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Quality of Apartment Layouts in Contemporary Urban Housing: The Study of Riga

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Abstract

Housing is not only shelter as well as a fundamental human right but also a setting which plays a vital role in daily life. In light of the housing issues in many urban settlements, it is important to consider human needs in efforts to solve housing problems. Unmet human needs may cause significant conflicts and pathologies for individuals and society. In turn, human-oriented design elevates the quality of housing and contributes to overall sustainability. Each year in Riga and its agglomeration, new residential projects appear. Little is known about how these projects respond to human needs and contribute to the overall goal of sustainability. This study aims to outline human needs theories in the context of housing design and to evaluate whether contemporary apartment layouts succeed or fail at fulfilling those needs. The investigation of human needs theories has been based on a relevant literature review. The exploration of housing evaluation systems in the United Kingdom and Switzerland has been used to link human need theories with measurable indicators regarding housing layouts. Afterwards, 12 indicators have been determined and used to assess case studies. The significant findings indicate that there are two main approaches to apartment layouts. In the case of the compact-budget approach, weaknesses, such as single-aspect orientation or small room dimensions, have been identified. In the case of the generous-luxurious approach, the much larger apartments and total floor areas allow for better layout options with added value in many instances. This paper also reviewed an extra case study, the Prototype project suggested by the Ministry of Economics of the Republic of Latvia, which appeared to demonstrate a mediocre performance in terms of human-centred design.

Keywords: human needs, contemporary housing, apartment layouts, residential environment, housing sustainability

1. Introduction

Since 10 December 1948, according to Article 25 of the Universal Declaration of Human Rights, housing has been considered a fundamental human right. Furthermore, 'adequate housing must provide more than four walls and a roof' [1] and should be a place where the family system can answer its various needs (Mahdavinejad, Mashayekhi & Ghaedi, 2012). In centuries past, numerous human need theories have been developed, including Maslow's hierarchy of needs, Alderfer's ERG (Existence, Relatedness, Growth) theory, Max-Neef's Matrix of Needs, and others. Human needs theorists suggest that one of the primary causes of severe internal conflicts is people's inability to meet their unmet needs, which is the case on all levels: the individual, group

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and societal (Marker, 2003). Furthermore, any fundamental human need not adequately satisfied generates pathologies (Max-Neef, 1991). Therefore, understanding human needs is one of the crucial aspects that may help achieve successful design. It has been suggested that living in a well-designed home, which provides adequate space to function well, is essential to ensuring general health and well-being. In addition, a well-designed home can provide the necessary settings for its occupants to meet their educational and work productivity goals, can easily adapt to their changing needs, reduce anti-social behaviour, and may stabilise the housing market in the long term (University College London, 2010). However, existing studies indicate that housing often fails to meet human needs. A study conducted in Oslo has concluded that apartments built in recent years do not reflect the needs of households of different cultural backgrounds, household types, and structures due to room sizes and layout configurations (Manum, 2006). Another study has found that many apartments in Melbourne include long, narrow corridors, insufficient natural light, and poorly designed private balconies with limited usage. This research aims to outline human needs theories regarding housing and evaluate how appropriately the Riga region's contemporary apartment layouts respond to these needs (City of Melbourne, 2013).

2. Research Methods and Case Studies

A literature review of human needs was used to ground a theoretical framework. An analysis of existing housing quality evaluation systems of the United Kingdom and Switzerland was used to link the theoretical framework with measurable housing characteristics. An apartment layout quality matrix has been developed through the adoption of indicators. It includes 12 indicators with their median values. These referenced median values serve as a reference point for qualitative discussion. This evaluation matrix was used to assess the case studies and indicators, and wherever possible, are visually represented with graphical methods. The first round of case studies was selected based on the following characteristics: located in the Riga region; the first construction phase was at least completed from 2000 to 2020; consists of at least two buildings in one architectural ensemble; includes at least 80 apartments; and housing unit layouts are available. The author's previous research has shown that Riga region apartments can be divided into two main groups. The first is the generous-luxurious group, characterised by relatively sizeable total apartment areas and an upper price range. Secondly, the compact-budget one, which, in turn, has a relatively small total apartment area and a lower price range. The second round of the case study selection was based on the division of these two types. Afterwards, apartment layouts were grouped by the number of bedrooms. The final selection was based on project size (in favour of bigger projects) and typicality (in favour of ordinary solutions). A Prototype project of the Ministry of Economics of the Republic of Latvia was selected as an extra case study. In total, nine apartment layouts consisting of typically one, two or three bedrooms were analysed in-depth. The overall results are represented in tables and figures, followed by qualitative discussion and conclusions.

