

# Flexibility as an Instrument of Social Stabilization of Residential Environment

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**Abstract.** This paper presents the results of research conducted at the Faculty of Architecture PUT, regarding flexibility and human factors in the design of housing environment. It points to the need of flexible approach at the initial design stage of decision-making; public opinion has to be considered and emphatic analysis needs to be undertaken to establish the required scope of flexibility. The paper presents the main features of flexibility in the design of flats/houses as opposed to the design of other facilities, such as offices, industrial and commercial areas. The results of research reveal significant differences in the demands regarding the interior of flats/houses and those regarding the residential area. Flexibility turns out to be a crucial factor in the creation of residential areas that stabilize social relationships and include human factors.

**Keywords:** Flexibility · Housing environment · Social stabilization

## 1 The Description of the Problem

The issues of flexibility accompany the design-related decisions that an architect faces when designing new facilities and refurbishing or adapting the existing buildings.

In architecture, flexibility involves forecasting the course of future events and choosing between various scenarios of future developments. Uncertainty related with the foregoing is a basic risk factor occurring in architecture. Redevelopments, adaptations, reconstructions of architectural facilities, and city planning may bring about positive spatial consequences, but they may also cause a functional degradation of the facility and result in serious financial losses. Risk control in this respect includes taking decisions regarding the functional layout, the structural parameters, the method of laying pipes and other systems in the building, the selection of building materials, the performance standards of the equipment. In terms of urban planning, it includes taking decisions regarding the size and the location of land reserves for future development, the system of pedestrian and motor routes, the arrangement of underground infrastructure and overhead lines.

Forecasting the course of future events and choosing between various scenarios of future developments are inextricably linked with the flexibility of architectural structures [1]. In this understanding, flexibility involves openness to change, ensuring an

easy adaptation of a facility to potential, difficult to anticipate, functional needs. Uncertainty regarding the future is the major reason behind thinking about flexibility in architecture [2].

Due to this uncertainty, there arises a question relating to the usefulness of designing flexible facilities. Perhaps it would be more sensible to demolish the old buildings, which do not meet new needs and build new, fully adapted buildings, in the place of the demolished ones? If our tastes, preferences, and needs change so quickly, what is the point of designing buildings that would be easy to adapt to the uncertain wishes and requirements of their future users?

This problem is particularly noticeable in the residential environment. The staff mobility dictated by global trends involves frequent changes of the place of residence and, what follows, quick turnover on the real estate market. Each new resident or new buyer wants to adapt the flat to his or her individual needs, which are usually different to the preferences of the former inhabitants.

The following questions arise:

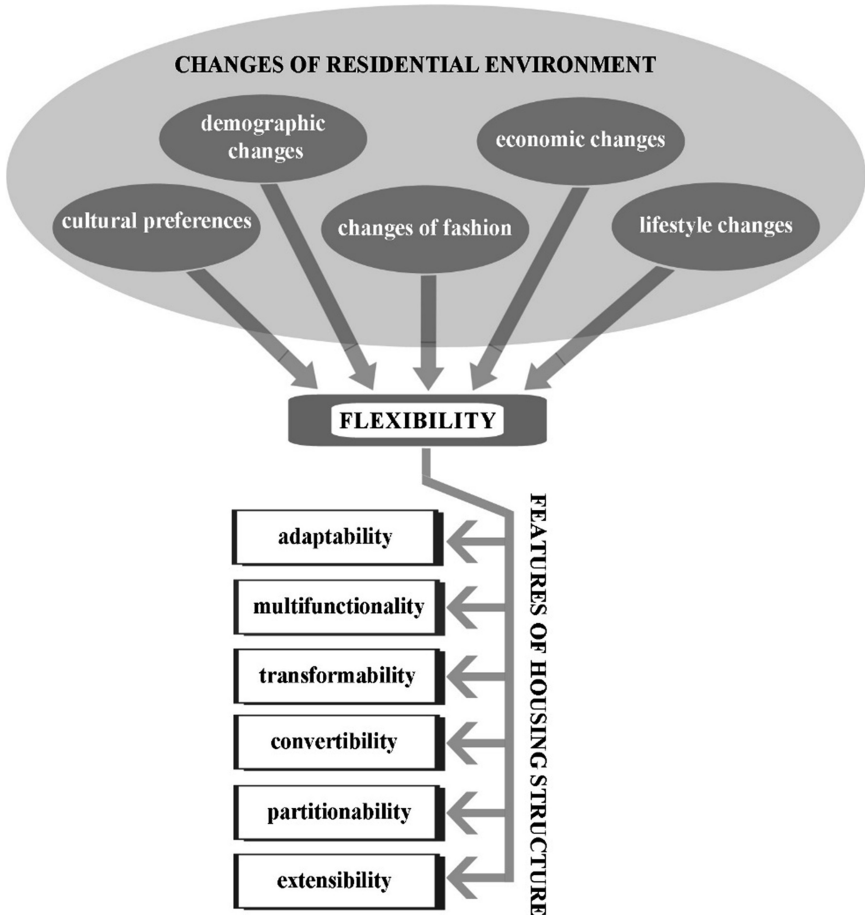
- Should new buildings be designed only according to the current needs, or should the possible future changes in their function, appearance and equipment be considered as well?
- How long can a building fulfil its tasks in view of the dynamic and difficult to predict economic changes, the changes of clients' preferences and tastes arising from new, currently unknown needs?

