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MOBILITY AND ACCESSIBILITY OF THE AGEING SOCIETY

DEFINING PROFILES OF THE ELDERLY
POPULATION AND NEIGHBOURHOODS

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ABSTRACT

A large body of literature already explores how mobility is associated with the well-being and quality of life in elderly people. However, many studies so far have been widely discipline specific. This paper aims, thus, to critically review relevant mobility- and accessibility-related studies that, from different disciplines, focus on the well-being of the older adults. To do so, the Capabilities Approach is assumed as a theoretical perspective able to convey how individual well-being is differently shaped and experienced by each person. More specifically, this study intends to consider how to define profiles of ageing mobilities, discussing a methodology for detecting different elderly populations and neighbourhoods. The relationship between urban mobility and quality of life in fact differs according to the examined populations and settings, involving features that are peculiar of the elderly. The possibility to define profiles contributes to develop different "narratives of ageing" that, according to this group of population and their territorial context, allows a more precise understanding of how varied forms of mobility contribute to a differently defined well-being and quality of life. The expected outcomes of this study are twofold: (i) to provide a theoretical framework with the complexity of factors in mobility, in order to be applied in future empirical research studies, as a basis for further analyses with quantitative and qualitative methods; and (ii) to introduce a methodology for defining profiles of ageing mobilities, considering elements that may be differently inflected according to the setting taken into exam.

KEYWORDS

Ageing population; Mobility and Accessibility; Profiles of the Older Adults; Well-Being and Quality of Life

1 INTRODUCTION

Everyday urban mobility is increasingly discussed as a fundamental contributor to individuals' well-being and quality of life (hereinafter QoL). A growing literature deals with varied forms of mobility and their manifold consequences on individuals and societies. Mobility in fact is a differentiated capacity to be mobile, differently available to each person depending on one's own individual, social and spatial characteristics (Flamm & Kaufmann, 2006; Kaufmann, 2002; Kaufmann et al., 2004). Each person may differently use or not this capacity, depending on his/her personal needs and wants (Ferreira et al., 2017). However, in contemporary societies "the need to be mobile, at least virtually, has become incorporated in people's lives" (Kellerman, 2012), particularly for reaching those goods, services, places and people that may matter to each person (Cass, Shove & Urry, 2005) and are necessary not to be socially excluded (Kenyon et al., 2002; Lucas, 2012; Preston & Rajé, 2007; Stanley & Vella-Brodrick, 2009).

relationship between urban mobility and QoL has been explored in relation to specific urban populations, amongst them the elderlies, which are the focus of this paper. The reason for dealing with ageing populations is at least twofold. On the one hand, particularly in the Western World one of the main issues that many cities of today are facing is the progressive ageing of population: as for the European Region, considering the 28 member states, it is estimated that nearly 25 percent of the population in 2030 will be above 65 (Population Reference Bureau, 2006). On the other hand, travel-related abilities change over one's life and tend to increase with age (Stjernborg et al., 2015), with relevant consequences on the individual well-being.

Consequently, the manifold contribution of mobility to the QoL requires to discuss how mobility and well-being are differently shaped and related to each other in the case of ageing populations. The paper, thus, aims to discuss a conceptual framework for the mobility and the accessibility of the ageing society, by drawing on a critical review of the relevant interdisciplinary literature discussing the mobility of the elderlies and its contribution to their well-being.

In general, well-being is a complex and fuzzy concept: while some studies differentiate between the two terms well-being and QoL, in this paper we use them interchangeably but assume a clear theoretical stance, based on the *Capabilities Approach* (Sen, 1985, 1992, 1999, 2009). The approach in fact assumes well-being as overall aim, but gives a primary space to individuals: it recognizes that individual well-being is differently shaped and experienced by each person, and focuses on "the freedom that a person actually has to do this or be that – things that he or she may value doing or being" (Sen, 2009). More specifically, this study intends to consider how to define profiles of ageing mobilities, discussing a methodology for detecting different elderly populations and neighbourhoods.

Existing frameworks dealing with elderly mobilities in fact tend to privilege different perspectives: the factors determining the ability to move of ageing people (Goins et al., 2015; Umstattd Meyer et al., 2014; Webber et al., 2010); the contribution of mobility to the well-being of the elderlies (Nordbakke & Schwanen, 2014; Ryan et al., 2015); or the setting of priorities for inclusive transport systems, focusing on ageing, impairments and travels (Martens, 2018). Instead, this study intends to define profiles for developing different 'narratives of ageing' (Bruner, 1999): according to the subjects and their territorial context, these may allow a more precise understanding of how varied forms of mobility contribute to a differently defined well-being and QoL. Furthermore, such narratives may enhance the design of different planning and policy measures contributing to the elderly well-being.

