Article

Understanding the Wicked Problem of Providing Accessible Housing for the Ageing Population in Sweden

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**Abstract:** While accessible housing is known as important to promote healthy ageing, the societal issue of providing accessible housing for the ageing population bears the characteristics of a ‘wicked problem’. The aim of this study was to gain better understanding of crucial variables for decision-making about accessible housing provision for the ageing population in Sweden. Materials used for a deductive content analysis were elicited through a research circle involving three researchers and twelve non-academic representatives. Brown and colleagues’ conceptual framework with five dimensions to address wicked problems was used for the understanding of crucial variables in decision-making about housing provision. The findings show that such reasoning is dominated by the socioeconomic dimension. Findings in the biophysical dimension reveal well-known challenges pertaining to the definition and interpretation of the concept of accessibility and its operationalization. The multiple dimensions are intertwined in a complex manner, which is essential for effective and efficient decision-making. The findings could make decision-makers aware of the diversity of individual thinking involved when addressing this wicked problem. Acting upon the crucial variables identified in this study could contribute to progressive decision-making and more efficient ways to develop and provide accessible housing for the ageing population.

**Keywords:** ageing in place; built environment; decision support; housing accessibility; housing and health; housing provision; research circle; trade-offs; planning; public health

1. Introduction

In their Housing and Health Guidelines report the World Health Organization [1] declared that ‘Poor housing conditions are one of the mechanisms through which social and environmental inequality translates into health inequality, which further affects the quality of life and well-being’ [1] (p. xv). People with the lowest incomes, minority groups, indigenous people, woman, single parent families and people ageing with functional limitations are overrepresented as residents in unsuitable housing, and thus groups prone to inequality and inequity [1]. In addition, poor housing conditions, inequalities and inequity put individuals who belong to one of the above-mentioned groups at risk of ending up in the other groups. Still, many questions remain to be answered about multiple interrelations and how the need for housing that creates conditions for good health for as many people as possible can be met [2].

Ageing societies are facing major housing challenges. There is an urgent need to better understand and provide for the diversity of housing requirements of senior citizens. Key issues are: accessibility; adaptability; affordability; attractiveness; availability of services, facilities and infrastructure; habitability; location; and security for tenure. This study is one attempt to contribute to developments responding to the needs of accessible housing for the ageing population.

Attempts to create comprehensive conceptual frameworks of housing and health have been made but given that the phenomena involved are multidimensional and changing over time, such attempts have also been criticized. One recommendation is to direct the inquiry or focus of interest to a certain aspect of housing and find fruitful concepts and theories from that point of view [3]. Accordingly, in this study we focused on housing accessibility as a prerequisite for healthy ageing.

2. Housing and Health

Globally, numerous research outputs on housing and health have recently been achieved [1,4,5]. A shared objective is a better understanding of various environmental variables, their interrelations and how they positively or negatively affect health and wellbeing. To bridge research with policy and practice, WHO [1] provided evidence-based recommendations to improve housing conditions and reduce the health burden. However, prioritizations and implementations vary and depend on national and contextual factors. Moreover, political will and muscle as well as cross-sectorial collaboration are required to achieve tangible progress.

2.1. Housing Accessibility

Accessibility is a basic quality of housing, which is not just about physical features in the environment but defined as the encounter between a person’s or group’s functional capacity and demands in the physical environment [1,6]. A physical environment that exposes people to risk of injuries, isolation and stress, and hampers daily activities and participation in social life has negative health effects [7] and increase the burden on formal and informal health care and social services [1]. With population ageing an increasing proportion of older adults is expected to live longer with functional limitations [1]. Accordingly, the prevalence and magnitude of accessibility problems are likely to increase, unless large-scale actions to improve accessibility are taken to resolve issues in the physical housing environment. Based on evidence, the benefit-harm balance and the feasibility to improve the supply of accessible housing, the WHO strongly recommend that *“… an adequate proportion of the housing stock should be accessible…”* [1] (p. 67)*.* The prevailing ageing-in-place policy – a priority for many senior citizens and a policy objective particularly strong in the Scandinavian countries [8] – further increases the importance of providing accessible housing. Ageing in place includes enabling people to live later life in ordinary housing as long as possible (i.e. life span housing, lifetime homes or life cycle housing) and making housing adaptations that allow people to do so and possibly delay functional, mental and cognitive decline [1,9]. In Sweden, despite high housing standards in the ordinary housing stock and municipal obligations to provide housing adaptation grants, there is a high prevalence of physical environmental barriers and considerable accessibility problems for senior citizens with functional limitations [7,10]. The situation is similar in other countries, such as the United Kingdom [11].

From an institutional and political point of view, the Swedish government’s general housing policy implies that the municipalities are responsible for providing adequate housing for their inhabitants within the ordinary housing stock. They are obliged to withhold ‘housing supply action plans’ [12] including both existing housing and the construction of new housing. These plans should ideally be developed in collaboration with the municipal building administration, the municipal health care and social services administration, public and private housing companies, and relevant communities of interest (non-governmental organisations, NGO). To support actions to increase housing accessibility, financial grants from the government can be awarded to construction companies, housing companies and private property owners to compensate for their investments [13]. In addition, there are grants for financial support for individual housing adaptations provided by the municipalities [14].

In other words, planning and provisions for accessibility involve a variety of institutions that include authorities (e.g. building committees, municipal management, housing distribution offices, health care and social services), various public and private actors in the housing sector (e.g. architects, construction contractors, property owners, real estate agents, CEOs, board members, project managers), and others (e.g. researchers, suppliers and citizens) whose assessments and decisions affect one another in a tangled manner. However, poor planning and administrative errors may cause gaps in the implementation of accessible housing and consequently have negative health effects [15]. While accessibility is a problem which has been discussed during decades, the understanding of crucial variables for decision-making about accessible housing provision for the ageing population is insufficient.

