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Flexibility: From Tent to Modern Houses in Turkey Evaluation and Guidelines

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Abstract. Old tribal life style of Turkish societies needed a house, that responds to the requirement of permanent moving and travelling. While, after the early settlements, new houses typologies appeared which also show high level of flexibility due to the minimalism style of living. In the last century, this was not the pandemic case in Turkey, even the users demanded flexibility as a factor in the design of housing projects. Architects and designers have not considered this need in planning phase. Hence, the solution to make modern houses suitable for new life style needs, or the change in family requirements, were either by moving to a new house or perform some modification to suite those new demands. Due to the lack of flexibility in those houses, the end users are forced to move to another house. This paper analyses the concept of flexibility in different Turkish dwelling types, in order to define clearly its meaning in Turkish society. While it has been always studied as one indicator to achieve social sustainability in housing projects, we think it is highly important as a keystone factor in the design of housing projects in Turkey. Thus, we suggest a multi-criteria evaluation system, in comparison with international examples, to present and understand its importance, taking in consideration the peculiarity of Turkish culture and society. Moreover, this evaluation system examined on different examples, showing the main elements to be considered and developed in order to create a responsive architecture to users' needs in different phases of the life of society. Finally, we suggest some guidelines for the designers to consider, aiming to design flexible houses in their future projects, suitable for the mentality and culture in Turkey.

1. Introduction

The different family types of different sizes need various dwelling designs and the demographic and social changes, such as cohabitation of different generations or separation of the young from the family creates different living conditions and new housing and lifestyles. If the mobility of today´s Turkish societies within the time and place - coming from the nomadic lifestyle is considered, the necessity of flexibility in housing design cannot be underestimated. Flexibility is a necessary notion in planning regarding social and constructional quality; and the most significant typology were flexibility is required is "housing" because we spend most of our lives there. So architecture in Turkey has to response to these changing living conditions of people who have various life stages. This also ensures architectural quality.

Although flexibility is defined to be adaptable to changing needs of user within the time, the definition of flexible housing is more comprehensive [1]. Flexible housing offers choosing different variants, multi usability, changeability and participation in planning from the design phase. Thus flexibility means a freedom for the habitants over the time and space.

Although flexible housing should be a real consideration in terms of sustainable use of space, there is not enough effort to demonstrate and evaluate it in Turkey. Today, housing in Turkey offers big

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spaces with many rooms which is assumed as usability which doesn´t give the possibility of a different design approach, while a smarter housing would be provided in smaller spaces with the help of flexible architecture. There are some studies of flexible housing in Turkey and on international level. These studies either evaluate flexibility qualitatively or as a part of a sustainability assessment system. Therefore, this study aims to expose how flexibility is examined until now on national and international level and discusses enhancement methods of these evaluation systems.

2. Related works

Flexibility studies in turkey are still new field of research, while in other countries it is already established a clear definition and evaluation systems. South Korean “Housing Performance Grading Indication System" which consists of 5 main performance parts, 14 performance categories and 20 detailed performance lists, has flexibility as one performance category under the long -Life main section, which lead to many deep studies [2] of flexibility evaluation, lately analysed even parts of the house flexibility.

In Europe, Flexibility was widely discussed in the 1950s. Since then, its concepts and applications have been constantly renewed. Flexibility can be considered as the capability of a space to provide distinct choices, configurations, and customizations [3, 4]; the generic purpose of an environment, where furniture and movable partitions symbolize its conversion [5]; the polyvalence of a space playing different functions without a change in the form itself, thus producing an optimal solution [6]; or the skill of creating margins where alternative interpretations can be implemented [7].

Flexibility studies can be found in living spaces, offices, sports centres, and elderly/disability care centres [8,9]. Living spaces and elderly care centres have been emphasized in literature, indicating their scientific relevance. Housing flexibility integrates contrasting variables, such as structure and construction techniques, furniture, partitions, materials, and dynamics among rooms [10,11]. Flexibility exists in the details and at a large scale by combining procedures that vary the level of use.

In Turkey, Özsoy and Hasgül [12] in a recent study have developed a “flexibility components matrix” in order to evaluate a project designed as demonstration of flexible house. [12] Albostan has also tried to present a framework to deal with flexibility concept in housing. Her methodology based on a research of case studies from Turkey regarding four themes. [14] Another study aiming to develop a decision-making process in multi-storey housing design allowing alterations in the layout according to the users´ acquirements conducted by Koman and Eren. [13] Ünlü and Inal conducted a research about flexibility regarding user preferences in post-disaster housing in Düzce. [15] Hatipoglu also studied flexibility evaluation as a part of a whole housing quality assessment system. [16]

3. Flexibility Evaluations in Turkey

The criterion of Özsoy and Hasgül´s study [12] to choose their case studies is focusing on the projects which emphasize flexibility as a design method instead of taking all housing typologies such as single house, mass-housing, apartment block, gated community, residence.

