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What Does It Take to Make the Compact City Liveable for Wider Groups? Identifying Key Neighbourhood and Dwelling Features

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Abstract: Compact cities promote sustainability through several mechanisms, and high-density city development has become a key strategy for policy decision makers to accommodate population growth and mitigate human impacts of the local and global environment. The aim of this study is to identify elements of the built environment and inner-city dwellings considered important for improving compact-city liveability for various groups throughout their life cycles. To attend to the depth and complexity of this issue, this study is based on a qualitative approach, where data are gathered through in-depth interviews with housing market specialists. The expert panel emphasises proximity to green spaces and easy access to local services/facilities and public transportation as key elements of the built environment to improve compact-city liveability. At the same time, some of the respondents strongly argue with facilitating neighbourhoods for private cars. With regard to dwelling characteristics, the experts emphasised the importance of adequate storage space and the availability of a balcony as vital to high-density liveability. Balconies can alleviate some of the negative effects by working as a personal 'mini garden'. Moreover, a general opinion among experts is that compact living developments should facilitate shared facilities to level out the space disadvantages of small-space dwellings.

Keywords: compact housing; compact city; liveability; sustainable city development; Germany

1. Introduction

High-density city development has become a key strategy for policy decision makers to accommodate population growth and mitigate human impacts of the local and global environment. Compact cities promote sustainability through several mechanisms, such as reducing car use, conserving surrounding natural areas, reducing energy use in buildings, providing better capacity utilisation of urban infrastructure, and maintaining a mixed land use that provides work opportunities and accessibility to service facilities and social contacts [1,2]. Moreover, compact cities, as opposed to urban sprawl, promote active travel (walking and cycling) and are found to be negatively related to BMI, obesity, heart disease, high blood pressure, and diabetes [3–5]. However, people's perceptions of liveability in compact urban environments differ, and some consider inner-city living inappropriate to specific groups, especially households with children, since the urban environment does not offer the same qualities that people often relate to life in suburbia [6,7]. However, density alone is not necessarily a principal determinant for liveability. Rather, more detailed elements of the urban form can be of greater importance, such as the built characteristics of the neighbourhood, public transportation services, various elements of the mixed land use, and the design of the dwelling unit (e.g., [8,9]).

These studies maintain that the relationship between density and liveability is multifaceted and complex and that liveability in high-density areas can be equal to or even better than that in more rural environments. Research is not conclusive on which elements of the neighbourhood and dwelling best capture variations in residents' perceptions of inner-city liveability [9]. A specific challenge exists with respect to developing residential environments that appeal to a wide range of people. Questions have been raised on whether residential environments within the inner city are sustainable in the longer term, since most residents are child-free and reside only on a temporary basis [6,10].

This study aims to identify important elements of the built environment for improving compact-city liveability for a wider range of people. Various features of the dwelling and the neighbourhood determine the physical character, quality, and liveability of a place, and these features should be further considered [9,11]. Contrary to previous research based on residential surveys, this study takes a qualitative approach and presents data from interviews with housing market specialists. The qualitative approach provides more in-depth information on dwelling and neighbourhood characteristics than is possible to obtain from quantitative surveys. Moreover, while previous research on urban form and residential perceptions has been conducted in North American cities, where traditions for central planning and urban forms are different compared to Europe [9], the present study is based on data from the North Rhine-Westphalia region in Germany, which features four of the country's ten largest cities. Within this context, this work explores key characteristics for successful inner-city residential development. More specifically, the present study addresses the following research question:

- What neighbourhood and dwelling characteristics determine liveability in high-density urban environments?

The paper begins by reviewing previous research on neighbourhood and dwelling satisfaction alongside the approach of the current study. Next, the methodological approach taken, and the interview guide used are discussed. This is followed by an analysis of the assessments provided by the expert panel, the aim of which is to provide a better understanding of key factors for improving compact-city liveability for a wider range of people. Finally, the paper concludes with a discussion of its major findings and their implications for urban policy.

2. Characteristics and Perceptions of Life in the Inner City

2.1. Liveability and Residential Satisfaction

The compact city is characterised by high-density developments, mixed land use, and well-developed public transport systems [12]. Despite its benefits with respect to promoting environmental living, the degree to which residing in a compact-city environment appeals to the wider community is uncertain. Compact-city living is often associated with less liveability since the urban form cannot compete with the idyllic image that people often have of life in suburbia [13]. In many Western cultures, the suburban detached house with a garden remains the ultimate dream, and high-density living is seen as unappealing and less attractive. Noise, air pollution, congestion, and higher frequencies of traffic accidents and crime are often associated with inner-city areas generating a less healthy environment compared to the suburbs [14].

Liveability is often associated with neighbourhood satisfaction, which aims to capture the extent to which physical and social characteristics of the neighbourhood meet the expectations of the residents [15]. Empirically, this concept is analysed by assessing the residents' approval of dwelling design, the neighbourhood, and the social interactions among community members [11]. Various studies have reported a negative relationship between density and residential satisfaction (e.g., [16–18]), which provide support for a more dispersed city development where functions and population are spread at lower densities. Yang (2008) claims that the negative relationship between density and liveability reported in much research is at least partly related to the study context since empirical studies of residential liveability tend to be conducted in older urban areas, which are subject to social and economic problems potentially unrelated to the physical form [19]. Arguments have been made that new

developments and redevelopments are built on better design and standards for compact and mixed-use development, which may show more positive effects of density on quality-of-life measures. Nonetheless, Howley et al. (2009) found that residents in a newly developed urban residential environment in Dublin, Ireland, were less content with their neighbourhoods compared to their low-density counterparts [10]. Moreover, very few of them rated the overall quality of life in urban areas as 'excellent', while at the same time, they had very high perceptions of quality of life in more rural settings. This led the authors to question whether high-density areas can sustain a long-term residential environment.