3. A Conceptual Framework to Address Wicked Problems

To unwind, understand and communicate the multiple and complex relations between housing and health in the context of housing provision for the ageing population, innovative and shared conceptual frameworks that apply systems thinking are needed [5]. One way to tackle the uncertainty associated with complex planning problems is to open up for contributions from a diversity of academic disciplines and non-academic partners to generate knowledge and develop ‘open transdisciplinary modes of inquiry capable of meeting the needs of the individual, the community, the specialist traditions, and influential organizations’ [16] (p. 4).

3.1. Wicked Problems

The issue of the provision of accessible housing is not unique in containing complexity, but many of the societal-environmental planning problems and challenges faced today are characterized by complex relationships, including a web of variables that directly or indirectly affect each other in an intricate way. About 50 years ago, Rittel & Webber [17] suggested referring to complex societal-environmental issues, including public policies for housing and population health, as ‘wicked problems’ and contrasted these to ‘tame problems’, i.e. problems that can be treated as scientific problems possible to solve within the existing modes of inquiry and decision-making. What further distinguished a ‘wicked problem’ was that it could not be justly considered or judged solely on the basis of a single measure or approach, but had to be interpreted on the basis of values linked to a variety of actors. A ‘wicked problem’ was characterized by the fact that it had no final solution but only a best possible solution at any particular time [17]. Using the notion of ‘wicked problems’ we developed a point of departure for the present study, outlined in Table 1. Based on current literature [4,5,11], public policy [1,18], public debate and experiences from our research, we related the definition of ‘wicked problems’ to the provision of accessible housing.

**Table 1.** The definition of ‘wicked problem’ related to the provision of accessible housing.

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| **Definition of wicked problem 1** | **Example from the provision of accessible housing** |
| *1. There is no definitive formulation of a wicked problem.* | The formulation of accessible housing *is* the problem. The information used to define the problem depends upon a variety of non-academic actors’ and institutions’ idea for solving it. |
| *2. Wicked problems have no stopping rule.* | What is considered ‘good enough’ provision of accessible housing is situational and continuously transforming. |
| *3. Solutions to wicked problems are not true-or-false, but good-or-bad.* | Solutions are likely to be differently judged, depending on the special value-sets and ideological predilections of actor and institution groups or their personal interests. |
| *4. There is no immediate and no ultimate test of a solution to a wicked problem.* | The full consequences of plans aimed at improving housing accessibility cannot be appraised until the waves of repercussions have completely run out. |
| *5 Every solution to a wicked problem is a* ‘*one-shot operation*’*; because there is no opportunity to learn by trial-and-error, every attempt counts significantly.* | Every action taken to improve housing accessibility is consequential for other household members, residents or visitor. Major retrofit actions to improve housing accessibility affect the residents during the construction process, are expensive, and leave long-standing and irreversible traces. |
| *6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.* | Many new ideas or efforts to provide accessible housing for the ageing population may become relevant as a re-solution. For example, refined grant mechanisms for individual housing adaptations or assistive devices, supports for the housing sector, changes in building regulations or human right laws, or incentives for relocations. However, despite a set of possible candidates the problems could persist. Enlarging the set of solutions as well as choosing which solution to pursue and implement is a matter of judgement. |
| *7. Every wicked problem is essentially unique.* | The basis for decision-making on accessible housing provision needs to be local, timely and put into the context of available resources (e.g. technological, financial) and the specific real-world situation (e.g. social, cultural). |
| *8. Every wicked problem can be considered to be a symptom of another problem.* | The level at which problems are settled depend upon the various decision-makers. ‘Higher-level’ problem formulations becomes broad and general, but less operationalizable. On the other hand, solely addressing the problem of accessible housing provision on a too low level and cure symptoms (e.g. individual housing adaptions; assistive devices) can create negative effects on several other variables and making it more difficult to deal with higher level problems. |
| *9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution.* | Diverse worldviews and intentions (e.g. self-interest, profitability, cost-efficiency, health prevention, or human rights) are strong determining factors for the various decision-makers. There are no optimal solutions or agreed upon ways to evaluate provision of accessible housing. |
| *10. The planner has no right to be wrong.* | Decision-makers become responsible for all the consequences of the actions taken to improve accessible housing provision. The increasing pluralism of the contemporary public, who use different and contradicting definitions and scales to assess and judge the consequences of the solutions increases the wickedness of the problem and related dilemmas. |

1 Rittel and Webber's ten properties [17].

Exemplified by Table 1, because a wicked problem requires an understanding of a variety of perspectives there is a high likelihood of conflicts between different views and interests [19]. These interests may be based on the individual, but they may also reflect the organizational structure of institutions or division within existing society. However, the pursuit of coherence in tackling a wicked problem is based on individual efforts and include multiple dimensions of individual thinking [20], although some individuals in a group setting usually have a greater ability than others to embrace complex problems. Based on this insight, Brown and colleagues [20] proposed a conceptual framework with five dimensions of individual thinking to address wicked problems: *biophysical*, *socioeconomic*, *ethical*, *aesthetic* and *sympathetic* (Table 2). Wicked problems require consideration from all these dimensions and the mutual interactions between them, in order for their complexity to be fully recognized and truly understood.