Their designed matrix includes six parameters; changeability, variability, specialisation, adaptability, extendibility, systematisation. General information about the project and target user, conceptual approach of the project regarding flexibility, floor plans, sizes of the spaces were used as research materials to assess the selected projects according to these parameters and also by comparison in each other. Results of the level of flexibility degree have been classified as “much, medium, less”. (Figure 1) This study remains as a general description of flexibility according analyses giving the significant features regarding flexibility of these demonstration projects. However, it doesn't give a real idea about the flexibility grade of the projects in themselves or which criteria are more/less important. The chosen cases are extraordinary projects, which already consider flexibility to a certain extent. They may be assumed to show how some criteria of flexibility are applied and which criteria of flexibility distinguished in the selected projects. However, material/construction use of the dwellings determining soft/hard flexibility, multifunctionality, housing type diversity, which are an important

aspect for flexibility, have not been considered and these six criteria or the decision system of the criteria are not well-described.

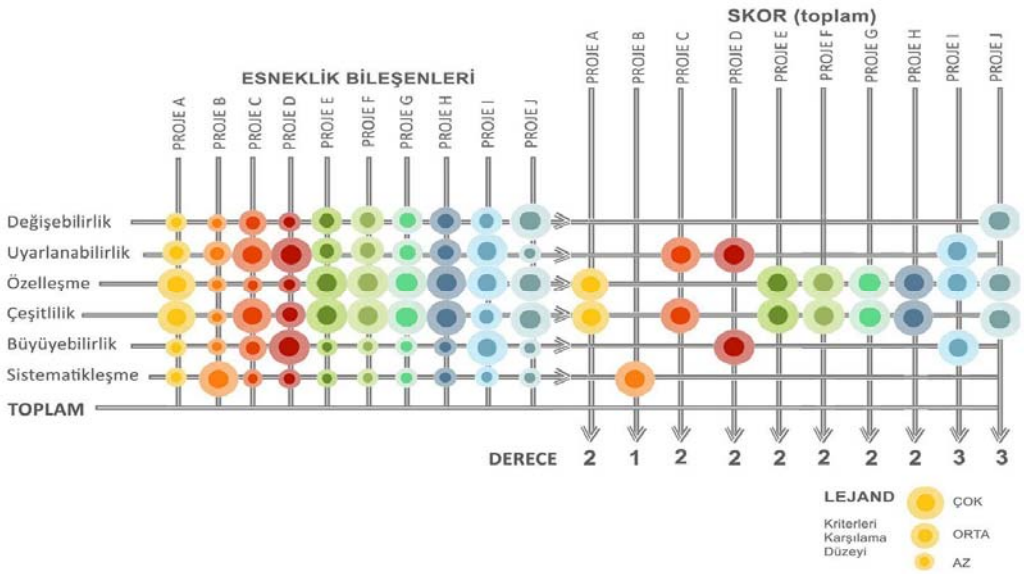


Figure 1. Özsoy and Hasgül´s results of suggested assessment method

Albostan´s flexibility aspects are "structural system", "service spaces", "architectural layout", and "furnishing for flexible use". [14] Also interviews with the architects of the projects were conducted to reveal the approach of the design phase. This study, which is based on studies of Till & Schneider [1,18] and Habraken about flexibility, describes general approaches to flexibility. Author chose case studies from Ankara which are not usual housing projects and do not reflect the Turkish reality. It has concentrated on analyses of possible changes on case studies but lacks a systematic approach for flexibility evaluation.

Ünlü and Inal [15] foresee an inflexibility problem regarding architectural and structural characteristics in permanent houses in Turkey and they want to present user preferences by selecting two different types of permanent houses in Düzce. Four plan types have been produced from each original housing plan to be preferred by users via interviews. In these plan types different levels of flexibility are offered to the inhabitants. These are classified according to their defined/undefined flexibility grade. Users have also been asked about four different construction systems, which are composed of reinforced concrete, timber, masonry and steel. This study is an important initiation to understand possible plan types or current user preferences in the mentioned case studies, which is related to user participation. It is described as different levels of flexibility, but it is actually whether the users want an open plan system or not. But the second user may have different requirements which flexibility can offer but lacks to provide or describe how to achieve it. Therefore, this is not enough to give a general flexibility guideline or assessment.