The paper is structured as follows. The methodological discussion moves from a review on relevance of mobility in relation to well-being, to a focus on the ageing population considering the specific opportunities they have in both the place-based and people-based features that impede or enhance their ability to move. Drawing on these elements, profiles of populations and neighbourhoods are discussed. On the one hand, profiles consider a person's mobility (ability to move) and movement (putting this ability into practice), investigating if people can move and how they do so. On the other hand, with relation to neighbourhoods, the profile considers the opportunities they offer (an accessible set of significant opportunities at the local scale) and their mobility provisions (degree of accessibility to the other areas of the city), investigating if people need to move to access opportunities and whether they can do so.

2 MOBILITY AND WELL-BEING: A CONCEPTUAL FRAMEWORK

In general mobility is defined as the ability to travel (Giuliano et al., 2003); the ability to move (independently or using assistance or transportation) from one space to another; from home to the neighbourhood and beyond (Webber et al., 2010). Others provide a more detailed definition of mobility: to be able to travel where and when one desires; to be informed about travel options and how to use them; to be able to use them while having the means to pay for them (Suen & Sen, 2004).

For Flamm and Kaufmann (2006) mobility is concerned with three main factors: (i) *access* (range of conditions under which available options may be used); (ii) *skills* (required in order to plan activities); and (iii) *cognitive appropriation* (the evaluation of the available options vis-à-vis one's projects). Well-being is a complex and fuzzy concept. While some studies differentiate between the two terms well-being and QoL, in this paper we use them interchangeably. Moreover, our focus is on individual well-being and conceptions of well-being at the level of communities, regions and countries are not included. In this study, mobility is assumed as an important element affecting the well-being and QoL of the elderly.

Nevertheless, only a limited number of studies have specifically studied this issue. Among them is the empirical study by Musselwhite and Haddad (2010) in UK, which emphasises the role of mobility and accessibility in the older adult's self-reported QoL and identify their perceptions as needs for accessibility, being independent, and travel for its own sake. Within a wide literature that associates mobility to well-being, QoL and social inclusion (Banister & Bowling, 2004; Nordbakke & Schwanen, 2014; Stanley & Vella-Brodrick, 2009), a capabilities perspective on urban mobility may provide a "more general" (Alkire, 2005), yet more sensitive approach to mobility in terms of its reflections on individuals' freedoms and aspirations; while bringing the gap between objective and subjective approaches to well-being (Gasper, 2007). The Capabilities Approach (CA), introduced by an economist Amartya Sen, in fact conceptualizes one's well-being in terms of his/her "freedom to lead one type of life or another" (Sen, 1992); individual capabilities, defined as the "freedom that a person actually has to do this or be that – things that he or she may value doing or being" (Sen, 2009). Mobility can be thus considered as one of the capabilities available to a person and contributing to her well-being (Beyazit, 2011; Hananel & Berechman, 2016; Nordbakke, 2013; Pereira et al., 2017; Ryan et al., 2015).

However, different are the conceptualisations provided in the literature, so that here a framework based on the shaping and the use of mobility is provided (Vecchio, 2018 for an extended exposition).

The use of mobility is crucial to define the manifold ways in which mobility may contribute or not to the individual well-being. In fact, since different is the use of each capacity, "whether opportunities promote well-being depends on how they are used" (Gasper, 2007). The main contribution is probably given by the instrumental use of mobility, as a way to access activities, values and goods (Cass et al., 2005), achieve a

minimum living standard (Smith et al., 2012), and sustain meaningful relationships (Larsen et al., 2006; Urry, 2007). Mobility could also be valuable in itself: for the travel experiences it allows (Goodman et al., 2014) or the health benefits that some practices may generate (Vale et al., 2016). However, also the voluntary decision not to move when possible may be significant in terms of individual freedom and well-being (Ferreira et al., 2017). Here, mobility was briefly sketched as a capability that contributes to the individual well-being; nonetheless, its composing elements need to be defined in relation to the specific needs and wants of elderly populations.