The *biophysical* dimension consists of what is created through our senses including tools that extend our senses and is objectively measurable in the biological and physical environment, which constitutes the scene of the problem at target. Applied to the wicked problem currently under study, research confirms that the material and spatial constituents of housing units are important for senior citizens and their preferences and requirements need to be understood [4]. The *socioeconomic* dimension does not only include the social and economic reality of people but takes on a wider meaning. It is about ‘stories’ reflecting the ways in which we have established our society and existence in the form of infrastructure, objectives and ways of life. On an overall level, this dimension encompasses economic and legal systems, and the importance people ascribe to the market and law, as well as the infrastructure set up to regulate these. It also encompasses the socially, ethnically, culturally and religiously conditional approaches and living rules established and maintained by parts of or the entire population. The *ethical* dimension constitutes the ethical principles of what is considered morally right and wrong from an individual’s stance in relation to fellow human beings, other creatures and the environment. These questions inevitably require a highly individual stance based on a moral or altruistic compass about what is right or wrong. While ethical questions might have ‘answers’ in existing policies and regulations, the answers are value-based and are thus changeable based on the values (‘stories’) that prevail in society. However, each individual has the opportunity to take a personal stance on these issues themselves and can accommodate change if one feels that existing policies and regulations go against one’s own stance. The *aesthetic* dimension is based on an objective as well as subjective view of what is attractive on the basis of our sensitivity to the patterns in natural and social systems. The value of aesthetics and unobtrusiveness as well as the importance of avoiding an institutional look and unwanted associations with loss of independence, is an example of a recurring attitudinal theme in relation to housing accessibility [21]. Research confirms that the aesthetic preferences of residents are not necessarily the same as those of architects and designers [22]. This raises the fundamental issue of whether senior citizens can personalize the interior of their homes. The *sympathetic* dimension refers to our ability to emotionally relate to, recognize or identify with what other people feel. While Brown and colleagues [20] have termed this dimension ‘sympathetic’ with reference to ‘sympathy’, we consider, - based on the description of the dimension, - that a more appropriate term would be *empathetic*. This is because sympathy as a concept only includes the negative emotion register and some distancing such as feeling compassion, grief or concern for someone [23]. Empathy, on the other hand, involves both the ability to understand another person’s situation (e.g. cognitive empathy) and react emotionally on the basis of this (e.g. emotional empathy) and also includes a broader emotional register and a closer distance [24]. The current study made use of the five dimensions proposed by Brown and colleagues [20] as a conceptual framework to identify pertinent variables in the context of accessible housing provision for senior citizens in Sweden.

**Table 2.** Framework with five dimensions to address wicked problems.

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| **Dimension** | **Description** |
| *Biophysical (measurements)* | The biological and physical environment in which an issue is set. Arrived at by observations, measurements and formal reports. |
| *Socioeconomic (stories)* | The social environment, including cultural rules and the socioeconomic systems (a prevailing emphasis in Western culture). Arrived at through reflecting on a cultural framework and/or a personal commitment to a way of life or a religion. |
| *Ethical (principles)* | The principles governing relationships between individuals and society and between individuals and the environment. |
| *Artistic/Aesthetic (patterns)* | Sensitivity to the patterns in natural and in social systems, arising from the capacity for inspiration within each human being. Arrived at by both expressing, and rebelling against, cultural norms. |
| *Sympathetic/Empathetic (feelings)* | Recognizing a shared understanding with another human being or group. Arrived at through feelings of openness, trust and shared experience. |

Note: After Brown, Lambert & Harris [20] (pp. 34–37).

3.2. Aim of the Study

Using wicked problems and the five dimensions as the conceptual framework underpinning the present study, the aim was to further the understanding of crucial variables for decision-making about accessible housing provision for the ageing population in Sweden.

4. Materials and Methods

4.1. Study Context

The study was conducted based on empirical materials originating from the initial phase of the project *Decision Support System for Improved Accessibility in Multi-Family Housing* [25]. The overarching aim of that project was to develop, test and evaluate a new decision support system for improved accessibility in multi-family housing, and to contribute to efficient collaboration among professionals involved in health care, planning and housing provision, as well as citizens. The project team consisted of researchers and two non-academic partners: a public housing company and a micro-sized software development company.

As part of laying the groundwork and creating conditions for the design of the new system, the aim of the initial phase of the larger project was to involve representatives for future potential users to gain an understanding of the potentials and challenges they envisaged with regard to the development, implementation and commercialization of the new system. We used the research circle (RC) methodology [26] as it encourages and provides opportunities for sharing knowledge, know-how and ways of knowing for mutual learning in the form of group dialogues on equal terms [27,28]. Findings from the RC relating to the specifications of the decision support system are presented elsewhere [29].

4.2. Participants and Recruitment

The RC participants consisted of three researchers with different academic backgrounds and twelve persons representing various categories of non-academic actors and institutions (i.e. key actors), whose perspectives were considered as essential to better understand the complexities in individual thinking related to the wicked problem of providing accessible housing for the ageing population. The recruitment was based on the fact that the key actors were interested in and beneficiaries of research on housing accessibility, had competence, knowledge, experience of and opinions on issues related to housing and health (Table 3).

**Table 3.** Participant characteristics (N = 15).

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| **Characteristic** | **Total (n = 15)** |
| *Sex*  Men  Women | 9  6 |
| *Key actors*  Public housing companyC6,C7,C7  Municipal building administrationB3,B4  National senior citizens’ organization  Municipal health care administrationB4,C6  Private service provider within the assistive device sector  Private architecture and engineering consultancy  National public authority  Business developer | 3  2  1  2  1  1  1  1 |
| *Researchers*  Lund University employee (authors O.J., M.H. & J.F.) | 3 |
| Classification of the municipalities in three main groups (A,B,C) and a total of nine possible subgroups (1-9) on the basis of structural parameters such as population and commuting patterns [30].  B3 Medium-sized towns – municipalities with a population of at least 50.000 inhabitants with at least 40.000 inhabitants in the largest urban area.  B4 Commuting municipalities near medium-sized towns - municipalities where more than 40% of the working population commute to work in a medium-sized town.  C6 Small town – municipalities with a population of at least 15.000 inhabitants in the largest urban area.  C7 Commuting municipalities near small towns – municipalities where more than 30% of the working population commute to work in a small town/urban area or more than 30% of the employed day population lives in another municipality. | |

