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THE AGE OF INHABITANTS AND THE AGE OF BUILDINGS AS A GUIDE FOR THE ARCHITECTURE DESIGN

J. W. Włodarczyk, A. M. Włodarczyk
Institute of Architecture and Urban Planning
University of Applied Sciences in Nysa, Nysa
Poland

ABSTRACT

Time is a very important factor in the architectural creation of structure, form, and utility of flats and buildings in human settlements. The impact of the age of inhabitants stimulates the needs and arrangement of these flats. The other question in this case is the relation between the flexibility of a building and its heritage. The aspect of the form in housing is also very interesting: flexibility, adaptation and external appearance (elevation) of these buildings. The method of the paper is based on case studies, in situ inquiry (city walk: photo documentation, interviews, materials analysis) and theoretical research (literature insight). In this paper the authors will present the state of actual knowledge in this field in Europe. The following case studies will be shown: the city of Zabrze, the Silesia region in the south of Poland (flats for the elderly), as well as "Puls 5" – an adapted multifunctional building in the revitalized post-industrial area of Untere Hard in Zurich, Switzerland, and "Park Hill" – modernized buildings in the housing area in Sheffield, England (flexibility in the process of revitalization and modernization of the heritage, flexibility of elevations). The results will concentrate on functional, constructional and esthetical adaptation aspects and flexibility of buildings with flats as a sign of time evolution, considering the need to improve the life quality of people, the preservation of heritage, and finally, sustainable development.

Key words: housing, flexibility, adaptation, time evolution, heritage

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Introduction

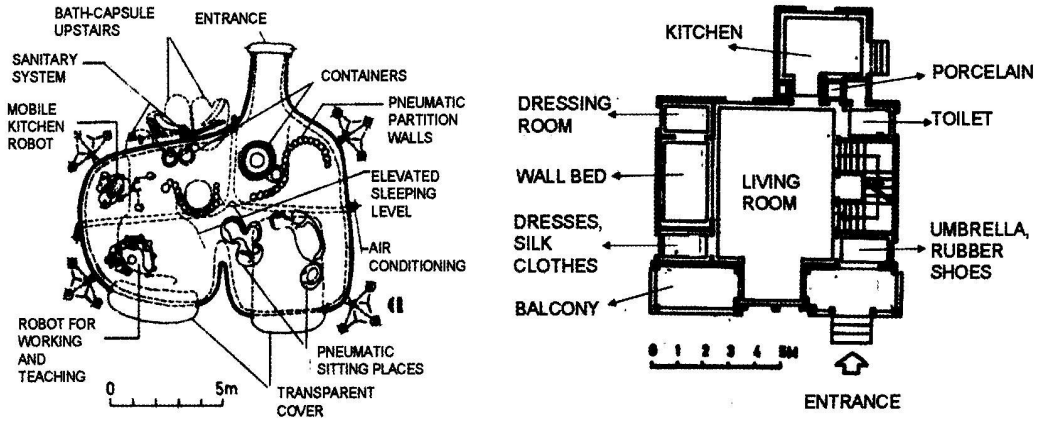
The undertaken problem relates to two important factors of flexibility and adaptation of buildings with flats. One factor is the change of the inner arrangement of flats according to the new needs of inhabitants who grow older. This factor will be researched on the basis of a case study from Poland, referring to scientific research [16]. The second aspect is the transformation of the outer form of architecture connected with the conversion of traditional factories. Here, one Swiss [1, 15] and one English [13] case study will be presented. In the world literature one can meet several meaningful case studies which illustrate architectonic attitude to formal and aesthetic re-use of existing buildings into apartments. One of them is the conversion of the industrial heritage in the city center of Manchester, England, into residential functions, similar to Bridge 5 Mill, which is a Centre for Sustainable Living, or Murray's Mills, which offers luxury apartments [10]. This kind of transformations, through the adaptation of historical factories to new reality, is the opportunity for former industrial cities to become "major international cities, and to market the place, and attract people and investment. Moreover, other types of architecture, which have been adapted for apartments in recent years, are, for example, public-use buildings, such as the former Townhall in Cologne, Germany or the former auditorium in Erfurt, Germany. Other subject is the creation of lofts for artists, for example, in the former clog factory in Lant Street in London, England [14], and Kaufmann Apartment recovered from the previous warehouse, also in London [2]. Besides, in Paris, France, Eden Bio residential housing estate was realized as a signal of sustainable development [4]. Furthermore, the problem of adaptation and flexibility is also the subject of deliberations when it comes to mass estates. The residential blocks from 1960s-1980s may be revitalized by means of new functional, formal and aesthetic elements, such as additional balconies, outer stairs enlarging the flats from one- to two-storied, rearrangement of apartments` plans, roofs used for gardens or photovoltaic installations, courageous visual mutations of facades, as well as many improvements of the surrounding public open space, including gardens, traffic, and different kinds of platforms among blocks [8].