On the other hand, more recent studies have found that compact-city residents are equally or even more satisfied with their neighbourhood than those who live in sprawled areas, suggesting that other elements of urban form may be more important for residential liveability than density per se. In a study of the Oslo region in Norway, Mouratidis (2018) found greater neighbourhood satisfaction for inner-city residents living in apartment blocks in compact neighbourhoods compared to those residing in detached houses in sprawled neighbourhoods in the outskirts of the city [8]. The density effect was present even after controlling for sociodemographic and neighbourhood characteristics, such as aesthetic qualities and attachment. What turned out to be a crucial factor to explain higher satisfaction among inner-city residents was high accessibility and mixed land use characterised by proximity to commercial and residential activities. According to the authors, short distances to shops and service facilities make life in the inner city liveable—even more so compared to low-density urban forms. Arundel and Ronald (2017) examined the social sustainability of medium- to high-density neighbourhoods in Amsterdam, in the Netherlands [9]. The concept of social sustainability captures elements related to residential attachment with the neighbourhood, social interaction among community members, and residential satisfaction. The authors found that density by itself cannot be a principal factor for social sustainability. Rather, the impact of density was non-significant, while elements of the urban form appeared to be a significant factor. Corresponding to the latter, research on urban place making has been occupied with identifying factors that influence the quality of open spaces as an extension of the community and improving the overall residential quality of high-density environments [20]. Various factors have been recognised, such as accessibility, social interaction, park facilities, aesthetic values, safety, and privacy (e.g., [21–23]).

The studies of Mouratidis (2018) and Arundel and Ronald (2017) describe two European cities that have been fairly successful in developing an attractive inner-city environment that caters to different residential segments [8,9]. When comparing residential satisfaction in Portland, Oregon, and Charlotte, North Carolina—two U.S. cities of comparable size to Oslo and Amsterdam—Yang (2008) found differing satisfaction outcomes [19]. In Portland, density and mixed land use were associated with higher neighbourhood satisfaction, corresponding to the European cities, while in Charlotte, compact and mixed-use environmental features were considered undesirable. Yang (2008) proposed that these differences were due to the variations in urban amenities and convenience of the high-density neighbourhoods in the two cities [19]. The specific amenities that contribute to neighbourhood satisfaction in high-density environments and their relative importance for improving satisfaction have been investigated in various studies. Table 1 summarises the results from selected studies undertaken in Europe, the United States, and Australia during the past ten years. These studies address the residents' perceptions of neighbourhood amenities rather than their objective characteristics since subjective perceptions have proven to be better predictors of satisfaction than objective factors [24]. The different studies considered various elements of the neighbourhood environment, but some main findings emerged. Variables regularly associated with greater neighbourhood satisfaction comprise physical, psychological, and social factors and include perceived safety, neighbour ties, the quality of green spaces, the perceived quality of the dwelling unit, and proximity to service facilities. However, neighbourhood characteristics were regularly found to have less or no significant relationship with neighbourhood satisfaction once other features have been considered, including several sociodemographic variables, such as gender, marital status, and employment status.

Table 1. Determinants of neighbourhood satisfaction in high-density areas.

Study	Context	Significant Determinants of Neighbourhood Satisfaction
Mouratidis (2018) [8]	Oslo, Norway	Neighbourhood attachment Quality of open public spaces Aesthetic quality Neighbourhood safety Neighbour ties
Bramley and Power (2009) [17]	England (nationwide)	Access to services Housing type Adequate parking Proximity to public transportation Low-income residents (negative)
Yang (2008) [19]	Portland (OR) and Charlotte (NC), U.S.	Crime Appearance Existence of bothersome situations Satisfaction with dwelling unit Open space within a block
Lovejoy et al. (2010) [25]	Selected urban areas in California, U.S.	Attractiveness (e.g., level of upkeep) Safety Liveliness
Howley, Scott, and Redmond (2009) [10]	Dublin, Ireland	Satisfaction with apartment Perceived safety in area Community spirit Employment opportunities Absence of litter
Permentier et al. (2011) [24]	Utrecht, Netherlands	Population composition Contact with neighbours Social safety Shops Green spaces
Buys and Miller (2012) [11]	Brisbane, Australia	Dwelling features (position, location with respect to neighbourhood facilities, quality of outdoor air, storage space) Noise (traffic, others' household appliances, emergency service vehicles) External (tidiness, walks, safety) Social (contact with neighbours, encountering strangers (negative))
Lofti et al. (2019) [26]	Quebec, Canada	Proximity to shops, services, and public facilities Ambience Trees and greenery Quietness
Arundel and Ronald (2017) [9]	Amsterdam, Netherlands	Local stores Length of waterfront per neighbourhood area Traffic nuisance (negative) Housing size Dwelling construction year
Ciorici and Dantzler (2018) [15]	North Camden (NJ), U.S.	Quality of social networks Extent of social networks Neighbourhood safety Neighbourhood's physical conditions Access to transportation Quality of public services

2.2. Dwelling Design

For compact living to be a viable mainstream housing alternative, it will need to be acceptable to a wide range of people. Many people currently view apartments and high-density living as neither appealing nor appropriate. Convincing residents to consider swapping their detached house in the suburbs for a compact dwelling in an urban environment will require planners and designers to prove that living in high-density areas is an appropriate and positive experience in different phases of life. A particular challenge in this respect is the dwelling unit. Compact-city development rests on limited living space, and residents must confine themselves to considerably fewer square meters compared to more sparsely populated areas. To create functional and appealing homes in a restricted space arrangement is a significant challenge.