3 TRAVEL BEHAVIOURS: ELDERLY MOBILITIES AND NEIGHBOURHOODS

While older adults tend to travel more frequently than non-elderly (Paaswell & Edelstein, 1976), the frequency of journeys made by older adults is found to be decreasing with ageing (+60) (Boschmann & Brady, 2013), with walking to appear an exception (Carp, 1971). Determinants of travel behaviours may concern endogenous factors (age and gender) as well as the exogenous ones (socio-economic and contextual features) (Bamberg et al., 2011). Within the more recent and rather scant literature, Schmöcker et al. (2008) have discovered that older adults prefer the modes with more independent mobility, the use of taxis become more frequent with ageing, yet also the positive correlation between accessibility measures (bus stops and rail density) and the use of public transportation.

Underling the importance of improving public transportation for the older adults, Sundling's (2015) study on elderly's travel motives to shift their modes of transport suggest designing services to strengthen the feeling to having control throughout the journey; extended personal service along the trip and making this mode attractive and safe to use.

For the purpose of this paper, people-based and place-based features are referred to as the characteristics that influence the shaping of urban mobility. Whether to focus on improving opportunities for individual or the qualities has long been controversial in urban policy debates (Bolton, 1992), yet some scholars have emphasised the importance of both place- and people-based development policies for a more effective and efficient interventions (Barca et al., 2012).

Several features define both individual mobility and the opportunities that one values, and how to access them: The *people-based characteristics* refer to the subjects who move, while the *place-based features* characterize the urban settings that they differently appropriate through mobility. Such features, widely discussed in the academic literature, are all those characteristics that facilitate or impede mobility, that is, they constitute resources or constraints.

The people-based features that contribute to the shaping of mobility comprise attributes of the individuals: the socio-economic conditions, widely investigated in terms of income and how this allows or not the usage of public transport services or private vehicles (Guzman & Oviedo, 2018); the physical and the cognitive abilities of subjects, two features that are often intertwined – especially in the case of ageing populations (Ryan et al., 2015); the perceptions, related to mobility itself, to the travel experience with specific modal options, or even to one's ability to move, which condition the person's willingness to move (Nordbakke, 2013); and the personal attitudes, including for example one's needs and wants whose pursuit depends also on mobility (Cass et al., 2005).

Instead, place-based features include a number of attributes of the spatial setting under exam: a number of stable contextual characteristics such as territorial structures, population dynamics, socio-economic trends, and spatial policies (Kaufmann, 2002), which also define the distribution of opportunities (Zali et al., 2016) and, consequently, the structure of trips in one territorial setting; the physical features of spaces that could

result inadequate for the needs of different groups (Meşhur, 2016); and elements specifically related to mobility, such as transport infrastructures and services. These features are considered mainly as independent variables that define contextual spatial and temporal conditions (Ryan et al., 2015) and influence the overall accessibility of an area (Rashid et al., 2010). Spatial features are relevant in relation to what they mean to people: a good example in this sense are the 'spatialities of ageing', which highlight how "both spaces and old age as a social category co-evolve and are continually being made and remade" (Schwanen et al., 2012).

4 TOWARDS PROFILES OF AGEING MOBILITIES AND NEIGHBOURHOODS

Considering the place-based and people-based features that dynamically define different forms of individual mobility, it is possible to define, accordingly, different profiles of ageing mobilities. Drawing on the elements highlighted in sections 2 and 3, the definition of profiles is an incremental process based on two steps: first, it draws on the conceptualisation of mobility as a *capability*: a differentiated ability that each individual may have or not (defined as *mobility*) and may consequently put into practice or not (referred as *movement*); second, it assumes that the main contribution of mobility to the individual well-being is conveyed by the access to valued opportunities, which could be available or not at the scale of the neighbourhood, or could be reached thanks to the local mobility services.

The definition of profiles, then, considers how the elderly differently shape and use mobility, examining also how the provision of valued opportunities and mobility services is diverse in different typologies of neighbourhoods. The proposed conceptualisation draws on a critical review of the existing literature and intends to valorise two elements.

In relation to ageing populations, it is possible to emphasise the individuals' freedom of choice over alternative lives (Sen, 1990), considering their ability and the consequent decision to move or not in order to reach specific opportunities. In relation to neighbourhoods, profiles privilege an operational dimension since they allow to focus on measures that may address the provision of mobility services or valued activities.