Over the recent decades, these issues have emerged as a significant architectural problem. Their rank varied, depending on the types of facilities. In some kinds of buildings flexible solutions have been applied more or less effectively for over a hundred years - for instance in industry, commerce, trade exhibition and office construction. In other areas such as housing, the problem of flexibility is currently gaining importance.

## 2 Flexibility in Residential Environment

In housing developments flexibility is characterized by specific features. A good flat should be adjusted to human needs; it should "fit" a person like a tailor-made outfit. A residential estate should be adjusted to the requirements of the local community. It should follow demographic changes, cultural preferences, and the changes in spatial behavior resulting from fashion, lifestyle, affluence, and the age of its inhabitants. A house/flat should be characterized by:

- adaptability – being adaptable to the residents' changing tastes;
- transformability – being adaptable to the technological progress;
- convertibility – easy exchange of components;
- multifunctionality – being applicable to multiple purposes, e.g. organizing parties, holding meetings, working, etc.
- partitionability – easy partition of space to create extra rooms;
- extensibility – potential to enlarge.



**Fig. 1.** Flexibility in residential environment: reasons and implications

Is it possible to achieve such flexibility? The achievement of an ideal is definitely very difficult, which does not mean that an architect should not make efforts towards this goal (Fig. 1).

Residential estates can be analyzed in functional, aesthetic, social and environmental terms. In this sense, many contemporary residential areas are, to a large extent, ugly, and infected with social and environmental problems. In connection with this situation, one may ask about the reasons for it. Maybe the cause lies in the lack of flexibility of the residential estate.

It seems that one of the most frequent mistakes includes the lack of flexible approach as early as at the stage of preliminary design decisions. Namely, the question of ensuring social participation of the members of the local community in the process of taking decisions connected with the development of their neighborhood. Flexible participation approach assumes that space is common good and each person should

have impact on the satisfaction of the basic needs connected with the nearest neighborhood [3]. Social participation does not only influence the physical development of the residential estate but it also creates social relations that bring about spatial and social order.

Górniak and Hausner [4] point out that subjective and equal treatment of citizens, creativity and the activity of partners are the condition of social participation.

The following types of activities ensure the adaptation of the residential area to the needs of its inhabitants [5]:

- public participation in defining the interests of the main actors: the inhabitants, the investor, the designer, planning authorities;
- public participation in the assessment of the consequences and the recommendation of the solutions: the residents (current and future) are involved in analyzing the impact of possible decisions and can recommend solutions which can be accepted to be implemented;
- public participation in the final decision: real input to the final decision – the decision is not only made by the architect, the urban planner and the developer, but each inhabitant can vote whether or not to accept the plan.

Public participation can be an effective method of inspiration.

The following tools are used:

- informal local contacts;
- surveys, questionnaires;
- workshops;
- advisory committees;
- public meetings;
- public hearings;
- public inquiry;
- special task forces.

It is necessary to get to know the opinions of the inhabitants and to include them in the process of taking decisions related to the design of the neighborhood while determining the form of spatial development [6].