Flexibility of Flats for the Elderly

An Aging Society Faces an Increasing Need for Flats' Surface

Flexibility means the possibility of using the same building object for another function – for other housing needs. It creates a form of a "living building", which changes the arrangement according to the needs of its inhabitants. Moreover, a lot of inspiration for future is based on electronic facilities (Figure 1a). Though, it is not as useful as traditional equipment, especially in Europe where the "silver" or "gray" generation dominates. Single-space-room in these flats as well as the appropriate size of their surface are very important factors. At present, satisfactory surface standard is

about 30-40 square meters for a single flat and about 60 square meters for two elderly persons (it refers to senior flats for elderly and not to rooms in a "senior service home") (Figure 1b).



(a) (b)

Figure 1 : (a) Living Pod with mobile and flexible arrangement. Drawing by J. W. Włodarczyk based on [6,16]. [1] (b) A house with a flat for an elderly lady. Diagram of a plan from the end of the 19th century. Arch. E. Gardner. Source: Prepared by the Author on the basis of item [5]. Descriptions of the drawing by J. W. Włodarczyk.

Therefore, in this paper, an example of this kind of a living space is presented. It is very distinctive that the fitness (mobile efficiency) of seniors declines with time and some of them change to a wheelchair. This fact is at present particularly visible in numerous senior flats in Poland. This is noticeable on the housing market. Year after year, the process of people growing older is creating bigger needs concerning the surface of their flats. The process of aging produces needs for more space for each of the elderly persons. This is a very topical problem today. In the paper, this up-to-date challenge is presented as the flexibility of housing. The fact of changing into a wheelchair in many senior flats has been recognizable only in the recent time. In the design practice of architects, it means that a flat for a person using a wheelchair takes up the space of two single flats for freely moving persons, without a wheelchair (Figure 2b-c).

Case Study: The City of Zabrze, Upper Silesia in the South of Poland

The case study described below concerns a four-storied communal building from the second part of 20th century (Figure. 2a,d). It is constructed in the system of concrete prefabricated plates. It means that it is an especially difficult situation for the creation and flexibility because of the structure system. The basic architectural idea of functional adaptation is based on the minimum number of changes of the structural

system and retaining the existing installations (pipe facilities) to a maximum possible extent. The vertical part of the building with two rooms inhabited by elderly persons on each of the four levels was chosen, in order to achieve flats, which would answer the needs of one person using a wheelchair.