Koman and Eren [13] proposed a reinforced concrete skeleton structure that provides different variations of rooms regarding dimensional characteristic and number of occupants. Different bathroom and kitchen design variations were examined according to number of occupants. Moreover, structural configurations, partition wall and mechanical shaft positions are examined for the planning stage. This study analyses three plan typologies according to family sizes and different alternatives of dwellings for each typology. Similarly to the study of Ünlü and Inal [15], this research is helpful to offer the possibility to choose or see the plan variations of dwelling for the tenants in terms of participation, but limits flexibility to plan diversity and adaptability, which is shown on a case study.

4. International Flexibility Evaluations

Idrissi conducts a research about flexibility analyses of the chosen case studies in Morocco. [17] She makes classification of the inhabitants according to age and gender and describes a flexibility index according to the functional area of the cases after the alterations made by users. Firstly, these alterations have been presented on 2d plans and axonometric views and function schemes of the planning have been prepared. She assumes living room, reception and bedroom as functional area. The flexibility index results from the ratio of the functional areas to the predetermined total usable area. She indicates that the higher flexibility index, the more flexibility of the housing unit is achieved. (Figure 2).

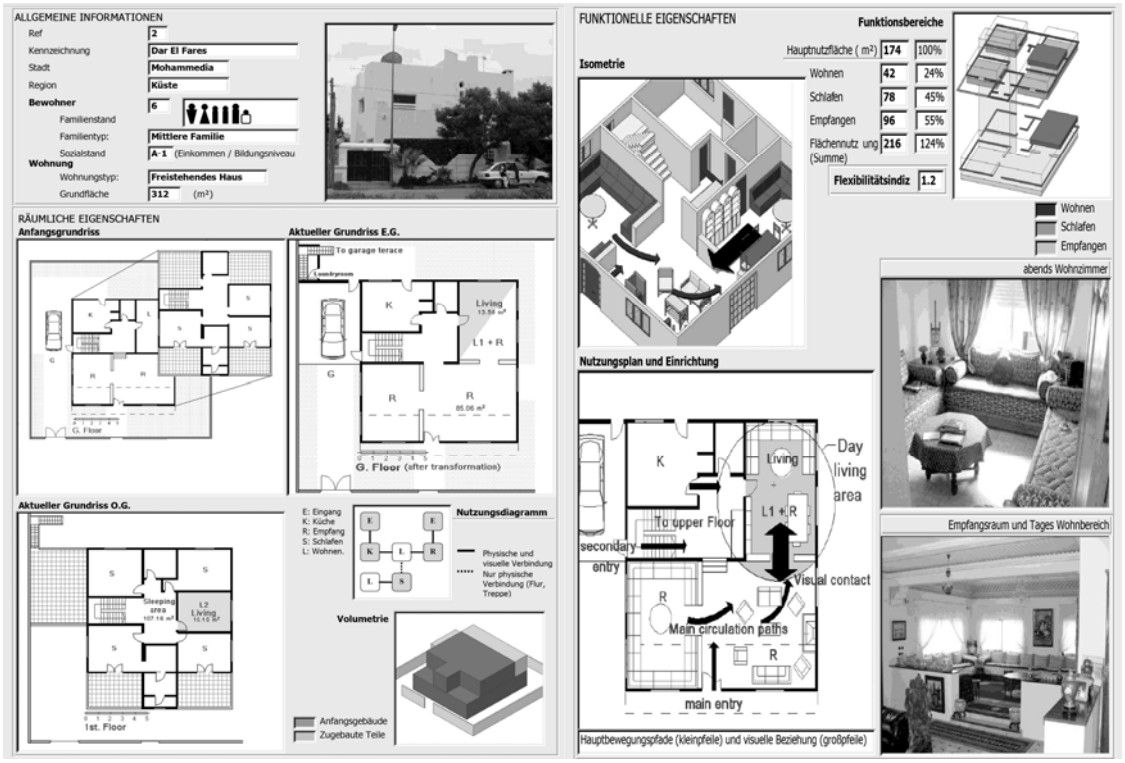


Figure 2. Idrissi´s program for quantitative assessment of flexibility

While Layla Ahmad in her PhD thesis from 1980 [20], suggests a method for evaluating flexibility of floor plans, dividing the factors affecting flexibility into two main categories: a-The factors affecting the scale of building flexibility, and b- The factors affecting the scale of housing unit flexibility. These two main parts are classified to sub factors as following: a: 1- Housing building form CF) 2- Building structure (S) 3- Circulation (vertical and horizontal) (A/C) 4- Technical service position (T). b-1- Unit type (U) 2- Unit size (Z)3- Unit proportion and position (P)4- Technical service position (T) 5- Building structure (S). Of course, this old qualitative study had established the base for later, wider and deeper studies classified and included more factors and criteria.

In Uk Till and Schneider, [18] in their paper: Flexible housing: opportunities and limits, included more factors, such as technology, functionalism...etc. comparing between houses designed and constructed by private and public sector in USA and UK, showing the pros and cons of each sector and suggesting a new evaluation system to be applied (Figure 3).