The added value of an approach based on capabilities are in fact its operational impacts, which allow to "include indicators such as quality of life and well-being" (Beyazit, 2011). Therefore, "instead of asking about people's satisfactions, or how much in the way of resources they are able to command, we ask, instead, about what they are actually able to do or to be" (Nussbaum, 2000); the proposed profiles intend to enhance the understanding of how mobility contributes to individuals' wellbeing, observing mobility as a differently available capacity that is differently deployed according to the kind of neighbourhood in which ageing populations are living.

Operationally, this implies considering "what can one do with these resources to improve the welfare of individuals, especially the disadvantaged" (Hananel & Berechman, 2016), by proposing "comparative assessments of states of affairs by comparing capabilities or freedoms (inter alia)" (Alkire, 2008). The following subsections outline these profiles of ageing mobilities and neighbourhoods, showing possible implications for planning and policy approaches.

4.1 PROFILES OF AGEING MOBILITIES

Profiles of ageing mobilities are defined considering the interplay of mobility and movement. Mobility is the ability to move through space and overcome spatial friction, while movement consists of putting mobility into

practice. Several individual features delineate whether an individual can move or not, while his/her personal choice defines if mobility is put into practice (and therefore the subject moves) or not.

In this sense, subjective factors are fundamental for determining different forms of ageing mobilities, in at least three senses: first, these define if the person needs to move or not, according to the opportunities one needs to accomplish her needs and wants; second, these contribute to the assessment of one's capacity to move, according to her physical, cognitive and psychological conditions; third, these determine if the person intends to move or not, determining if a person feels at ease or not when experiencing movement.

The distinction between mobility and movement could be significant for different categories of subjects, but here are considered taking into account the specific features of elderlies and how these may impact their ability to move. Regarding these variables, four profiles are here defined (Fig. 1).





		movement	
		the individual moves	the individual does not move
mobility	the individual can move	<p><i>active individual</i></p> 	<p><i>non-motivated individual</i></p> 
	the individual cannot move	<p><i>assisted individual</i></p> 	<p><i>immobile individual</i></p> 

Fig. 1 Four profile of ageing mobilities

Active individuals are those that are able to move and decide to put this ability into practice, to reach the opportunities/ destination they value. This category includes those individuals that can move independently, even if with different degrees of autonomy; and do so they do not rely on human or technological supports.

Assisted individuals are those that are not able to move on their own but nonetheless tend manage to fulfil movement.

While their individual features may not be favourable for their mobility, individuals in this category may rely on different forms of assistance thanks to which they may be able to move through space. Assistance may be provided by other individuals (e.g. people accompanying the elderly) or assistive devices (e.g. wheelchairs or scooters).

Non-motivated individuals are those who do not achieve movement despite having the ability to do so. This category includes individuals who may have the ability for moving but may decide not to do so, due to a personal decision.

Such decision may be explained with personal perceptions (e.g. a person feeling herself as a nuisance for other passengers; Nordbakke, 2013), experiences (e.g. having being involved in accidents such as falls or car crashes; Webber et al., 2010) and even psychological issues (e.g. suffering from depression; Gayman et al., 2008). *Immobile individuals* are those who are not able to move and therefore do not move. Individuals in this group are not able to move from one space to another due to varied individual features: spanning from physical (e.g. disabilities), economic (e.g. lack of economic resources), or psychological constraints. They may also lack forms of assistance that could contribute to overcome their individual inability to move. Independently from the provision of valued opportunities and mobility services in the neighbourhoods in which they live, immobile elderlies experience severe issues in accessing those opportunities that are relevant for them.

4.2 PROFILES OF AGEING NEIGHBOURHOODS

Profiles of ageing neighbourhoods are defined considering the interplay of mobility supply and opportunities. Mobility supply is the set of services and infrastructures that allows to reach a number of surrounding areas (e.g. other neighbourhoods in the same city or surrounding municipalities). Here, mobility supply is generically defined as good or bad.

Opportunities instead are the set of places, activities and services that the elderly population of a neighbourhood has reason to value and is therefore willing to reach. Despite a rich literature on age-friendly neighbourhoods (Buffel et al., 2012; Lui et al., 2009; Menec et al., 2011; Plouffe & Kalache, 2010), the typologies here defined take into consideration the opportunities valued by ageing populations and the possibilities they have for moving.

In this sense, subjective factors are significant for defining how the features of the neighbourhoods are perceived by elderlies: these refer for example to the availability of local opportunities and their ability to respond to one's needs and wants; to the quality of transport supply, to be perceived as safe and reliable; to the quality of the built environment required to access the transport services (Ewing & Cervero, 2001) and, particularly, to its walkability (Humpel et al., 2002). Considering these aspects, four profiles are outlined as follows (Fig. 2).