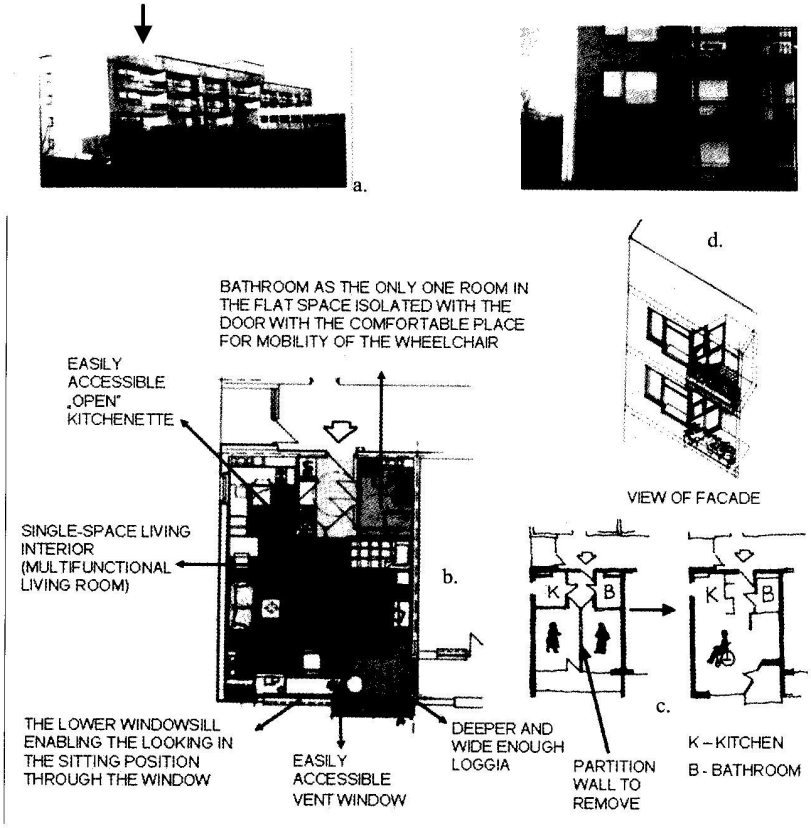


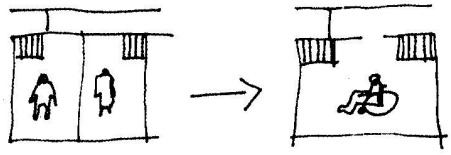
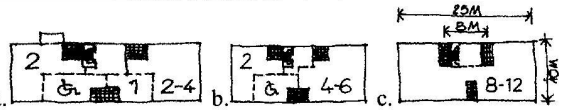
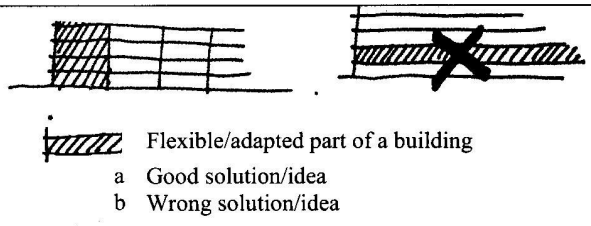
Figure 2 :. The building with senior flats in Zabrze, Poland: (a) General view, (b) Arrangement after adaptation, (c) The process of change from two single flats into one single flat for the handicapped elderly, (d). A view and photograph of the facade details: adapted/changed elevation. Photos and drawings: J. W. Włodarczyk.

This situation had the following advantages:

- comfortable fitting of vertical installations (especially, fitting the traditional gravitational ventilation without making noise(!)),
- real improvement of construction elements (it was possible to remove the middle partition wall without fears of a building crash),
- easy improvement of facades, which was constrained by standard and ergonomics demands (the permissible opening of a window, or widening of a narrow balcony) - (Figure 2).

Summary / Results

Table 1 :. Principles for building flexibility. Source: J. W. Włodarczyk.

Rule No.	Principles for building flexibility	
	In text	In sketches
1.	-The presented flexibility is necessary because the housing needs for the elderly double, -The strategy of the change process from two to one senior flat.	
2.	-The optimal structure system for the flexibility of housing is the skeleton system, assuming the suitable acoustic insulation between rooms, -General in housing: the adequate location of the sanitary system allows to distribute the housing surfaces optimally.	 No. 2,1,2-4,2,4-6,8-12: mean number of inhabitants. Segments of a multi-family apartment house. Variants of the structure of flats (a,b), common flat (c).
3.	-In the process of adaptation the choice to change the vertical part of a building (segment) is much better than to adapt the horizontal floor (horizontal part of a building, one floor space of a building).	

Flexibility of the Built Environment as a Way to Postindustrial Revitalization of Cities: Zurich-West in Zurich, Switzerland

Flexibility and Adaptation of Former Factories for Living Purposes (History and Modernity)

Relations between the flexibility of a building and the heritage is well seen in the case of the industrial history in Zurich, Switzerland. There, the remodeled workers' area "Zuerich-West", is becoming the fashion label of the modern city life, nowadays well known for new luxury apartments confronted with traditional shipbuilding past. On the opposite, the historical city center "Altstadt" is recognized as a conservative space, where mostly elderly people live at present, because the architecture in that area must

be preserved without any transformations. In this urban sense, the post-industrial district is more flexible also in the spatial meaning. The map below shows the advantageous location of the "Zuerich-West" district, between the significant connection of the Limmat river and railway, as well as close to the city center and the Zurich Lake (Figure 3).

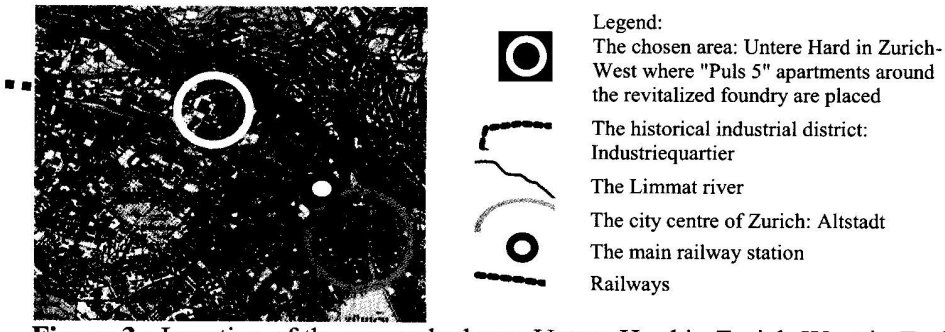


Figure 3 : Location of the researched area Untere Hard in Zurich-West in Zurich, Switzerland. Source: Analysis of A. M. Włodarczyk on the basis of a city map.

