

A better offer of public transport is a relevant factor in modal choice?

The results showed that in zone 3 most students (54,1%) use public transport in their daily trips, contrarily to what occurs in the other areas. We remind that this area is served by a wide variety of public transport, including the metro. Such condition in clearly expressed in their main reasons for the mode choice: comfort and fastness. Zones 1 and 3 correspond to those that are best served by public transport (bus and metro networks), although they present different mobility patterns. On the other hand, when looking to the south bank travellers' behaviour of zone 6, we verify they also have a larger use of public transport, though in this case it is mostly related with having no other option, and also with the cost. Low rate of car ownership and traffic jam problems related with bridge crossings may justify such results. In this sense the recent expansion of the metro line to this area may improve its connectivity with a larger offer, avoiding modes interfacing (one of the biggest identified problems).

Good public transport network is related to population density?

Zone 1, 2 and 3 are also the ones with higher population densities: 44,25 hab./ha (zone 1), 79,67 hab./ha (zone 2), and 29,7 hab./ha (zone 3). As argued by Rodriguez and Joo (2004), higher population densities tend to promote the use of non-motorized modes, a situation that occurs in zones 1 and 2. It is also associated with mobility patterns that favour public transport use (Ewing & Cervero, 2001), which occurs in zone 3. It seems, however, that distance has an important role here too, being difficult to discern which factors contribute more to the modal choice. Probably these

factors influence one another: for large distances, the density can be an irrelevant factor for the use of non-motorized modes, but not for shorter distances. It is therefore necessary to interpret the residential density with caution, since other factors may overlap its importance, as argued by Ewing and Cervero (2001).

In summary, we conclude that distance affects modal choice, noting that, for short distances, students prefer to use non-motorized modes, while the car is preferred for longer trips. Another factor related to the physical environment that seems to influence the modal choice is public transport availability in the area: when there is a good public transport system with direct routes, students tend to use this mode more often. However, in our study, this factor is not entirely independent from distance and density. The areas providing a better public transport service are normally located closer to the FEUP's area, and as advocated by Naess (2003), distance factor prevails over a good public transport network.

7 Final Remarks

In this article we began by defining that mobility patterns based on individual transport are more harmful to the environment, not only due to high fossil fuel consumption per passenger, but also for the noise, because of the high rate of soil consumption (either in car parking or in several other infrastructures needed for its operation), and because short trips are the most polluting per kilometre travelled (Bopp et al., 2011). Our results are clear: the mobility patterns of FEUP students are not sustainable, due to the high propensity to FEUP's students to use the car on their commuting to college.

This study aims to assess the degree of sustainability of current mobility patterns and to identify the main constraints in achieving it. We have organised our explanation around three main groups of factors able to influence travel behaviour. This conceptual framework allows us to understand how to promote more sustainable travel behaviours. The results of our study showed that mobility patterns are influenced by several main factors: Modal Factors, directly related to the modes of transport (such as fastness); Individual factors (such as age); and factors related to place of residence (such as density, public transport system and the availability of public transport with direct routes) which appear to influence the choice of transport mode. Some of these factors are sometimes interrelated, which in our study occurred with distance, population density and public transport availability; or with distance and type of accommodation. Therefore, understanding the role of each factor is extremely difficult and requires caution.

The results revealed that subsidies for public transportation and small changes along metro and bus routes, meeting the specific travel needs of the student population, would cause a considerable shift from car users to public transport. The metro line network should also benefit from the ring effect, with the introduction of a new circular line. Other important measure aiming to increase the attractiveness of public transport must necessarily consider the reduction of time, through real-time information at bus stops and giving new tolls and activities to use during the time trip. Promoting inclusive solutions, where these two major groups of public transports users (students and ageing people) are considered and related, would have not only functional and economical benefits but especially social ones. We should not forget that Portugal has a growing ageing

population where social inclusion solutions should be preferred. Furthermore, as presented in this study students and ageing people have complementary daytime movements, allowing a better management of the fleet. If incentives are coordinated, this optimization may have better results.