3. Human Needs Regarding Housing

3.1. Human Needs Theories

Human needs is a topic that has been discussed since ancient times. Aristotle determined two kinds of needs. Firstly, absolute needs do not refer to any goal except one's existence, which must be met to live. Secondly, the needs are based on an aim that a human pursues, thus achieving a good or avoiding an evil action (as cited in Kragulj, 2014). According to Soper (as cited in Seelig, Milligan, Phibbs & Thompson, 2008), 'needs refer us to the essentials, to what is indispensable rather than to what we would merely like to have.' Flew (as cited in Seelig, Milligan, Phibbs & Thompson, 2008) suggests that 'the satisfaction of people's needs must be in their interests, or in some other way good for them… whatever is needed is needed not for its own sake but as a means to the fulfilment of some further function, purpose or end.' In the last century, numerous human need theories have been developed, including Murray's system of needs, Malinowski's theory, and the ERG theory by Clayton Alderfer and others.

One of the most famous theories is Maslow's hierarchy of needs, which was introduced in 1943. This theory refers to five human needs represented in a hierarchical pyramid. At the bottom are

physiological needs, such as food and water. Next, there is the need for safety, love and belonging, esteem, and finally, the highest demand, self-actualisation. Maslow states that the lower needs must be satisfied before a person can pursue the next more increased need category. This theory is simple, intuitive, widely known and has practical value. However, one of many criticisms suggests that there are many exceptions to the hierarchy. For example, some people find self-esteem more important than love. Responding to such criticism, Maslow modified the initial hierarchy in the 1970s and 1990s to include a further psychological set of needs. Above the esteem needs, he added cognitive requirements, which refer to the need to know, understand and explore. Above cognitive needs, he added aesthetic needs. Maslow suggested that in order to continue self-actualisation, humans need an aesthetically pleasing environment. The highest need added, transcendence, involves helping others while sacrificing one's own comfort or even life to serve the collective [2]. In turn, Max-Neef has created a matrix which consists of two categories: the existential category, which includes the needs of being, doing, having, and interacting, and the axiological category, which includes the need for subsistence, protection, affection, understanding, participation, creation, leisure, identity, and freedom. These categories create a matrix of needs.

Moreover, Max-Neef states that all fundamental human needs are finite, few, and classifiable and do not differ among cultures. The only aspect that changes is the way these needs are satisfied. In other words, housing has transformed from caves into high-rise buildings, but the main point has stayed the same (Max-Neef, 1991).

3.2. Human Needs and Housing Design

According to human need theories, there is a wide range of needs, which include the built environment and particular housing. It has been argued that an 'ideal house' must cover all human needs, and it is possible to evaluate a house by the degree to which it meets these needs. More precisely, an ideal house should be a 'motivational house'. This means that a home not only provides physiological and objective needs but also helps people to reach their maximum potential (Estaji, 2014). However, there are several debates about what exactly are the necessary characteristics of housing to ensure the fulfilment of human needs. As Jacobsen (2014, p.7) points out: '…one may ask what the minimum sufficient space requirement for an apartment is. This is obviously user dependent, but one may assume that the space is too small if it prevents the user from accomplishing the activities they want or need to perform.'

Meanwhile, Branco Pedro (2017) states that a house should be spacious enough to meet all the needs of its occupants: 'It is commonly understood that a house should be big enough to meet the needs of the occupants for living, cooking, dining, sleeping, washing and storage of household goods and have a convenient access to adequate residential amenity space.' Moreover, successful housing design has broadly considered such attributes as age, household type, household size, stage in the life cycle, social class, income, occupation, education and values (Beamish, Carucci, Emmel, 2001). However, it has been acknowledged that architects do not have all the information about the end users (cited in Yavari, Vale, Khajehzadeh, 2015). Moreover, Brierly highlighted that in housing design, it is challenging to meet the precise needs of the occupants due to differences between users' and designers' values (cited in Bin Mohd Jusan, Bashri Bin Sulaiman, 2005). Also, researchers, in many cases, have opposite opinions. For instance, Zhao stated, ' Kitchen and bathroom space should be minimised so that more space can be used for additional activities'. In turn, Dou claimed that 'Kitchens and bathrooms should have enough space as they are of great importance to the basic comforts of life' (as cited in Sima, 2018).