We used purposive sampling [31] via two channels to recruit key actors: 1) A list of persons who had previously shown interest to participate in research at our centre; 2) Persons who were encountered during the planning and start-up of the research project. Homogeneity was reached as the key actors were selected from among non-academic actors and institutions involved in housing and health issues relevant to housing accessibility. Heterogeneity was attained using professional position, organization and sex as selection criteria. The key actors selected had a potential to be information-rich, and they were experts on organizational opportunities and constraints among different non-academic actors and institutions. An inclusion criterion was that they were able to participate in all three RC sessions. In total, 25 persons were invited to participate, and 12 accepted (Table 3). Representatives from one industry organization and four private housing companies were among those unable or not willing to participate.

4.3. Procedure

Three RC sessions were held, scheduled for three hours each and included audio-recorded presentations and discussions. Two of the authors (O.J. & M.H.) took on the role of moderators. One author (J.F.) participated and took notes in the third session. In the first session, the theme concerned how problems addressed by the new system were currently solved. The theme of the second session concerned the potential outcomes and applications of the new system. The theme of the third was about identifying potential customer segments and developing a draft business plan for the new system. The researchers hosted the first and third sessions that were held in conference rooms at the university. By a joint decision, a public housing company was host for the second session.

4.4. Ethics

According to current Swedish legislation, formal ethical approval is not required for studies that do not elicit material concerning sensitive information and do not include any intervention to humans. Following recommendations for proper research conduct [32], the key actors received written and verbal information on the RC study, as well as opportunities to ask questions. They signed an informed consent at the start of the first session. The General Data Protection Regulation (GDPR) was followed to prevent processed information being traced to individuals.

4.5. Analysis Procedure

The empirical material consisted of the audio recordings from the RC sessions and the corresponding transcripts. One author (J.F.) transcribed the audio recordings according to Linell’s transcription level 2 [33] using NVivo [34], read the material several times while taking notes and summarizing thoughts in relation to the study aim.

We applied deductive manifest content analysis according to Elo & Kyngäs [35], focusing on the ten properties of wicked problems [17] (see Table 1). We used Brown and colleagues’ [20] framework with five dimensions as a grid to sort critical variables involved in decision-making processes. Two authors (J.F. & O.J.) had iterative discussions throughout the analysis process. The data was reviewed for critical variables, coded in emerging categories and sorted in the five dimensions. The emerging findings were validated repeatedly through communication including all authors, as well as through input from interdisciplinary research seminars. A professional translator translated selected accounts from the participants to English, which were used as quotations to illustrate and contextualize the findings. In a last round of optimization, two of the authors finalized the findings (O.J. & S.I.).

5. Findings

All five dimensions considered by the framework were represented in the material. For the biophysical, socioeconomic and ethical dimensions several categories were identified (Table 4).

**Table 4.** The identifiedcritical variables and categories sorted into the five dimensions.

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| **Dimension1** | **Category** | **Critical variable** |
| *Biophysical (measurements)* | Different opinions on the meaning and definition of housing accessibility prevail  Systematic inventories are warranted but must be comprehensive  Evidence based on biophysical information is lacking but is wanted | Definition of housing accessibility  Environmental barriers - who is affected?  Level of detail of housing accessibility  Systematic inventories of environmental barriers  Degrees of housing accessibility – how to classify and label?  Embrace variations in human functioning  Objective and comparable information on housing accessibility  Evidence on the benefit to public health and societal economy |
| *Socioeconomic (stories)* | The ageing-in-place policy is significant for decision-making  Organization and distribution of resources suffer from ‘silo-thinking’  Varying practices and competing priorities among the actors  The absence of clear housing accessibility guidelines and goals | Coherent policy  Agreed objectives  Cross-sectorial communication  Multi-level information sharing and transparency  Efficient distribution of resources and responsibilities  Systems thinking  Gain advantage from technological progress  Demand from the market on housing accessibility  Efficient financial policy  Awareness, knowledge and competence  Organizational culture  Cross-boundary collaboration  Reasonable distribution of responsibilities among the various actors |
| *Ethical (principles)* | Individual freedom and societal solidarity  Social responsibilities of housing companies  Housing accessibility as a social right - for whom? | Fair and reasonable use of resources  Acknowledge individual’s right to chose  Maintain the welfare state  The needs and interests of other groups  Allow for different alternatives |
| *Artistic/Aesthetic (patterns)* | Actions with the intention to provide accessible housing might jeopardize attractiveness | The proportions and compositions of rooms  Affective experiences of housing accessibility – messages sent and received  Suit the specific context  Attractive locations and attributes |
| *Sympathetic/Empathetic (feelings)* | Understanding of others situation and perspective | Proactive thinking to predict behavior  Thoughtful communication |

1 Brown, Lambert & Harris’s five dimensions [20] (pp. 34–37).

5.1. The Biophysical Dimension

5.1.1. Different Opinions on the Meaning and Definition of Housing Accessibility Prevail

The individual interpretations of the concept of housing accessibility generated a diversified discussion, highlighting some differences between the categories of participants involved. A shared opinion was that the building regulations indicating the minimum acceptable level of physical properties in the built environment served as a foundation. However, an attitude that prevails in society is that housing accessibility only concerns people with physical limitations rather than being a right for all. The researchers argued for a relational definition between functional capacity of the individual(s) and barriers in the physical environment as a way to embrace the complexity of functional limitations, enabling cross-sectoral collaboration and various analyses and evaluations. The key actors agreed, but some of them highlighted the importance of including cognitive limitations (senior citizens’ organisation representative) and barriers for social interactions (representatives from the municipal health care administrations and the national public authority). Moreover, there were different opinions about the level of detail necessary to understand accessibility problems, and the boundary between the dwelling, its immediate surroundings, the neighbourhood and the connecting local environment. For example, a more exhaustive definition was promoted by the senior citizens’ organisation representative. The participants put forth that a common definition of housing accessibility is a critical, high-priority aspect to create cross-sectorial solutions, enabling the provision of accessible housing for the ageing population.