Dwelling design relates to the internal and exterior design features of the unit. The high residential turnover of inner-city living is closely linked to residents' perceptions of urban apartments being unsuitable in the longer term. Several studies cited above found that dwelling satisfaction is a key determinant of neighbourhood satisfaction, implying less residential turnover with improved dwelling satisfaction. However, few of these studies broadly evaluate specific features (e.g., facilities, size, cost, and design) that determine dwelling satisfaction. Lewicka (2010) claimed that while much research has focused on perceptions of and attachment to neighbourhood characteristics, less is known about the role of the dwelling in forming residential satisfaction [27].

Nevertheless, small units and space limitations are repeatedly found to be factors that reduce satisfaction and perceived liveability in high-density areas. Access to larger residences is the main reason for moving out of the city [26,28], and cramped living conditions are found to severely lower psychological well-being [29,30]. However, what is considered adequate living space varies, and it has been argued that conceptualising adequate living space as something objective might be irrelevant when people may make sense of a dwelling size in diverse, subjective, and relative ways [29]. Moreover, dwelling size alone is not necessarily the most critical factor, provided the space arrangement is efficient and flexible. Flexibility refers to adaptation potentials. A flexible dwelling can adapt to residents' changing requirements, with respect to both technological changes, such as updating old services and personal changes such as becoming older or having children [31]. Thus, flexible dwellings may well improve the perceived liveability of smaller units, since no linear relationship exists between individual housing size and residential outcomes. For instance, Arundel and Ronald (2017) found that while larger dwellings up to a certain level appeared to increase reported resident satisfaction, the largest dwellings were also related to a lowered sense of community scores [9].

The impact of specific features on dwelling satisfaction was investigated by Buys and Miller (2012) in a high-density city environment in Brisbane, Australia [11]. Dwelling satisfaction was significantly related to the position of the dwelling in the building, facilities in the dwelling (sanitation and heating), communal facilities (pool, laundry), the design/layout of the dwelling, and spacious living rooms. Thus, limited space was a concern, and when asked about what they would change in their dwelling in an open question, 83% of the respondents stated a desire for larger and better-designed units. Satisfaction with the size of the kitchen was the most important factor for overall satisfaction with the apartment in Howley's (2010) study [32]. In addition, storage space, sound insulation, and the view from the dwelling were significant determinants of apartment satisfaction. The author concluded that improvements in the design of these features could lessen the negative effects of high-density living and, in effect, bridge the gap between high-density and high-quality urban liveability. These results indicate that various factors, aside from dwelling size, are of importance; however, size limitations in various forms (e.g., area, storage, flexibility) stand out as the critical factor with respect to dwelling satisfaction.

2.3. Residential Groups

The residents in high-density areas are increasingly made up of young adults in lone-person households with above-average socio-economic status [7,32,33]. The appeal of high-density living to young people rests on preferences for an urban lifestyle [33], less car dependency [34], and access to the '24 h vibrancy' of the city [7]. Moreover, demographic and economic factors contribute to the 'youthification' of cities. Birth rates are declining, and today's young adults are having children later than previous generations. Claims have also been made that young adults face greater uncertainty in the labour market given the growth of 'flexible work arrangements'. Combined with rising housing prices, this leads young adults to purchase or rent smaller apartments at a lower total cost than, for instance, a detached house in the suburbs [33].

Housing affordability constraints mean that several families with children cannot afford to rent or buy a dwelling with sufficient space in the city centre. Easthope et al. (2010) argued that government pressure for increased urban consolidation should be accompanied by an acknowledgement of the different sub-markets within the apartment population and the needs of these groups. In addition

to young adults and those transitioning to families, these sub-markets might be elderly households, empty nesters, and families with children and multi-generational living arrangements [35]. The lack of including a wider range of people may lead to gentrification, as the central city can become socially exclusive and demographically limited in the sense that it can be considered inappropriate to specific groups, especially households with children [6,7]. Temporality is a related problem since young professionals are unlikely to remain in the city for long periods as they normally aim to relocate to lower-density areas when they enter the family stage of the life cycle [36,37]. Having children is a fundamental transformation in life, and different demands and preferences for living spaces and neighbourhood environments arise [38,39]. In the study of Howley et al. (2009), 77% of residents in a regenerated area in the inner city of Dublin, Ireland, stated that they were likely to move from their unit in the next five years because of the quality of the dwelling unit [36]. According to the authors, catering to the minority of the population will severely limit the potential of these areas to continue to grow, which is central to achieving compact-city goals. A balance in age and household structure areas is required to achieve sustainable communities. In addition, high residential turnover is found to lower neighbourhood satisfaction [19].