According to a survey conducted in the UK, 31% of respondents are not willing to buy a home built in the last ten years or would consider that a last resort. The most mentioned reason was that the rooms were too small (60%) (RIBA, 2011). Moreover, the survey data of new housing occupants in the United Kingdom shows that 47% of respondents could not fit all their furniture into their homes, 43% indicated insufficient space for convenient cooking, and 34% of respondents said that there was not enough space to have dinner with friends (RIBA, 2011). It has been stated that insufficient space, which leads to overcrowding, may increase aggression and psychological distress. Housing is designed for longevity; too-small dwellings cannot adapt to changing needs.

Moreover, spatial changes are costly. Inadequate housing usually requires more maintenance and has a shorter service life (Branco Pedro, 2017). It has been claimed that regulations that stipulate minimum floor space sizes cannot only ensure the liveability of new housing but also quality, which otherwise would be sacrificed to meet other policy priorities, such as higher-density development (University College London, 2010). However, it has been argued that 'The usability of a home depends not only on its size but also on whether it can be organised to suit the way the residents wish to live.' (The National Affordable Homes Agency, 2008, p.28).

3.3. Apartment Layout Quality Evaluation

Although there are a significant number of debates regarding necessary housing attributes that fulfil human needs, there are existing housing standards, guidelines and evaluation systems to ensure and encourage qualitative living environments. The '721 Housing Quality Indicators (HQI) Form' developed in the UK includes ten housing quality categories from which layout refers to 'unit size' and 'unit layout' categories. The internal area and the number of living spaces determine unit size. The unit layout category includes the following indicator groups: furniture, activity and access zones, additional features, units by layouts and storage requirements. The unit layout category comprises provisions for a list of furniture that must fit into each room and includes illustrations of access space requirements for the comfortable use of the listed furniture and typical activities. For example, a WC is required to have 600 x 700 mm of free space, while the living space has to accommodate a coffee table with dimensions of 500 x 1050 or 750 mm diameter. An alternative approach has been offered in the form of the Room Matrix Approach. Scoring of HQI is divided into five levels – from 'Exceeds by more than one item or more than 10%' to 'Falls short by more than one item or more than 10%' (The National Affordable Homes Agency, 2008).

Table1. Apartment layout evaluation matrix (adapted from [6], [7]).

Colour	Nr.	Indicator	Reference values		
			1-bedroom	2-bedrooms	3-bedrooms
-	1	Unit total area (without outdoor spaces), m2	50	74	92
	2	Master bedroom area, m2	14	14	14
	3	Secondary bedroom area, m2	-	12	10 / 12
	4	Living room area (with kitchen), m2	14 (20)	18 (28)	22 (36)
-	5	Number of bathrooms	1	2	2
	6	Bathroom equipment	B/WC/S/WM	WC/S; B/WC/S/ WM	WC/S/Sh; B/ WC/S/(WM
	7	Number of cooking modules (60 x 60 cm)	5	6	8
	8	Number of seats at dining table	4	5	6
	9	Private outdoor area, m2	4	6	8
	10	Number of storage modules or storage room area	2 (2 m2)	4 (3 m2)	6 (5 m2)
	11	Number of natural light sides	1	2	3
	12	Extra features, such as laundry, window in bathroom or kitchen etc.			
B – bath; Sh – shower; WC – toilet; S- sink, WM – washing machine					

In turn, the Swiss apartment evaluation system (Wohnungs-Bewertungs-System WBS) includes 11 indicators in terms of apartment units, such as cooking and dining space, room sizes, extra spaces, etc. The minimum requirements for apartments have been determined depending on the number of rooms. For example, the minimum total living area of a one-bedroom apartment should be at least 40 m2; it should include three seats at the dining table, among other minimum requirements. Evaluations of apartments can be done according to a scoring system which considers quantity, quality, and innovation for each indicator [3].

Latvian building codes include several housing layout quality requirements. For example, the minimum width of a kitchen must be at least 2 m; one bathroom is required in one-room and two-room apartments, and apartments with three or more rooms, additional sanitary facilities are designed in the bedroom area [4]. Within the housing development plan of Riga, housing standards have been developed. However, only a few indicators relate to housing layout quality and, comprehensively, dwelling areas. The first indicator is the number of rooms compared to the number of people living there. A good standard is the availability of one room more than the number of persons residing in the dwelling. The second indicator is the total area of dwelling per capita. The acknowledged optimal standard is 35 m² per person in apartments and 52 m² per person in detached houses [5]. Considering the existing evaluation systems, particularly the Swiss approach, this research determines 12 indicators and suggests their values. These values are not intended as minimum requirements, optimum or maximum, but as a reference point for further qualitative discussion.