Flexibility is required at this stage, because even at the highest level of social participation in the process of architectural design and urban planning most people will have to live in a neighborhood designed by someone else (an architect). Even if this neighborhood fully met the clearly identified and formulated needs of the inhabitants, one should be aware of the fact that social preferences change over time.

In order for most inhabitants to live in satisfactory environment, the designer must put considerable effort. The design of the neighborhood must be adjusted to the requirements of particular inhabitants to the highest possible extent. The empathic analysis is a reliable base for decision-making in order to define the required scope of flexibility. Urban empathy is especially useful in grasping the context in a comprehensive manner. The idea behind this method is that the designer is part of the situations/conditions of the local inhabitants, and observes their immediate surroundings through their own eyes, as if travelling together with them through the events which happen to them on the street, in a square, or in their house [7].

In this sense, flexibility manifests itself in the practical-functional and symbolic aspect.

## 2.1 The Practical-Functional Aspect

The idea is to provide the possibility of adjusting the residential environment to the current needs and functional requirements of the inhabitants. This relates to amenities which facilitate running a household, easy installation of the equipment offered by the dynamically developing market of kitchenware, sanitary systems, energy-saving ventilation and heating systems, TV and multimedia devices [8]. The major problem is related to the anticipation of space for future systems and piping enabling the installation of new sanitary fittings, easy connection to new energy-saving devices, ventilation and air-conditioning.

It is also important to have the possibility to partition the housing area in adjustment to the changing family life cycle (growing up children, ageing parents, the death of a spouse, etc.). Ideally, the total area of a flat should be possible to increase or decrease, depending on the family's needs, for instance, the separation of an independent flat at the moment when parents are left alone in the flat after their adult children moved out should be possible. Based on his own design experience, the author defined the following characteristics of a flexible residential environment [9]:

- changeable, universal, multifunctional plan and movable partition walls;
- appropriately selected span of the load-bearing walls, the construction module cannot limit space arrangement;
- appropriate construction system, optimally a skeleton construction;
- centralized system of utilities delivery, integration of the building management systems;
- modularization of installation elements which enables quick assembly of additional equipment and fittings without additional costs of connection;
- leaving space under the floor for additional systems (e.g. air-conditioning, heating, structural network, installation of home entertainment systems including the sound system);
- in the case of flush mounted wiring, the determination of the installation zones on the walls and “free” zones for safe hanging of decorative elements (paintings, shelves);
- easy to adapt house/flat interior: moveable partition walls equipped with ducts for the “plug in” system installation;
- the possibility of connecting the house/flat to alternative energy sources;
- segment systems of network infrastructure enabling an easy separation of the systems, extension, branching and independent measurement devices for the separated zones;
- the possibility of installing internal control systems for micro-climate quality;
- integrated design approach, cooperation between the architect, the developer, the local council, the energy and water suppliers, the sewage collection companies, and the construction material and technical equipment manufacturers;

- the possibility of the application of closed-loop water circulation systems, and waste recycling inside the residential unit.

## 2.2 The Symbolic Aspect

The idea is to be able to change the image of a flat easily to mark one's own personality. In order to achieve this, it is necessary to ensure adaptation flexibility and innovation flexibility.

- Adaptation flexibility. Each new resident attempts to adapt the space to his or her own tastes and systems of values, confirming one's individuality and personality. This is a relatively new phenomenon, which has been indicated by Bonenberg [10]. The author notices that the willingness to distinguish oneself in the environment is a growing phenomenon in the post-industrial society.
- Innovative flexibility. This kind of changes results from the fact that, after some time, the residents cease to approve of the environment that they formed themselves in the past. They consider it outdated, unfashionable, in need of innovation and adjustment. The reasons for change in this respect may be explained by the general principles of human nature, and in particular, the impact of fashion on the behavior of the residents [11].

The analysis of the residential environment flexibility requires significant differentiation between two basic types of space: public space (a street, a square) and private space (a flat, a house). While the tendencies presented above refer mainly to private space (where the variability of needs is significantly high), the rules governing public space are different.