Although much research expresses concern for potential gentrification and the exclusion of households with children from inner-city areas, other studies emphasise that inner-urban residents are heterogeneous and that the demand for city-centre living is diversified. For instance, Mouratidis (2018) found that density was positively related to neighbourhood satisfaction across age groups in Oslo, Norway, although the effect was somewhat stronger for the younger age group (<50 years) compared to the older group (>/=50 years) [8]. Moreover, contrary to most other empirical studies, Mouratidis (2018) did not find that households with children living in high-density areas were less satisfied with their neighbourhood compared to similar groups in the suburbs [8]. Rather, the impact of density on neighbourhood satisfaction for this group was positive but non-significant, suggesting that "compact areas in Oslo are liveable even for families with children" [8] (p. 2419). In a Swiss study, Rérat (2012) emphasised that residents with the financial freedom to choose from a wide range of locations preferred to live in urban areas [40]. Rérat maintained that this preference can be explained by the value attached to urban characteristics, e.g., proximity, density, and public transportation systems. Nevertheless, most empirical studies point to compact living as unattractive to households with children, especially those with school-aged children [41]. However, the opposite is true for young well-educated renters who appreciate social heterogeneity and have less desire for privacy.

2.4. Summary

The literature has identified various neighbourhood and dwelling features vital to increasing compact-city liveability to wider groups, e.g., transportation, land use, public areas and green spaces, communal facilities, facilities in the dwelling, the design/layout of the dwelling, dwelling flexibility, and storage space. The insight from the literature review provided a frame for the research design and the interview guide used in the meetings with the housing market experts.

3. Method

This study takes an explorative approach and aims to explore the characteristics of the compact-city neighbourhood and dwelling that will make high-density living acceptable to wider groups of people. Information was gathered through in-depth interviews with eleven housing market specialists from the North Rhine-Westphalia state in Germany. The informants were chosen to represent the relevant housing market fields, such as research, architecture, development and construction, property management, and marketing, as well as owners (see Table 2). The respondents have work experience from one to more than thirty years in their respective fields. More than half of the specialists live in their own houses or apartments. Four informants live in a rental apartment, whereby one of them is part of a flat-sharing community. The respondents thus represent a wide range of work experience as well as different housing situations.

The population of North Rhine-Westphalia is about eighteen million, and while the population size has remained stable over the past ten years, the number of households increased by almost 10% to nearly nine million in the same period. The growth in the number of households increases the demand for housing, especially in the agglomeration areas [42]. In some regions, housing prices and rental rates have reached levels that make it difficult for people to find adequate apartments. North Rhine-Westphalia is the most densely populated federal state in Germany, and about thirty of the one hundred most populated communities in the country are found there. Population density in Düsseldorf, one of the biggest cities in Germany, is 2800 inhabitants/km^2. In Cologne and Essen, two other main cities, this number is 2700 inhabitants/km^2 [42]. Thus, compact living and the reduction of living space increase in importance for planners and developers.

Data were gathered through semi-structured interviews, which allow for detailed responses while making comparisons among the respondents possible [43]. Although this method requires adherence to the interview script, it allows for flexibility, as different paths develop during the interview process [43,44]. Before the interviews, the respondents were informed about the purpose of the study, and confidentiality was guaranteed. The interviews lasted approximately one hour and were conducted in person in May 2018. With the permission of the participants, the researchers audiotaped and subsequently transcribed the interviews.

The expert panel named elements of the built environment and dwelling that they considered important for improving compact-city liveability and the most likely residential groups for compact living. Concerning the last topic, specific attention was given to people's 'housing career' and the potential to attract more heterogeneous residential groups to the inner city. Analysing the interview data, all attributes mentioned from more than one participant have been considered. In doing so, twenty-four neighbourhood characteristics and almost thirty dwelling attributes have been identified.

Table 2. Key characteristics of informants.

Informant	Gender	Real-Estate Expertise	Work Experience	Housing Situation
#1	Female	Research	10 to 15 years	Flat sharing
#2	Male	Owner	n/a	Owner (house)
#3	Male	Research	15 to 20 years	Tenant (apartment)
#4	Female	Architecture	1 to 5 years	Tenant (apartment)
#5	Male	Development and construction	more than 30 years	Owner (house)
#6	Female	Architecture	15 to 20 years	Owner (house)
#7	Male	Property management	more than 30 years	Owner (house)
#8	Female	Owner	n/a	Owner (apartment)
#9	Female	Marketing	5 to 10 years	Owner (apartment)
#10	Male	Architecture	15 to 20 years	Tenant (apartment)
#11	Female	Property management	5 to 10 years	n/a

4. Results and Discussion

4.1. Neighbourhood Characteristics

The expert panel was asked to list qualities of a high-density neighbourhood that they considered vital to increase the acceptance of inner-city living. Altogether, twenty-four different community attributes were listed. The attributes are grouped in three general categories based on their common features: (i) access to and the quality of transportation facilities, (ii) access to and the quality of open spaces, and (iii) proximity to commercial and public facilities (other than transportation). The specific attributes within the categories are listed in Figure 1. The ranking within each category corresponds to the number of times the specific attribute was mentioned by the respondents.