5.1.2. Systematic Inventories are Warranted but Must be Comprehensive

The discussions revealed that a systematic inventory of environmental barriers in the existing housing stock is regarded as a critical variable. An important step is to establish databases and create conditions for setting the biophysical dimension of housing accessibility against other biophysical measurements such as construction, energy consumption and fire safety for prioritizing and decision-making. According to the participants, such tools were currently lacking. Applying the definition that the degree of accessibility is determined by the concept of person-environment fit, the possibility to enter data on human functional capacity into databases with information about environmental barriers was much appreciated by the key actors, as a way to support decision-making. The participants emphasized the fact that human physiology entails a variation in cognitive abilities. Dealing with variations in human functioning in a valid manner, combining data on the environmental and personal components of accessibility could produce useful information and enable classification of the degree of accessibility on the local, regional and national levels, as well as on individual and group levels.

The participants requested a reliable database that would make it possible to extract objective and comparable information. Such a database was seen as potentially useful as a support for a diversity of non-academic actors and institutions and different kinds of decision-making. Examples given were support for housing companies when making decisions about possible retrofit actions to improve accessibility, such as zero-step entrances. Another was as support for people to find a new dwelling with the best possible accessibility based on their current or future functional limitations:

“*Information is of course important, both for those who want somewhere to live and those who want to build or own housing, as well as others such as the municipality who have to make repairs and compensate for faults and deficiencies. (Municipal building administration)”*

5.1.3. Evidence Based on Biophysical Accessibility Information is Lacking but is Wanted

Lack of evidence on the effects of action to improve accessibility for public health and societal economy was found to be a critical variable. Participants asked for evidence on how housing accessibility related to health-related aspects such as injuries from falls, the need for home services and the opportunity to live a longer and healthier life. This kind of data was desirable to lay a foundation that potentially could underpin cost-effective decisions made on regional and national levels and to enable and motivate ‘matching’ of housing based on individual functional ability. More research was asked for on this issue, and researchers were attributed an important role. The importance of having access to a model or ‘argumentation collection’ rooted in research results through which one could work proactively and convince others to think and/or act in a certain direction was stressed.

5.2. The Socioeconomic Dimension

5.2.1. The Ageing-in-Place Policy is Significant for Decision-Making

One prevailing narrative that the participants highlighted as significant for decision-making was the ageing-in-place policy. This objective was said to guide societal efforts and strongly influence decision-making linked to the provision of accessible housing for the ageing population. However, there was some uncertainty regarding the interpretation of this prevailing policy objective. On the one hand, it could be interpreted as that people’s current dwellings are the places for them to age in no matter the costs, with individual housing adaptations, home health care and social services provided to avoid relocation to residential care facilities. On the other hand, the ageing-in-place policy could be interpreted as proactive because providing accessible housing on the ordinary housing market, where the conditions for autonomy without individual societal support, is preferable.

5.2.2. Organization and Distribution of Resources Suffer From ‘Silo thinking’

The prevailing organizational structure was found to be critical, characterized by a ‘silo’ mentality hampering different types of collaboration. One facet of this was expressed in the form of difficulties related to cross-sectorial communication:

That someone from the care sector can talk to someone from the housing sector, although you meet on neutral ground… I think that's often where deep gaps are ... you talk using concepts and terms from your own sector, and it can be very exclusionary if people don't understand the terminology, so I think that is very important. (National public authority)

A critical variable related to the organizational structure took the form that relevant information and knowledge were often available and used on the local level and not sufficiently shared regionally, nationally and across sectors. In the field of new construction, participants argued that the complexity and existing organizational ‘silos’ resulted in actors often missing essential aspects due to lack of knowledge, miscommunication and no actor taking full responsibility:

One does this, another does that and then all of a sudden it turns out as it does, and then maybe it’s necessary to correct problems that arise, so that is done and so on... I mean, I have tried to map out the processes, in other words I try to identify where all the errors are occurring... but it feels like one long obstacle course. (Municipal building administration)

According to the participants, these ‘silos’ have contributed to a distribution of resources and responsibilities that to some extent has impaired the opportunities to take action to improve accessibility. This was considered to partly be due to the state not providing public housing companies with sufficient resources with regard to the level of societal responsibility they were interested in and expected to assume:

*“Then we have a problem... it of course classic... that the money is in different coffers, so everything we have to do is not profitable from a business economics perspective, but it is very profitable from a societal economics perspective. (Housing company)”*

Another critical variable highlighted by the participants representing housing companies was the European competition law, prohibiting companies from conducting any bargaining with municipalities. Despite the housing companies’ interest, ambitions and responsibilities, this hindrance to getting appropriate financial compensation prevented major retrofit actions.

Thus, key actors from public housing companies said that major retrofit actions, currently with low financial compensation, resulted in increased housing costs for the tenants; sometimes to the extent that they could not afford it. The participants had diverse opinions concerning the practical consequences of such efforts under the current distribution of responsibilities and resources. Some put hope in existing and new technology to achieve sustainable development. Some gave examples of efforts that turned out to be counter-productive, such as new construction projects with high degree of accessibility, but where apartments remained vacant:

*“It's great with side sliding doors, then you have an air lock... there is technology for everything. (Municipal building administration)”*

But air locks cost... then you need two [sliding doors], but it is possible that it will be so, that there will be a directive that you must have sliding doors. Yes, okay, then we do not have two hundred thousand, then we have three hundred thousand who can’t afford to live in this country. (Housing company)

5.2.3. Varying Practices and Competing Priorities Among the Actors

Reflecting on the interest in accessibility matters among the general public, certain accessibility features were said to be valued by almost everyone. According to key actors from public housing companies, few housing applicants give priority to accessibility matters unless they face problems themselves and few accessibility issues are raised by their tenants.