Open neighbourhoods are those that offer the opportunities that ageing populations value and also provide good connections to other areas. These are the neighbourhoods that potentially provide the best conditions for elderly well-being: opportunities are easily accessible at the local scale but at the same time it is possible to access relevant activities and services located in other places, increasing thus the range of opportunities available to the elderlies.

Dependent neighbourhoods do not offer valued opportunities, but are well connected to other areas in which relevant activities are present. Their condition configures a dependence from surrounding places: the inhabitants of the neighbourhood need to move beyond their local area if they want to reach significant opportunities, but the available mobility supply allows to easily do so. Mobility is thus crucial to guarantee the well-being of the ageing populations in dependent neighbourhoods.

Self-contained neighbourhoods provide valued opportunities at the local scale, while the available mobility supply does not allow good connections to other areas.

These neighbourhoods allow thus to easily access local opportunities, implying a reduced need for mobility. Nonetheless, the lack of access to other areas potentially reduces the range of reachable opportunities, forcing the local elderly population to participate only in the locally available activities.

Isolated neighbourhoods do not offer valued opportunities nor have the necessary mobility supply for reaching other areas. In terms of elderly well-being these areas are the most critical, since the lack of local activities and services cannot be currently compensated by the possibility to move.

5 DISCUSSION AND CONCLUSION: KEY OUTCOMES AND WAYS FORWARD

This paper has made an attempt to make an overview of the existing literature on mobilities of the ageing society with relation to the notion of well-being and quality of life with the aim (i) to provide a theoretical framework with the complexity of factors in mobility, to be applied in future empirical research studies, in other words as the basis for further analyses with quantitative and qualitative methods; and (ii) to introduce a methodology for defining profiles of ageing mobilities, considering elements that may be differently inflected according to the setting taken into exam.

The profiles presented in the paper are intended as a first methodological contribution to better understand and tackle manifold forms of ageing mobilities and their varied contributions to the elderly's well-being. However, the perspective here chosen is mainly a local one, focusing on the scale of the neighbourhood and how ageing populations experience it; nonetheless, different scales should be examined when considering how mobility contributes to individuals' well-being, since a) the arrangements of land use and transport supply involve different, wider scales and b) the local dimension may receive very different definitions according to the examined setting (e.g. a settlement in a metropolitan area, a village in a rural region). Considering that the definition of profiles depends on the examined setting, the paper discussed the practical issues and limitations related to each category of profiles that can be relevant to better conceptualise the complex relationship between ageing, mobilities and well-being.

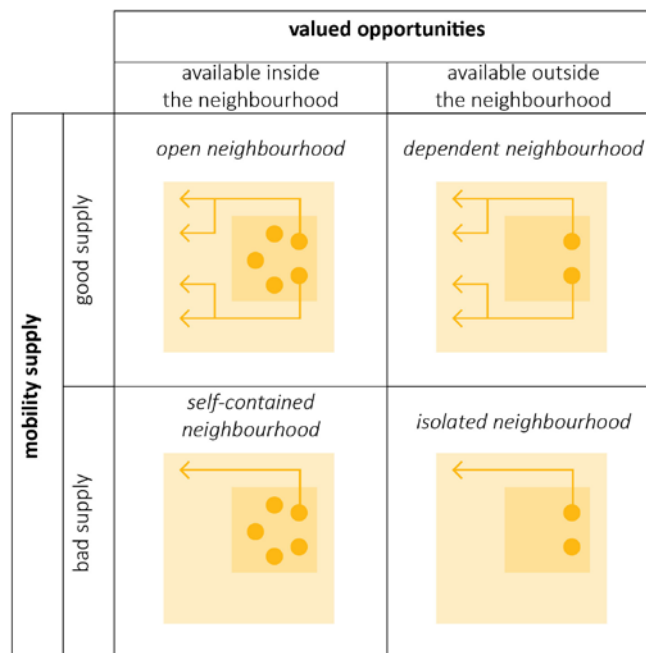


Fig. 2 Four profile of ageing neighbourhoods

Practical issues and limitations of ageing mobility profiles. While the variables here chosen for defining profiles could be significant in different settings, the specific definition of what counts as mobility depends on the examined context as well as on the subjects taken into account.