4.1.1. Transportation

Almost half of the responses considered transportation factors. Mobility in the compact city rests on new mobility concepts, where car use is reduced and public transportation and non-motorised

travel prevail. A well-developed public transportation system was highlighted as a prerequisite for the acceptance of inner-city living by most respondents. Specifically, the respondents emphasised that public transportation reduces car dependency and the need for parking, making space available for other purposes:

> *Easy access to public transportation systems reduces the need for private parking. Having direct access to public transport offerings means that people don't need two cars per apartment anymore . . . There are still many regions in Germany where the public transportation system is not yet well developed. In these regions, people don't have many alternatives to a private car. (#4)*

However, as the second part of the quotation illustrates, the respondents stressed that the quality of the public transportation system in some of the main cities in the North Rhine-Westphalia region is inferior and not sufficiently developed to reduce people's car dependency. Thus, for many people, mobility needs are not covered by public transportation alone, and car access is regarded as vital if inner-city living is to appeal to a wider range of people. In fact, all respondents emphasised that inner-urban developments should organise individual car access and had various opinions on how this can be arranged. Car sharing was the most frequently mentioned neighbourhood item. Car sharing can take various forms (see [45] for an overview), and with recent technological advances and the use of smartphones with broadband connectivity, new systems are constantly being introduced. However, generally speaking, car sharing is a system that allows people to rent locally available cars at any time and for any duration [46]. Thus, car sharing outsources the ownership of the vehicle, while, at the same time, the individual has access to a fleet of shared-use vehicles on an as-needed basis. Several respondents considered car sharing to be well-suited as an alternative to private ownership in walkable, high-density, mixed-use urban areas with convenient transit nearby:

> *To be honest, if you live centrally, a lot can be done by bike. Okay—when I had to transport something, I used car sharing. In general, when I was still living in the city, I didn't own a car. (#6)*

> *The young generation is not interested in cars anymore. A car is simply a commodity. They revert to car-sharing systems if they need to—but that's it. (#7)*

However, the owner and marketing expert emphasised the importance of individual car ownership. This was commercially motivated in the sense that apartments with access to a private parking space were considered more attractive and marketable since people generally appreciate the value of private parking close to their home. The marketing expert drew on personal experience when stressing the need for private parking:

> *Short distance to parking spaces is very important. I used to live in an urban area where I had to search a parking space every evening for at least half an hour. If you have done that for four years, you know about the value of private parking spaces. (#9)*

> *Private parking is definitely necessary. Otherwise, it is impossible to sell the apartment. (#2)*

A final mode of transportation brought up by the respondents was bicycling. Four respondents reflected on organising bike-sharing systems to support transport for short-distance trips within the city, e.g., a high-accessibility service where renting can come at a cost or be free of charge:

> *I myself use bike sharing. It makes you very flexible—depending on weather and location, it is often a lot easier to go by bike than by car. Especially in the city centre, you are not dependent on a parking space. (#8)*

Furthermore, several respondents emphasised the need for organising infrastructure for electric bikes. Although still in its infancy, the e-bike is touted as an important contributor to reducing air pollution and noise in urban environments [47,48], and e-bikes have become a common mode of transportation in some countries, such as the Netherlands and Germany [49]. The transportation researcher and the marketing expert emphasised the comfort and the range of e-bikes as especially advantageous:

Bike sharing systems are great. It doesn't have to be e-bikes—normal bikes are sufficient. But e-bikes are definitely a little more comfortable. (#1)

From my point of view, e-bikes can provide high mobility in cities. (#9)

4.1.2. Open Spaces and Features of Mixed Land Use

About one-third of the responses on neighbourhood design concerned features of open spaces in the nearby surroundings. The literature reviewed above showed that the provision of open-space areas is a key element for increasing neighbourhood satisfaction in high-density environments. The respondents in the present study were particularly concerned with residents' access to green spaces. The concern for green environments was shared by all respondents, and apart from car sharing, this was the neighbourhood quality most frequently mentioned as a prerequisite for greater acceptance of inner-city living. However, the panel emphasised that the impact of green spaces on liveability is strongly related to the accessibility, quality, and maintenance of the area:

If the building is located close to a well-groomed public green area, a [park], or a forest, this increases the quality of life and leisure. Even better—I have the chance to live a little greener with a private garden. (#9)

An apartment should either be close to public green spaces [or] have a private green space or maybe roof greening. (#10)

Although large green spaces are preferred, some respondents mentioned that the planting of trees within the cityscape or roof gardening will improve neighbourhood quality since people generally like to be surrounded by greenery. This view was put forward by the respondent from the development and construction sector, who also stressed the positive impact of roof greening on the urban climate:

It should be required by law to grass flat roofs. This would improve the city climate. (#5)

The studies cited above (e.g., [50]) emphasise the importance of urban green areas to promote physical activity, health, and psychological well-being. The respondents in the present study stressed accessibility as a key factor to achieve the benefits from urban green spaces and meeting points. Accessibility describes the spatial ease of reaching these areas, and green spaces should be accessible by foot or bike:

Regarding one of our residential areas—a lot of people say that's perfect to have direct access to a green space by bike. (#11)

Another effect of having green areas in immediate surroundings is that people may be more willing to accept the space limitations of their dwellings. This view was expressed by one of the architects who believed that if developed the right way, easily accessible green areas can work as extensions of apartments since they provide an immediate area for relaxation and comfort in everyday life. In addition, looking out to green surroundings creates the impression of expanse and spatial generosity:

Of course—having a wider range of possible leisure activities and green space, I would be willing to make certain concessions or to have less private living space. Maybe even when I could directly look into the green out of my window—such a view extends the actual living room. (#6)

Approximately 20% of responses were related to qualities of mixed land use. Several respondents emphasised access to institutions of local supply, such as supermarkets, drugstores, bakeries, and pharmacies, as vital to increasing liveability. In addition, kindergartens, schools, and public swimming pools were considered important. Nevertheless, these neighbourhood features were less frequently mentioned by our expert panel as determining the liveability of high-density living compared to transportation facilities and access to green spaces.