A critical variable found was the need of a financial policy that does not impact on peoples’ choices, making it possible for individuals to make choices about where to live in later life without being pressured from unwanted personal economic consequences. Participants felt that in the prevailing socioeconomic systems there were understandable explanations about why personal finances were prioritized over housing accessibility. Still, stronger emphasis and more proactive thinking about housing accessibility among citizens as well as actors in the planning, housing and care sectors were seen as important. From a citizens’ perspective this was argued partly for reasons related to democracy and the maintenance of the welfare state:

*“Of course, we must get citizens to be more involved in the development of welfare. (Municipal health care administration)”*

The participants argued that although the municipal building administration should be the institution where much of the accessibility work was based, the interest in these issues was often low there. Those who worked there were said to be primarily interested in new construction rather than existing buildings, which was assumed to be one plausible explanation. For the drive and commitment towards the provision of accessible housing, the participants suggested that the municipal health care administration should be actively involved. Furthermore, it was alleged that building inspectors and administrators in the municipality had limited knowledge about housing accessibility. In smaller towns/urban areas and rural municipalities it could be a single person who had such a focus, but if there was no person with such special competence the responsibility ended up with the building permit administration. Similarly, key actors from housing companies declared that they too lacked knowledge and competence in this area. The importance of acknowledging the mindsets of leaders of organizations and the creation of sustainable competence and culture within an organization was emphasized:

*“Within each main category there must be several stakeholders working on this issue; it is not enough that it’s only one individual, that’s very important... (Housing company)”*

A partial explanation for low competence in this area was a combination of a limited interest from the management, and the fact that to obtain accessibility knowledge, people were referred to texts of general recommendations and standards that they did not have time to go through. Moreover, housing companies claimed that they had to rely on accessibility consultancy firms. Their services were regarded by some as expensive, potentially unreliable, and not in line with the aim of becoming a more self-sufficient, competent and learning organization. However, the opinions about consulting services were divided. The representative from the architecture and engineering consultancy emphasized that they not only had knowledge but also contributed with new approaches and creative solutions.

5.2.4. The Absence of Clear Housing Accessibility Guidelines and Goals

The absence of reasonable and clear guidelines and goals regarding what was considered as ‘good enough’ housing accessibility, both in terms of degrees and coverage ratio, was a crucial question from the point of view of housing companies:

*“Thus, the main argument from the developer is why we have to make 100% of our apartments accessible. Why isn't 25% enough? It is not as if everyone is disabled… (Housing company)”*

Hence, the importance of balancing use value with monetary cost was emphasized. Calculation of costs for investments in accessibility and alternative costs for individual housing adaptations, home health care and social services on the municipal level was encouraged:

Of course, it is then that examples are important for the municipality so that the municipal board can examine the alternative costs of investing in making their own housing portfolio better and more accessible in comparison to all of the other aids and assistance measures needed to cope with the demographic development. In that case, the municipality can decide on this, based on its own portfolio. This is something that naturally could be introduced by adding examples and cost calculations. (Municipal building administration)

5.3. The Ethical Dimension

5.3.1. Individual Freedom and Societal Solidarity

One issue that emerged in the discussion of the ageing-in-place policy was which approach to endorse when persons in later life wish to remain in, or move to, a less accessible dwelling that comes with the risk of requiring costly housing adaptation grants for the municipality, rather than move to a more accessible alternative. Some participants argued that the current laws, allowing municipalities to reject applications for individual housing adaptation grants, limited such risks. Discussing the responsibility of the individual to apply an ethical perspective, participants emphasized that on the one hand it is important to contribute to fair and reasonable use of resources, on the other hand it is important to let people make their own housing decisions. However, it also became apparent that the frequently mentioned issue of senior citizens’ relocation from less accessible villas to more accessible apartments was not regarded merely as a question of individual freedom or societal solidarity. It also emerged that in a situation of housing shortage and overcrowded households, it could be framed as taking responsibility for using resources and the existing housing stock efficiently:

We ran a project where we said: Anyone over the age of 75 living alone in a villa has 10 priority choices for accessibility adapted… for apartments they could enter and leave without hindrance; and then families with children bought the villas and this allowed the municipality to grow in population numbers without having to build even a single new square meter. That was absolutely the best. (Housing company)

5.3.2. Social Responsibilities of Housing Companies

The amount of social responsibility that public housing companies should take was discussed. The participants representing such institutions reported that in past decades they had been forced to take on an increased social responsibility:

We have to have some kind of commercial profitability in what we do. We are not social services. We are a business when all is said and done. If people think we are social services and that it is our responsibility to look after the vulnerable groups, they might have the wrong idea. Now I am speaking for myself, but in reality we are functioning as social services at the moment… and it is a good thing we are because there are a lot of holes in the net these days that people are falling straight through… (Housing company)

In addition, the importance of getting private housing actors to assume a more active role to provide accessible housing for the ageing population was emphasized. The participants argued that private housing actors should show greater interest in work aimed at improving housing accessibility, at least if such efforts were to be associated with increased value.