4. Apartment Layout Assessment

The assessment of case studies is represented in Table 2.

Table2. Case study apartment layout assessment

Generous-luxurious			**Compact-budget**			**Prototype project of Ministry of Economics of the Latvian Republic**		
								
1-Bedroom apartment Project 'Magdalēnas kvartāls' (project layout from [6])			**1-Bedroom apartment Project 'Krasta kvartāls' (project layout from [7])**			**1-Bedroom apartment Prototype (project layout from [8])**		
Nr.	Value	%	Nr.	Value	%	Nr.	Value	%
1	53.5 m2	107	1	38.9 m2	78	1	46.9 m2	94
2	13.2 m2	94	2	13.2 m2	94	2	13.4 m2	96
3	-	-	3	-	-	3	-	-
4	13.3 m2	95	4	16.3* m2	82	4	23.3*m2	117
5	1	100	5	1	100	5	1	100
6	B/WC/S/WM	100	6	B/WC/S	75	6	B/WC/S/WM	100
7	7	140	7	5	100	7	4.5	90
8	4	100	8	-	0	8	4	100
9	8 m2	200	9	3.5 m2	88	9	4.2 m2	105
10	3.9 m2	195	10	1	50	10	1	50
11	2	200	11	1	100	11	1	100
12	Extra Wardrobe	100	12	-	0	12	-	0
								
2-Bedroom apartment Project 'Skanstes Parks' (project layout from [9])			**2-Bedroom apartment Project 'Trebu homes' (project layout from [10])**			**2-Bedroom apartment Prototype (project layout from [8])**		

2-Bedroom apartment Project 'Skanstes Parks' (project layout from [9])			2-Bedroom apartment Project 'Trebu homes' (project layout from [10])			2-Bedroom apartment Prototype (project layout from [8])		
Nr.	Value	%	Nr.	Value	%	Nr.	Value	%
1	100.1 m2	135	1	66.9 m2	90	1	65.8 m2	89
2	21.4 m2	153	2	11.7 m2	84	2	10.5 m2	75
3	16.7 m2	139	3	12.0 m2	100	3	10.3 m2	86
4	29.0 m2	161	4	31.0* m2	110	4	25.7* m2	92
5	2	100	5	2	100	5	2	100
6	B/Sh/WC/S; Sh/ WC/S; WM	133	6	B/WC/S; WC/S; WM	100	6	B/WC/S; WC/S, WM	100
7	8.5	142	7	6	100	7	6.5	108
8	6	120	8	5	100	8	4	80
9	6.2 m2	103	9	5.8 m2	73	9	4.2 m2	70
10	3 m2	100	10	1	25	10	4.4 m2	126
11	2	100	11	2.5	125	11	1	50
12	Laundry room, Direct window in kitchen area	200	12	1 Bathroom with natural light	100	12	Laundry room	100

3-Bedroom apartment Project 'Lindenholma' (project layout from [11])			3-Bedroom apartment Project 'Akācijas' (project layout from [12])			3-Bedroom apartment Prototype (project layout from [8])		
Nr.	Value	%	Nr.	Value	%	Nr.	Value	%
1	115.2 m2	125	1	72 m2	78	1	83.2 m2	90
2	11.9 m2	85	2	13.2 m2	94	2	12.5 m2	89
3	12.3; 10.6 m2	105	3	10.5; 10.4 m2	94	3	11.7; 12.4 m2	110
4	20.6 m2	93	4	28.4* m2	79	4	27.5* m2	76
5	2	100	5	2	100	5	2	100
6	B/WC/S/WM; WC/S/Du	100	6	B/WC/S/WM; WC/S	86	6	B/WC/S; WC/S, WM	86
7	8	100	7	5	63	7	6.5	81
8	6	100	8	6	100	8	4	67
9	10.8 m2	135	9	6.2 m2	78	9	4.2 m2	53
10	1.9 m2	32	10	1	17	10	4.4 m2	88
11	3	100	11	2	67	11	1	33
12	1 Bathroom with natural light, direct window in kitchen area	200	12	-	0	12	Laundry room	100

* Living room area including kitchen;
B – bath; Sh – shower; WC – toilet; S- sink, WM – washing machine;
Nr. Refers to the indicator number of the evaluation matrix;
value refers to the measured value of the particular project;
% refers to the difference of the project value to the evaluation matrix values.