Among individual factors, results indicated that age affects modal choice, with a tendency for older students to use the car more often. In this context, it seems important to focus on the younger population. Since younger people have a greater propensity to use sustainable modes, it may be more effective to encourage the continuity of mobility patterns that already occur than to change behaviours. The results also revealed that car ownership is an important indicator of travel behaviour, as suggested in several other studies (Cervero, 2002; Ewing et al., 2005). In our study, most students who have their own vehicle use it.

The results reveal that students who normally use public transport on their commuting most of the times combine it with other modes. Furthermore, our study also reveals that people who use active commuting (walking or biking) are more sensitive to local physical environment. We found that people who combine the public transport (metro or bus) have to walk more than five minutes in the end of their journey. In this way, we should give special emphasis to the attributes of the local physical environment of FEUP. Furthermore, the fact that a vast majority of students using public transport point out traffic jams as the main obstacle they have to face in their daily trips, makes imperative the design of bus lanes connected in ring in a real network, integrating the city with the faculty area.

Our study reveals that students residing in rented houses live near the college and these students usually commute by foot to college. Home-college proximity is a condition capable of promoting more sustainable mobility behaviours, which is in accordance with the results of other studies (Naess, 2003, Ewing et al., 2005). Urban planning policies for university campuses should encourage the students to live nearby, either by the construction of student residences or by rent housing incentives directed to this specific group, where the University may play a main role as a coordinator.

Regarding the travel options for longer distance house-college trips, our study reveals a different scenario: the preferred transport mode is generally the car. However, in residential areas with access to a wide public transport network with direct routes to the destination, as in one of the analysed zones (zone 3), students use collective modes more often. In this context, and as suggested by Naess (2003), public transports can, under certain circumstances, be a viable alternative to private transport. Students and ageing people, represent potential main users of public transport. As argued, if one is used to perform sustainable behaviour, in the future will have more propensity to keep such conduct. Our study also reveals that these students, as the students who commute by car, have a worse opinion about the public transport service than the ones who use it.

In conclusion, we consider that it is essential to find answers to the current problems of displacement of students, in order to promote sustainable mobility. Such process could be enriched and much more advantageous if ageing people would be considered in its development. In addition, our results on the students' mobility patterns show that it is possible to increase the use of public transport and non-motorized modes, if certain conditions are achieved. Furthermore, finding strategies to promote more sustainable mobility patterns to specific traffic generators is relevant to

other environments such as shopping malls, sciences parks and hospitals. In fact, as we will see, in face of our findings, and under an updated literature review, we consider the relevance of attending ageing people mobility patterns, complementary to the university students in the Portuguese context.

8. Some Guidelines

In this scope, the study of FEUP college students' mobility is particularly relevant, because students and ageing people share the same physical space to commute to FEUP and São João Hospital and other related services. In fact as our study pointed, Polo II is located in a node of ring roads, which converts this area in an island, a fragment of the city that urgently needs to be integrated. Conversely, the high connectivity to the highways network promotes the use of car. On the other hand, it would be important in future studies to verify if and how the results would vary in another environment, with different conditions (location, connectivity, mix-use). Despite the relevance of this case study, other situations, such as faculties placed in the inner-city and campuses with different connectivity to the city area, also frequently exist and would present comparative results to our research.

The Campus area faced several unsuccessful plans. For its complexity and importance to the city we consider being necessary for the University to understand that the population who uses this area is temporary, therefore it is not considered in the political agenda of the Oporto municipality. Moreover, different municipalities have independent local administrations with local policies and land-use plans. As we verify in several universities worldwide it is mandatory for the University to promote the conciliation of its students interests with the city. It has to assume its role has a relevant social player promoting its own strategies in key issues such as mobility, housing policies or health promotion.

Promoting sustainable mobility behaviours is one of the main challenges faced by universities. TDM strategies have been implemented on several universities with effective results. It is necessary that these benefits become explicit. Under the present economic and social crisis, it becomes more difficult to justify such measures. A pedagogical approach with good communication strategies that clearly explains both environmental and social benefits of this policy, as well as the individual benefits, is fundamental.

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