An outstanding example to analyze in the transformed Zurich-West district is the former foundry, called today "Puls 5". As far as the function is concerned, it includes also new architecture, such as shops on the ground floor, offices in the middle and flats in the upper part. The aspect of the form in housing is also very interesting: Flexibility and adaptation are visible in the external appearance (elevation) of this building (Figure 4). The original factory still exists, nevertheless, it is hardly visible since the new facade covers it from the ground to the roof, which is new, because the flats are built on the top of the building (Figure 5a-b-c). Each apartment is different and adapted to various social needs: singles, couples, and families. However, the addressees are rather young and rich people, who want to live in such specific historical surrounding, like the revitalized post-industrial district. The other question is the diversified formation of flats, as their inner individual arrangement corresponds with its users (Figure. 5d-e).

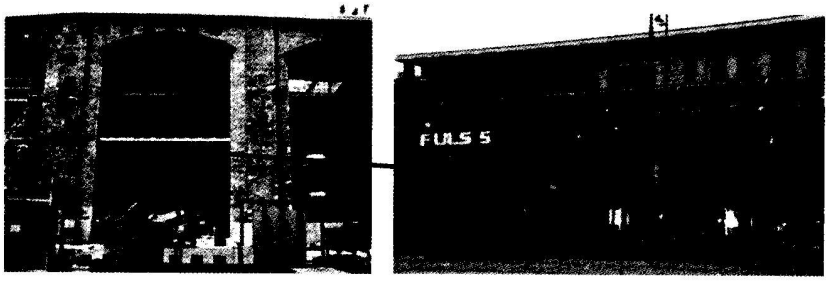


Figure 4 : (a) Before: the former foundry in this area had not been used since industrial metalwork activity (post-industrial destruction of the north façade). It was

re-used in 2004 as a commercial zone, recreational zone and the "Puls 5" footpath. Flats surround the heritage building. Photo: A. M. Włodarczyk, 2003. (b) After: the presentable façade of the "Puls 5" composed of new elements, hiding the original historical structure of the foundry (marked orange). Flats on top storeys are visible in the outer form as the standing-out part combined of three levels. Photo: A. M. Włodarczyk, 2009.

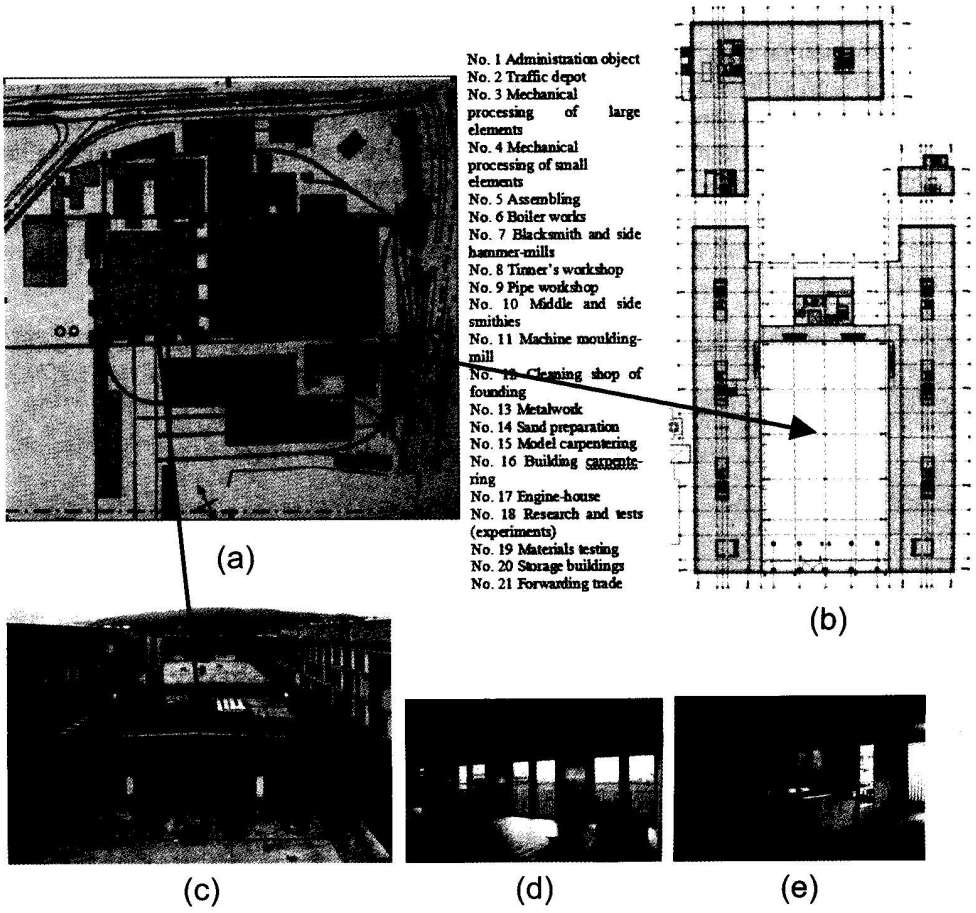
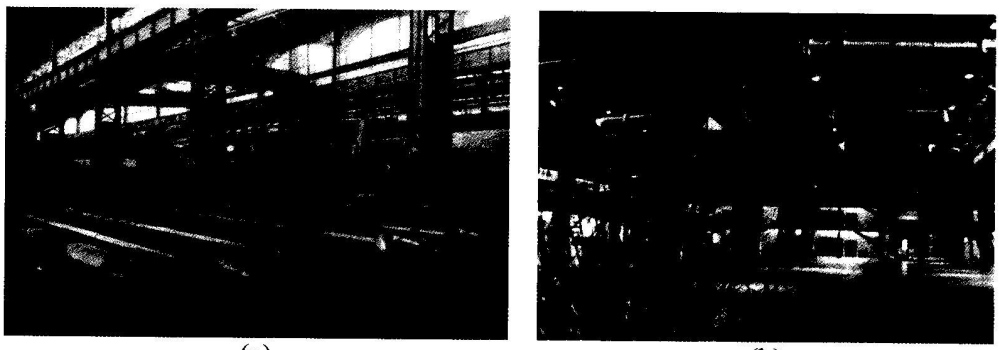