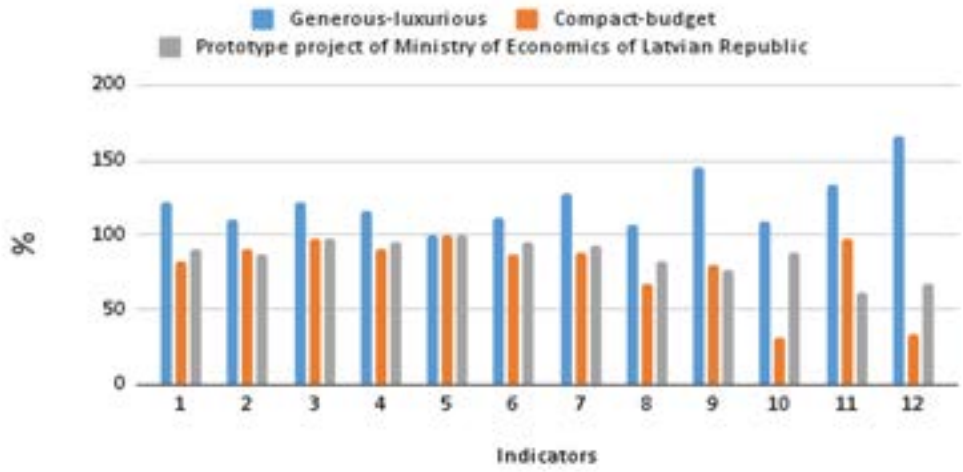

Figure 1. Results of case study assessment by 12 indicators in relation to referenced values.

As represented in Figure 1, the overall results of the case study assessment show that generous-luxurious apartments exceed the referenced values in all 12 indicators. The highest value is reached on indicators 12 (extra features) and 9 (outdoor space). The compact-budget apartments in the vast majority of indicators are below referenced values. The lowest value is at indicator 10 (number of storage modules or storage room), but the highest value, which reaches 100 %, is at indicator 5 (number of bathrooms). Like compact-budget projects, the Prototype project is underperforming in almost all indicators, except indicator number 5 (number of bathrooms).

5. Discussion and Conclusions

The results of this study show that there are several human need theories, and how they apply to the built environment field is still a topic for broad debate. However, it has been acknowledged that housing which accommodates human needs may positively impact health and productivity and increase people's satisfaction with housing, quality of life and overall sustainability. Broadly used housing standards, design guidelines, and evaluation systems can be used as a reference point for assessing contemporary urban housing. Unlike other countries, Latvia has no direct housing layout quality evaluation systems. However, this study has proposed 12 indicators and their reference values.

The sample size included in this research is too tiny for broad generalisation; however, this research gives valuable insight into the problematic aspects of contemporary apartment layouts and their typical issues. Two main types of contemporary apartment layouts can be identified in the Riga region. The first one is a generous-luxurious apartment. These types of apartments reach 100 % or exceed the median referenced values of the 12 determined indicators of this research. They provide large enough bedrooms and living/kitchen areas, and in some cases, exceed bathroom equipment and give some extra features, such as a laundry room or a window in the kitchen or bathroom. The additional features are made possible through a relatively large total area, which ensures enough space for different needs. However, these kinds of developments should be in balance with adequate scales. Oversized apartment areas can lead to land misuse and decreased resource efficiency, among other threats.

Moreover, the large apartment areas should be used to provide added value rather than just more square metres. The second housing layout type is the compact-budget one. In this case, almost all indicators are below referenced values. In contrast to generous-luxurious apartments, the compact-budget apartments have relatively small apartment areas. That is one of the main obstacles to providing the necessary space for comfortable bedrooms, enough storage spaces or more seats at dining tables. That, in turn, can lead to adverse effects, such as overcrowding and dissatisfaction.

Moreover, a few extra features with added value can be observed. The third project type discussed in this paper is a Prototype project suggested by the Ministry of Economics for the

Republic of Latvia. Although this prototype project has underperformed in most indicators, it is slightly better than the cases of compact-budget apartments. However, revision and an increase in quality are necessary to implement this prototype project successfully.

The quality of the Riga region contemporary apartments discussed in this paper varies from case to case. It can be concluded that larger apartments from the upper price range may provide higher layout quality, while low-price range apartments with limited total areas are unsatisfactory. To increase housing layout quality in future developments, there should be an opportunity to incorporate some measurable indicators in building codes, such as minimum bedroom areas, requirements for bathroom equipment, minimum outdoor areas, etc. Moreover, more precise housing standards should be developed, as well as an evaluation system. Using education and promotional campaigns to communicate the impacts of quality housing layouts on society could also have valuable benefits.

Conflict of Interests

The author declares no potential conflict of interest was reported by the author.

Endnotes

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