Car sharing
- Public transportation
- Individual car use
- Individual parking
- Bike-sharing
- E-bikes
- Bicycle lanes
- Alternative mobility concepts
- Intelligent parking system
- Reduce traffic load

Transportation (47 %)

- Access to green spaces
- Access to open spaces
- Access to public meeting points
- Rural location
- Quality of green spaces
- Accessibility to parks
- Quality of open spaces
- Connection to landscape zones
- Street greening

Open spaces (32 %)

- Access to institutions of local supply
- Access to job/work spaces
- Access to local services/facilities
- Sport facilities/leisure activities
- Launderette

Proximity to commercial/public facilities (21 %)

Figure 1. Neighbourhood characteristics considered important to improve the acceptance of high-density living.

4.2. Dwelling Design

Some thirty attributes were listed as relevant with respect to the design of the dwelling. In Figure 2, these are grouped into three overall categories: dwelling size and flexibility, dwelling features, and shared facilities/space. Again, the ranking within each category corresponds to the number of times the specific attribute was mentioned by the respondents.

4.2.1. Dwelling Size

Compact living implies the reduction of the individual living space. At the same time, inner-city dwellings must meet certain spatial demands to gain appeal to wider groups of people, and spatial disadvantages must be levelled out by some means. Flexible and adaptable architecture is a key feature in overcoming some of the drawbacks of compact apartments, as stated by several respondents. Flexibility refers to the capability of a space to provide distinct choices, configurations, and customisations, as pointed out by the architects and one of the developers:

There should be some flexibility regarding the architecture. It should be possible to change it [the apartment] slightly if your needs change. (#4)

It would be perfect to plan a house immediately in a way that allows you to change its architecture later without any big effort. (#11)

However, flexibility is not only a question of dwelling design. The respondents emphasised that an apartment block must meet different demands throughout the residents' life cycle stages. In this context, flexibility refers to the opportunity for residents to alternate between apartments within the building when significant transformations in life occur—for instance, when a young household with children is growing and requires more space or when empty-nester households want to reduce their residential area. In turn, this contributes to a more stable residential environment and less residential turnover:

There [in one building] should be apartments with various price levels and adaptable sizes. In this way, one can move within the building to a more suitable apartment or rebuild the apartment itself. (#3)

4.2.2. Storage Space and Shared Facilities

The panel was clear that space limitations demand efficient floor plans where every square meter serves a specific function and 'dead corners' are avoided, meaning every single element of the dwelling

should exist for good reason. Nevertheless, reducing individual living space means eliminating certain elements and functions. Adequate storage space was regarded the most challenging aspect of compact dwellings and a key feature to improve high-density liveability for various groups. Even in small apartments, developers should prioritise storage space for personal belongings, as expressed by one of the architects:

> *The furnishing of a dwelling should be good. It should provide a lot of storage opportunities, even in a small space. (#10)*

Shared facilities are another way of levelling out the space disadvantages of small-space dwellings. In fact, the respondents considered shared facilities a requirement of compact living. Examples given included laundrettes, craft rooms, the outsourcing of various functions, multi-functional rooms, green spaces, and rooftop terraces. However, as emphasised by several respondents, tidiness is a general problem in connection to common facilities. Moreover, a few respondents warned against the widespread use of sharing concepts since they can intimidate individual space and possibilities to retreat from neighbourhood relations. As pointed out by the marketing expert, compact living means not only the reduction of living space but also the need to live within a community:

> *I believe that if you live compact, you don't have the possibility to distinguish your individual spaces. Compact apartments are always combined with common spaces and sharing concepts. You don't really live alone but rather in some kind of community. (#9)*

4.2.3. Dwelling Features

Regarding specific dwelling features, the respondents emphasised kitchen facilities and a private balcony as the most significant elements (Figure 2). A balcony can alleviate some of the negative effects associated with high-density living by providing a personal 'mini garden', a place to retreat and take time out from daily routines. Moreover, to some extent, a balcony replaces parks or other green spaces in the close environment, as expressed by one of the property managers and one architect:

> *Without one of them [garden or balcony], I wouldn't move in or at least not buy it. Additionally, it is desirable to have quick access to a green space. (#7)*

> *It is important to have a common meeting point, e.g., an inner courtyard where people meet. In addition, it is necessary to build balconies to give the inhabitants the opportunity to be outside. (#10)*

The respondents had differing assessments of the role of the kitchen in compact dwellings. A general agreement existed that compact living developments should include shared kitchen facilities; however, the respondents disagreed on whether such facilities should replace the individual kitchen inside the dwelling or just be a supplement. While some of the respondents viewed the kitchen as an element that can be eliminated from the apartment and replaced by shared kitchen facilities and reasonably priced restaurants in the nearby surroundings, others valued the kitchen as a vital and essential element of a dwelling, which could only be supplemented—but not substituted—by a larger shared kitchen:

> *I believe I can say from my own experience that in the case of letting an apartment, people put great emphasis on the bathroom and the kitchen. (#6)*

> *There should be a laundrette or something similar ... And I think a shared kitchen would be great. (#3)*

The exposure of the apartment and spacious ceiling height were additional dwelling features emphasised by the panel. These features are vital since they prevent the feeling of living in a small and dark box, according to our respondents. An apartment with exposure to pleasant surroundings enhances well-being and comfort, whereas a spacious ceiling height, to some extent, compensates for the reduction of living space:

You need a good exposure of the dwelling, an adequate size, a comfortable room height, and one part which is only private. Then there can be an appropriate proportion of common space. (#3)

Sufficient windows and a good room height are important. (#9)

Figure 2. Dwelling characteristics considered vital to improve the acceptance of high-density living.