A first issue concerns what kind of ability to move is taken into consideration. According to the setting, different could be the prevailing modal choices as well as the dominant mobility practices: for example, in the United States cars would have a central role, while in the Netherlands bicycles could be a significant modal alternative. Consequently, different would be the ability to move to be considered when defining if a person can move or not. Furthermore, such ability is not simply present or absent, but could be available with different intensity (Robeyns, 2016). It could be in fact that an individual is able to move despite the presence of some constraints: for example, a person may be able to use public transport but may experience difficulties when entering a bus and another person instead may easily enter it without specific efforts. Therefore, both subjects are able to move but the ability available to them is different. This aspect would suggest the definition of a sufficiency threshold for mobility, that is, defining if people are able to fare well enough in relation to their ability to move. In conclusion, what counts as ability to move and what is a sufficient degree of mobility should be defined according to the setting and the elderly population taken into account.

Practical issues and limitations of ageing neighbourhood profiles. The definition of ageing neighbourhood profiles can usefully draw on the proposed categories, but these simply provide a conceptual framework that needs to be defined according to the examined setting. Both mobility and opportunities in fact are strongly context-related and should be assessed according to specific local features. As for mobility, the definition of what is good supply can take into consideration at least two factors. First, the modal choices that are considered as relevant for reaching valued opportunities depend on the place-based features of the settings and on local habits. Second, crucial are the connections provided by the available mobility supply, for example assuming that a good mobility supply allows to reach a certain number of areas or opportunities within a given travel time. However, even the definition of valued opportunities is not straightforward. First, it requires to consider what set of activities can be significant for the wellbeing of local elderlies, including for example basic services (shops, health care facilities, ...) but also other significant destinations (e.g. places of encounter). Second, a sufficiency threshold for such opportunities should be defined, assessing at what conditions people may consider to have access to a certain service or activity.

The definition of neighbourhood profiles depends thus on the interplay of mobility and opportunities, which conjointly determine at what conditions wellbeing is granted at the local level. For example, considering the previously mentioned factors a possible result could be the following description: a neighbourhood would offer valued opportunities if it made available one health care facility, a commercial activity and a place of encounter within a travel time of 15 minutes, to be covered by public transport.

To enhance the contribution of profiles, three actions are necessary: context-based definition of profiles, assessment of significant interplays between profiles, design of relevant policy measures.

As for the definition of profiles, the features that determine them needs to be chosen according to specificities and needs of the examined setting. The previously presented typologies are intended as a tool for orienting analysis, possibly taking into consideration both quantitative and qualitative approaches. For example, quantitative analyses can be significant for determining the number of available opportunities, the mobility supply and the accessibility levels defined by the interaction between these two elements, as well as the characteristics of the elderly population.

Nonetheless, qualitative approaches (such as surveys, interviews and focus groups) are crucial to involve the relevant stakeholders (different ageing populations, policymakers, service providers...) in the definition of relevant opportunities, sufficiency thresholds for their availability, and acceptable travel times, as well as in the construction of the ageing mobilities profiles.

Regarding the assessment of significant interplays between profiles, it is necessary to consider how the interaction between different mobilities and neighbourhoods determines diverse possibilities for accessing valued opportunities. For example, the same assisted individual would experience a different access to opportunities in a dependent or in a self-contained neighbourhood. To the best of our knowledge, the literature on ageing mobilities tends to focus on the analysis of people-based or of place-based features, without devoting significant attention to the interaction between the two. Such aspect seems thus to open a significant direction for further empirical research on the issues of ageing, mobilities and wellbeing. However, from the perspective of urban mobility planning and policy some interactions in particular can be significant. Policymakers in fact can more easily address the needs of those population and places for which interventions on mobility can enhance the current experienced wellbeing. In this sense, it can be more relevant for policymakers to focus on the subjects who do move (that is, active and assisted individuals) and how they differently behave in the four typologies of neighbourhood.

As for the design of relevant policy measures, the interplay between different profiles can be considered, in order to determine the needs of these configurations, and consequently design relevant actions for tackling them. In this sense, the definition of profiles and their detection in place can contribute to the territorialisation and individualisation of policy measures (Bifulco et al., 2008).

Territorialisation refers to the 'positive discrimination' of disadvantaged areas that require priority interventions, while individualisation implies the development of tailored measures for populations in need. While previous studies have highlighted the complex relationship between urban planning policies, mobility and well-being (Tiboni & Rossetti, 2014), we believe that profiles can be the first step towards the definition of policy measures that address the different elderly mobilities and their varied contribution to individual well-being.

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