5.3.3. Housing Accessibility as a Social Right - for Whom?

Another ethical issue related to the assumption that within the current socioeconomic systems, apartments in the older and often less accessible housing stock were said to allow some groups of individuals to have a home at all:

*“There are a great many who need a simple apartment due to problems renting, and we don’t want them to drop out of the market either. (Housing company)”*

With today’s socioeconomic systems in Sweden, major retrofit actions to improve housing accessibility were said to risk increased housing costs and force more individuals into homelessness. Although in principle this can be said to be primarily a matter of funding, this nevertheless raised ethical questions about which groups benefited or suffered when accessibility increased in society. Additionally, participants also mentioned to what extent the habits and culture of different ethnic minority groups should be accommodated. Norms for crowdedness were mentioned as an example that could be defined differently across cultures and countries, thus influencing the provision of accessible housing. Another example was the custom of using bidets among certain ethnic groups, while these amenities are not usually installed in current Swedish housing. Here it was noted how housing companies were forced to make a choice about how to allocate space in bathrooms – to take into account people with mobility problems and follow the building regulations, or to take into account the social practices of ethnic minorities. One argument put forward was that while human physiological constitution is an indisputable fact, habits and patterns of life are diverse and changing:

*“So you have to keep in mind that there are other group interests to consider; it is not just about mobility impairment and advanced age, there are masses of other factors too… (Housing company)”*

*“The difference of course is that there is not much you can do to reverse mobility impairment and getting older. You must base things on those who are most vulnerable… (Municipal building administration)”*

Following this logic, some key actors recommended that in the event of conflicts, priority should be given to the needs of senior citizens and people with functional limitations rather than to individuals and groups who, with their current habits and lifestyles wanted solutions that deviated from the prevailing Swedish standards.

5.4. The Aesthetic Dimension

5.4.1. Actions With the Intention to Provide Accessible Housing Might Jeopardize Attractiveness

The main topic of the content sorted into the aesthetic dimension was that housing accessibility might jeopardize attractiveness. According to key actors from public housing companies, one aspect in examining the efforts to improve housing accessibility was the possible negative impact on how internal layouts of apartments were provided. While spacious halls and large bathrooms and bedrooms are recommended from an accessibility perspective, the fulfilment of such recom-mendations bears the risk of reducing the size of the remaining rooms. Consequently, internal layouts could limit the possibility of social gatherings at home and might not be perceived as proportional and attractive:

*“It is also a problem that if you want this improved accessibility, then, you might also need to steal space from the other living areas and then make the rooms not so attractive anymore. (Housing company)”*

As to home care provision, in order not to create negative feelings or stigma, participants discussed that it was important that the dwelling did not give an institutional impression and negative associations with loss of autonomy. Similarly, traces of retrofits or housing adaptations that did not fit the housing context in which they are placed were seen as potentially having a negative impact on the attractiveness of a home and willingness to use supporting housing features which also may then have additional negative consequences.

In addition, the key actors argued that attributes such as a private garden or proximity to the sea has a major impact on senior citizens’ decisions to stay in a less accessible villa instead of relocating to a more accessible apartment without such attractive attributes.

5.5. The Empathetic Dimension

5.5.1. Understanding of Others Situation and Perspective

The empathetic dimension resonates with discussions about trying to understand and influence attitudes and feelings about housing accessibility. That is, a better understanding of other people’s situations was considered as important to achieve a change in attitudes. As most citizens without functional limitations and professionals were accused of not thinking proactively enough about housing accessibility, the ability to better understand the real-world situations residents facing accessibility problems encounter were mentioned as key ingredients in such processes. For example, understanding the feelings and thoughts that this phenomenon elicited, followed by thoughtful communication, focusing on positive instead of negative aspects:

When we talk to people aged between 55 and 65 years old, well they can get quite het up, and that is certainly something. There we must think one step further… I think it is a selling point if I can stay in the same place or if I need to move if I know that I can, compared to if I need to stay in the same place because I won’t need so many home care night visits or night camera monitoring, or that I won’t avoid having to go to A&E because of a fall or something. I think that is very good information to tell the elderly about. (National public authority)

6. Discussion

The findings illustrate that multiple critical variables are intertwined in a complex manner within the wicked problem of providing accessible housing for the ageing population. There is no linear cause-effect relation, but a complex web of interdependent variables characterised by diverse as well as more congruent individual thinking, and trade-offs are necessary because there is no optimal solution.

It is noteworthy that the findings from the present study are similar to results presented already 30 years ago [36] – different actors operate in parallel ‘silos’ when it comes to decision-making and realization, and the outset to tackle the problem differs between various perspectives. Such a persistent problem deserves serious attention and action and could benefit from the developments described in ‘boundary work’ [37], which is a concept gaining an increased interest in organization and management science. The concept denotes ‘*purposeful individual and collective effort to influence the social, symbolic, material, or temporal boundaries; demarcations; and distinctions affecting groups, occupations, and organizations*’ [37] (p. 704). Boundary work refers to individual and collective efforts regarding different types of boundaries and, for example, the opening of these. This kind of reasoning is closely related to Brown and colleagues’ [20] framework to address wicked problems and therefore highly relevant to pave the way forward, making use of the findings of our study.

In line with findings from Imrie [11], our findings reveal that the outset from the perspective of housing companies is that accessibility matters are a biophysical problem that only concerns people with functional limitations, rather than an outset seen from a socioeconomic preventive-health perspective or an ethical and basic-human-right perspective. Various interest parties and decision-makers affect the provision of accessible housing, and their diverse perspectives should be acknowledged and communicated in closer collaboration to be able to better understand and act upon the wicked problem elucidated by the findings of the present study.