4.3. Residential Groups

Neighbourhood and dwelling design developments along the lines suggested above can increase the acceptance of the inner city as a residential area to other groups than those seen today. Still, most respondents did not consider compact housing an attractive alternative to large groups of households with children, irrespective of environmental and housing improvements. Discussing the residential groups for compact living, only one of the architects pointed to families as a main target group for high-density living (Figure 3):

I think families can be a main target group. From my point of view, young adults and even young families are willing to live with less room. (#4)

Most respondents still considered compact living a housing alternative, primarily those in the younger generation. All but the two property managers named young professionals/students as the most likely residential group. Students, as well as young professionals, have limited financial resources and are willing to accept reduced living space to reside in the inner city. These groups value the urban vividness and the short distances within a city:

I think that mostly young people would be interested in compact living. Maybe students and young professionals—mainly people with low requirements. (#1)

Young and old people ... don't need a lot of living space and have lower incomes. (#3)

For compact housing, it seems obvious that the main target groups are young singles and, in particular, young couples—so-called DINKYs (double income, no kids yet). (#10)

Six respondents considered seniors and so-called empty nesters (i.e., households where the children have moved out of their childhood home) as main residential groups. According to the respondents, these groups view their houses as a problem with regard to heating, cleaning, and various other duties that come with living in a detached house. Moreover, seniors and empty nesters have more spare time, and several respondents believe this increase of spare time is used to establish new social contacts and make the most out of various activities and cultural facilities within the city:

I think younger and also older people are willing to reduce living space, older people in the following manner: being happy that they don't have to keep all the nonsense clean—to heat, to tidy up, etc. (#5)

In Germany, I believe that it would be worth [it] to encourage innovative concepts for older people living together. Currently, we plan and build a flat-sharing community for seniors. They are happy with this concept because they don't have to live alone but rather together with other people. (#4)

Some respondents pointed to investors as another group who pay great interest to inner-city apartments. Rising property prices and a large and growing demand for rented property by young people with a transient attitude to inner-city living have contributed to the growth in the number of investors 'buying to let'. Specifically, investors look for small apartments to rent to commuters and students who regularly change living environments. This is also apparent in the fact that a lot of marketing concepts for compact dwellings are geared towards this target group by emphasising high profitability. The marketing expert expressed these thoughts in the following way:

Providers of small apartments are often [oriented] towards capital investors. This becomes obvious when considering the marketing concepts. A lot of apartment buildings with very small units (twenty to thirty square meters) are advertised with risen market prices and high profitability. (#9)
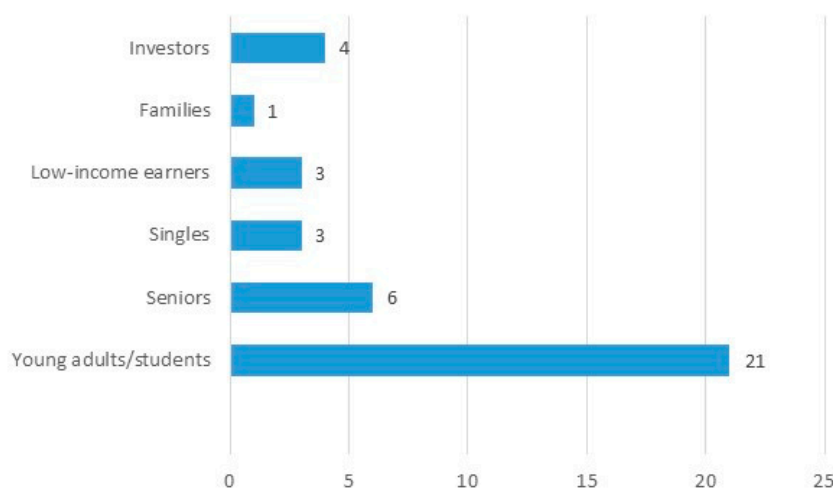

Figure 3. The most likely residential groups for compact housing projects.

5. Conclusions

This study has examined elements of the built environment that real-estate experts consider important for improving compact-city liveability. What the above discussion shows is that both the neighbourhood design and qualities of the specific dwelling determine the character and liveability of a residence. Many of the features addressed by the panel correspond to previous findings in the literature. For instance, the panel considered access to green spaces as the single most important neighbourhood factor for improving the appeal of compact living. Green areas are often a limited resource in densely built areas, but research repeatedly points to public green space as an essential infrastructure element within the compact city, increasing residents' well-being, life satisfaction, and physical and mental health [50–52]. These benefits are highly valued by residents, as various studies have found that high-density residents are willing to pay a substantial premium to have a green space nearby or have a view of a park [53,54]. In addition, corresponding to previous research, experts attach great importance to proximity and easy access to institutions of local supply, jobs, co-working communities, and local services/facilities. Such characteristics of urban density are essential to making compact living attractive for various residential groups.