The author of this paper has conducted studies in fifteen residential areas. They reveal that, in general, the residents are reluctant about changing their local space. Changes implemented there are the cause of many local conflicts because the existing status quo is the result of a difficult compromise. Changing the location of a bus stop or a playground, even if it is substantiated with functional reasons, always gives rise to many controversies and conflicts. The inhabitants are not fond of the changes in the profiles of the local shops or service outlets, often mentioning the former bakers, shoemakers or florists with nostalgia. Being accustomed to the looks of the street, the existing façades, and the old greenery is part of the local identity that develops for years.

The sentiment to the appearance of public space, which people were attached to for years, brings on severe social protests in the case of an attempt to change its form or function, even if it seems that it will be more functional and attractive.

Thus, the art of flexible designing of residential environments consists in a skillful combination of two requirements: keeping the historic continuity of the public space (keeping the homeliness of public spaces) and implementing the necessary adaptations and innovations in private space.

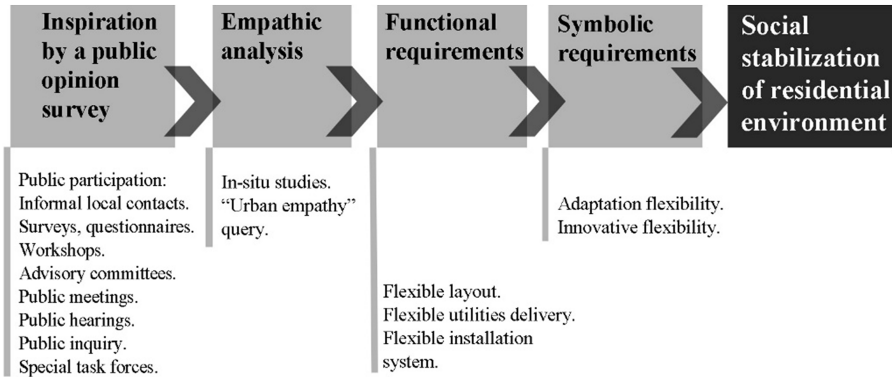
### 3 The Characteristics of a Flexible Residential Environment

#### 3.1 The Residential Area

- The residential area ensures a harmonious social development and neighborhood integration; it gives the effect of social synergy owing to common space that favors the cooperation of the residents and uses their potential and activity.
- The residential area ensures access to basic services within a walking distance from one's house, in a safe public space, giving the possibility of meeting neighbors whom we can talk to, share our worries with or tell about our success.
- The residential area ensures open, functional-spatial structure that allows for the location of workplaces for as many inhabitants as possible within the area, in accordance with the principle that work should be brought to the place of residence rather than putting the residents in a difficult situation of commuting to remote places. This is possible as the result of the creation of new workplaces in the sector of specialized creative services (software and computer games, design, advertising, antique art market, art restoration, second hand book shops, multimedia, fashion, etc.), in the sector of recreational and health services and modern office services of the Small Office Home Office type. These are the workplaces for young creative specialists who are able to find employment in their neighborhood. This is also an ideal solution for parents with small children and people searching for flexible forms of part-time employment.

#### 3.2 The House/Flat

- A flexible house/flat is characterized by a spatial layout that is adjusted to the family's lifestyle, rather than making the family adapt to the spatial layout.
- A flexible house/flat is characterized by the constant following of the needs of its successive residents/tenants. This means the ease of adaptation over time and quick and cheap implementation of changes that improve life quality.
- A flexible house/flat is characterized by the ability to adjust to the changing needs in the partition of space and equipment in connection to the family life cycle.
- A flexible house/flat means that the resident can be "growing with the house", without the need to move. This is a step forward towards the members of the local community, who wish to lead a stable life among neighbors, live with children and elderly parents and grow into the local community. This is a house/flat for people who do not want to be anonymous and who intend to be active members of the local community (Fig. 2).



**Fig. 2.** Social stabilization and flexible approach to the housing design

## 4 Summary

To sum up, it may be stated that a high level of flexibility has a beneficial effect on the sustainable development of a residential estate. It stabilizes social composition and, simultaneously, strengthens the social bond. The residential environment that is characterized by the lack of flexibility imposes high inhabitant turnover, which destabilizes the social composition of the area following the changing family life cycle. A flexible residential environment requires greater effort on the part of the architect. However, in the long-term perspective, this effort gives positive consequences resulting from social stabilization: place attachment, place identity, sense of place and stronger neighborhood relations.

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