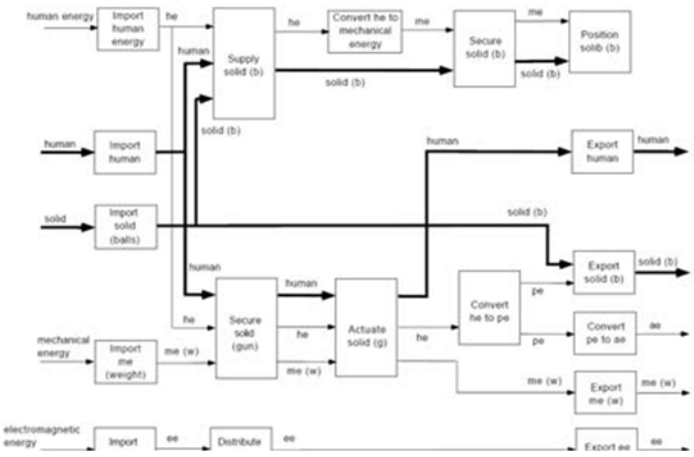


Figure 3. Functional Model for Nerf Blaster

Quantitative evaluation methods were also introduced early by many studies, Altas and Özsoy in the paper: "Spatial Adaptability and Flexibility as Parameters of User Satisfaction for Quality Housing", [19] suggest a numerical evaluation, using the frequency of users answer about house adaptability. The one factor study limited the application of the method in multifactor analysis.

Palaniet al. [21] from Sweden explained a clear ranking system to evaluate flexibility in their paper "Design for flexibility- measures and guidelines", taking in consideration the Swedish society as reference, and suggesting design guidelines suitable to be applied not only in Sweden but also all over Europe. That method, even it represents a clear quantitative evaluation system, does not take in consideration the cultural and social peculiarity of each community, and generalize the needs and demands of flexibility in housing in highly different and diverse societies, which we think it is not suitable to be applied in Turkey for many social and cultural reasons.

5. Results and Discussions

The comparison between national and international systems shows big difference between the priorities. Moreover, the factors took into consideration to evaluate the flexibility varies in vast range according to each society conditions. Nevertheless, these methods offer different evaluation tools. These are in Turkey, mostly either qualitative, or non-holistic which covers some factors and ignores others.

The quantitative international methods are suitable for the societies designed for, but it is not possible to apply them directly in Turkey for different reasons, mainly because the focus of the community is different from international perspective.

In order to suggest and apply a suitable method of flexibility definition and evaluation the study of (Improving Turkish Housing Quality through Holistic Architecture) performed by the author of this paper as part of PhD, offers a housing quality assessment system [16], includes Y/N questions to understand the level of flexibility of the housing and analysis the planning schemes of the case studies chosen from Vienna (Austria) and Konya (Turkey) to make a comparison of both contexts. This evaluation method consists of three main and twenty-four sub indicators. It has the potential to be extended in terms of flexibility by adding more details and descriptions within a systematic approach, even it will be modified to provide a quantitative analysis method easily.

6. Conclusions

Researchers conducted in Turkey aim to reveal the importance of the flexibility concept and the analyses on the case studies give ideas how some aspects of flexibility have been applied in case studies. Generally, case studies are chosen from the projects, which demonstrate flexibility. However, none of them have been a real demonstration project for flexibility when compared to international

projects. While international evaluation studies tried also quantitative methods, studies in Turkey describes criteria of flexibility from their point of view without detailed analyse method without a holistic approach.

The real need in Turkey is a housing flexibility strategy which enables the modification of houses across time, especially for middle and low income families.

Since people have forgotten trying changes, and used to accept available designs, the dominant and well-accepted housing design type in Turkey is big sized dwellings with many rooms. Instead of thinking or applying possible changes in dwelling, Turkish people have adapted to large spaces assuming future needs with the idea: "if we need more space; the room is waiting there". This causes a problem in our scarcities regarding sustainability and brings consume of more than we need. Nevertheless, the housing in Turkey had its own qualities, which offer specific smart flexible solutions before this perspective transformation occurred in a negative way. The development of Turkish house began with a tent, which is the most flexible way of living, evolved to today's fix houses which changes / forms living style of people.

In order to change this perspective to an opposite direction in which people adapt the houses instead of adapting to the houses, authors intent to design a systematic evaluation method for Turkish community with a holistic view. Thus in this article different flexibility approaches have been manifested to achieve it in design phase which also contribute the sustainable use of space for the future needs of the inhabitants. The future studies aim to focus on a quantitative evaluation method providing guidelines for the design of flexible Turkish house in different scales.

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