The biophysical dimension revealed that there is a lack of systematic information about the state of housing accessibility in the ordinary housing stock, as well as a low level of knowledge on the health and well-being impacts on individuals and society. The lack of a widely accepted definition of housing accessibility prevails, and there is no consensus about what should be included in measurements of housing accessibility. Relating to such challenges, we emphasize that the absence of reasonable and clear guidelines and goals regarding housing accessibility is in accordance with a previous study elucidating how the definition of standards for housing design influences the prevalence of housing accessibility problems and public health [38]. The opinions of what to include and consider in housing provision policies and practices vary, and housing accessibility relates to many other needs that are important to address. According to Lawrence [39], shared terminology and shared goals that are valid from the micro-scale housing units to the macro-scale national housing stock are a prerequisite for transdisciplinary modes of inquiry, but in reality that ambition is far from met.

A main finding is that the largest proportion of content was sorted into the socioeconomic dimension. It is obvious from the categories and quotations used for illustration that in this dimension there are many variables contributing to the wicked problem addressed. With ‘silo thinking’, distribution of responsibilities and resources, various practices, and competing priorities among actors, the cultural facet of the socioeconomic dimension is obvious. The findings indicating that efforts to improve housing accessibility could reveal or create challenges in other dimensions confirm the wickedness of the problem. In line with Brown and colleagues [20], the findings show that boundaries to knowledge cultures are strong, and that open transdisciplinary modes of inquiry and cross-sectorial communications are needed for mutual learning and development of common understanding of preferred situations, including the economic and social structures. Representatives of all actors and institutions including people facing social, environmental and health inequalities should be engaged in dialogues to discuss and agree on crucial variables and trade-offs in early planning and provision phases to apply a transdisciplinary approach.

The ethical dimension revealed considerations relating to equality, personal responsibility, responsibility for others as well as fair and reasonable use of resources without compromising people’s freedom of choice. The findings show that decision-making related to housing accessibility involves ethical dilemmas and necessary trade-offs because of the diversity of needs that should be addressed. One such indicated risk was that efforts to improve housing accessibility - based on the principle that everyone, regardless of ability to function, has certain rights [40] – could make it difficult to achieve the principle that all people should be entitled to the right to have a home and the municipalities’ responsibility for all inhabitants [12]. However, the findings in the ethical dimension also revealed creative and responsible solutions to dissolve conflicting principles and address several problems at once, for example motivate ‘matching’ of housing to both resolve accessibility problems for one group of individuals and problems with crowdedness for the other group of individuals.

The dialogue on matters sorted into the aesthetical dimension concentrated on trade-offs such as negative attitudes to housing features fulfilling accessibility standards but resulting in disproportional interior layouts, stigmatizing housing adaptations and hospital-like dwellings. Current literature highlights the value of aesthetics regarding housing adaptations and the need to involve the users in the decision-making processes to achieve the best possible acceptance of design solutions [21].

The empathetic dimension revealed a shared mutual understanding of the challenges inherent in providing accessible housing. Emphasizing the need for communication, the dialogue focused on trying to understand and influence attitudes and feelings about housing accessibility. The findings indicate that creative ways to communicate and influence are vital to changing people’s positions, bridging boundaries and striving for preferred situations. In line with Tural and colleagues [21], the findings indicate that communication strategies targeting citizens should include positive messages such as independence and health benefits. Once again referring to research on similar matters published long ago [36], while the participants in the present study seemed rather optimistic regarding the possibility to change attitudes, this is a longstanding challenge that has proven very difficult to overcome.

6.1. Strengths and Limitations

The conceptual framework used [20] was instrumental in unwinding and understanding the complexity of providing accessible housing for the ageing population, our experiences during the process of analysis, as well as the presentation of findings, reveal that the five dimensions are intertwined. As wicked problems are complex issues influenced by a web of interrelated variables that are unpredictable [17], this is not surprising and thus speaks to the relevance of Brown and colleagues’ framework. The use of the five dimensions to address wicked problem and the deductive approach was helpful in unwinding and visualizing the critical variables for decision-making about accessible housing provision.

During the analysis process we identified the socioeconomic dimension as particularly challenging, because, as described by Brown and colleagues [20], it is different from common interpretations and uses. That is, while it does comprise what in the traditional sense is called ‘socioeconomics’, it also refers to what is usually described as ‘culture’. That said, during the analysis it was particularly challenging to distinguish content related to the socioeconomic dimension from content belonging to the biophysical or ethical dimensions. On the one hand, the stringency of our analysis process could be criticized, but on the other hand this experience has strengthened our impression of the complexity of the key variables of the wicked problem of providing accessible housing for the ageing population in Sweden.

Reflecting further on study strengths and limitations, we perceive the RC method [26] as adequate for dialogue and mutual learning. The procedure and approach created an open climate where both researchers and key actors took active roles in the dialogue. In addition to the fact that the number of participants was low, a noteworthy shortcoming is that we failed to include key actors from the private housing sector, as those invited were not able or willing to participate. Their absence was raised as an issue by key actors from public housing companies with the argument that they are both players in the same market. The findings serve to deepen the understanding of the wicked problem at target, but only represent what was discussed in the context of the present study in Sweden.

7. Conclusion

While discussions regarding accessible housing for the ageing population among researchers and representatives of housing sector and public institutions are dominated by socioeconomic matters, the multiple dimensions of this wicked problem are intertwined in a complex manner. This is critical for decision-making, which to a large extent takes place in parallel organizations and processes with insufficient communication among the actors involved, which speaks to the need for boundary work. Decision-making linked to housing accessibility should not be approached solely considering biophysical or financial variables. Rather, issues related to ethics, aesthetics and empathy variables that are interrelated should not be ignored. The framework used in this study can serve as a cognitive tool for decision-makers, and the findings could increase the awareness of the diversity of individual thinking involved when addressing this wicked problem. Acting upon the crucial variables identified in this study could contribute to progressive decision-making and more efficient ways to develop and provide accessible housing for the ageing population.

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