Sustainable compact-city development relies on severe restrictions on individual car use, a well-developed public transportation system, and walkable neighbourhoods and urban areas. The panel highlights the importance of public transportation and non-motorised travel for compact-city liveability. However, at the same time, they perceive heavy restrictions on car use as a severe obstacle to increasing the attractiveness of urban environments to wider groups of people. Car sharing is a measure used to mitigate the needs for individual car ownership, but several respondents strongly argued for facilitating neighbourhoods for private cars. These opinions were particularly expressed by the property managers, the marketing expert, and the resident owners in our panel, suggesting a commercial interest underlying these ideas. The emphasis given to facilitating private car use opposes much previous research on neighbourhood satisfaction and liveability in high-density areas conducted elsewhere in Europe (e.g., [8,9,28]). In addition, much recent research in transportation indicates a levelling off or much slower growth in car use and ownership in Western countries (e.g., [34,55]). Nevertheless, as expressed by one of the respondents, cars are a symbol of freedom and mobility for many Germans, and car density in Germany is among the highest in Europe (https://ec.europa.eu/eurostat/statistics-explained/index.php/Passenger_cars_in_the_EU). Hence, in the present context, dealing with private car ownership indicates a major challenge with respect to increasing the attractiveness of high-density living to wider groups of people.

With regards to dwelling characteristics, much research has focused on limited living space as a major hindrance to high-density liveability. A general opinion among the experts in the present study is that many people, most households with children being an exception, are willing to accept space limitations if the compact dwelling meets certain spatial demands. Specifically, the panel emphasised adequate storage space as a prime factor for improving liveability. According to the experts, people would be less reluctant to downscale the size of the dwelling provided it offers sufficient storage space for various belongings. Dwelling size and storage space are clearly related. Nevertheless, improvements in the design of storage space of compact apartments could alleviate some of the negative effects associated with high-density living. Likewise, the panel emphasised the availability of a balcony. In a compact dwelling, a balcony may serve several purposes. It provides a 'mini garden' for planting and the greening of the apartment, which, to some extent, can replace other greening elements in the near environment and can provide an area for recreation and a place to take time out from daily routines. A balcony can also make a unit seem more spacious, which is particularly important for smaller apartments. Thus, adequate storage room and access to a private balcony can bridge some of the gap between high-density and high-quality urban liveability.

A general opinion among the experts is that compact living developments must secure shared facilities. A specific issue addressed by the respondents was the role of the kitchen. Here, the panel were split in their opinions. Some identified kitchens as an element that could be replaced by shared kitchen facilities and reasonably priced restaurants in the nearby environment. Others perceived the kitchen—as well as the bathroom—as vital elements of an apartment. Traditional kitchens can perhaps be reduced to small kitchenettes for compact dwellings, provided they are supplemented by larger shared kitchen facilities in the same building. However, in today's climate, it would be difficult to let or sell an apartment without private cooking facilities.

The panel expressed concerns about the residential quality of today's high-density environments. Planners and developers should pay more attention to neighbourhood and dwelling facilities that raise the liveability of compact urban areas. Nevertheless, the improvements emphasised by the respondents are not seen as sufficient to attract households with children to the inner city. According to the panel, the majority of households with school-aged children continue to prefer conventional suburban neighbourhoods with a relatively sprawled environment and better access to green areas. Thus, compact living developments should primarily be designed to accommodate residents with no/small children and lower-income households, which are found among senior citizens and young adults/professionals. For households with small children, life in the inner city is likely to be transient, and in the long run,

they will leave for a less dense environment. However, high-density development 'done well' will increase dwelling and neighbourhood satisfaction and, ultimately, lower residential turnover.

Study Limitations and Further Research

Through in-depth interviews with housing market experts, the present study has provided information on dwelling and neighbourhood characteristics considered vital to improving residential liveability in high-density environments. Many of the features highlighted by the respondents correspond to previous findings based on quantitative approaches, while at the same time, the data provide a more thorough understanding of these attributes than is possible to obtain from survey questionnaires. However, as for most qualitative studies, the generalisability of the results can be questioned. A limitation of the study concerns the composition of the expert panel and the geographical context. The respondents were recruited among housing market experts in the North Rhine-Westphalia state in Germany, and the results must be interpreted within this regional/cultural setting. Reflecting on the neighbourhood characteristics, it is apparent that the respondents emphasised physical attributes (e.g., transportation facilities, proximity to green areas, access to jobs) more than psychological/social factors, such as perceived safety, neighbourhood attachment, and ambience. This contradicts some previous research cited above (cf. Table 1) and might be a consequence of the respondents' professional backgrounds. Architects, developers, etc., are more likely to directly influence the physical factors of a neighbourhood environment than psychological/social factors and thus might also weigh these attributes more heavily than factors that they cannot directly influence. Moreover, the geographical context must be considered when interpreting the importance given to transportation facilities in general and individual car use in particular. Car density in Germany is among the highest in Europe, and to many Germans, the private car is more than just a means to get from A to B but rather a symbol of freedom and identity. Thus, provided that high-density city development maintains a key strategy for policy decision makers, future studies of compact-city developments should include various geographical and cultural contexts. Moreover, qualitative research on the reasons for accepting/rejecting compact living, in particular among households with children, will prove useful in facilitating a more mixed demographic environment in high-density areas.

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