Figure 5 : (a) The plan of the original industrial area Untere Hard in Zürich-West in 1950. The heritage of the former foundry is marked orange. Source: Analysis of A. M. Włodarczyk based on a map from [7, 15], (b) The plan of the floor with living apartments of the "Puls 5", which surround the former metalwork located in the middle. Source: [12], (c) A photo explaining the architectural situation of the historical foundry and the new building surrounded with shops, offices, and flats. Source: [12], (d, e) The interior with large living spaces and the modern arrangement

of new flats in the "Puls 5" ex-foundry building: An example of a kitchen and a living room space, where the historical image of the post-industrial district is visible through the window. Source: [12]

The structure contains one big apartment at two levels or is divided into two floors, sometimes with more rooms, depending on the desired plan and client's situation. Significant modifications can be recognized in the interior of the former foundry, which in 2004 was transformed into a new public space and since then the equipment is regularly updated (Figure 6). This place seems to be the main highlight for upper flats, because people may use it in various ways. Around this public hall many shops, fitness rooms and other services are located. They are significant for the inhabitants of the new apartments, in the same way as the new public space, taking into account the care for optimal living conditions [1, 11] for both physical and psychological health. The architectural situation of the industrial heritage confronted with the added architecture, where new flats are connected with the "old" structure, is to be perceived from the outside, as well as looking on drawings comparing the history with present times (Figure 5a-b-c).



(a) (b)

Figure 6 : (a) Before: Interior facilities of one of the shipyard buildings in the 1940s, which were used for the production of aeroplane propellers. This technical invention of the Escher-Wyss Company was developed during World War II for aeroplanes. Source: [9]. (b) After: The open space created in 2004 in the re-used "Puls 5" industrial metalwork. At present the building and its adjacent new parts offer services, commercial, and residential functions, keeping the inner part as a footpath within the original industrial construction and the partially preserved metalwork's machinery at the roof level. The new public space accompanying apartments at the higher storey is made attractive by regular changes of the arrangement. Photo: A. M. Włodarczyk, 2009

Flexibility of the Built Environment as a Way to the Modernization and Revitalization of Block Houses: Park Hill in Sheffield, England

Flexibility of Building Facades in the Modernization Process of a Housing Estate (History and Modernity)

The second example of flexibility and heritage is the revitalization of social block houses in order to adapt them to the new living needs in the area called Park Hill in Sheffield. The location of the neglected housing estate (Figure 7) is advantageous: close to the heart of the city, main rail station, and the newly designed green parks in the surroundings. Additionally, the space is placed on a hill with remote views towards the townscape of the city center. Moreover, the neighborhood is quiet since the hill and the park isolate apartments from the noisy rail station and the main market. These living conditions are very good, therefore these buildings are being adapted and not demolished (Figure 8).

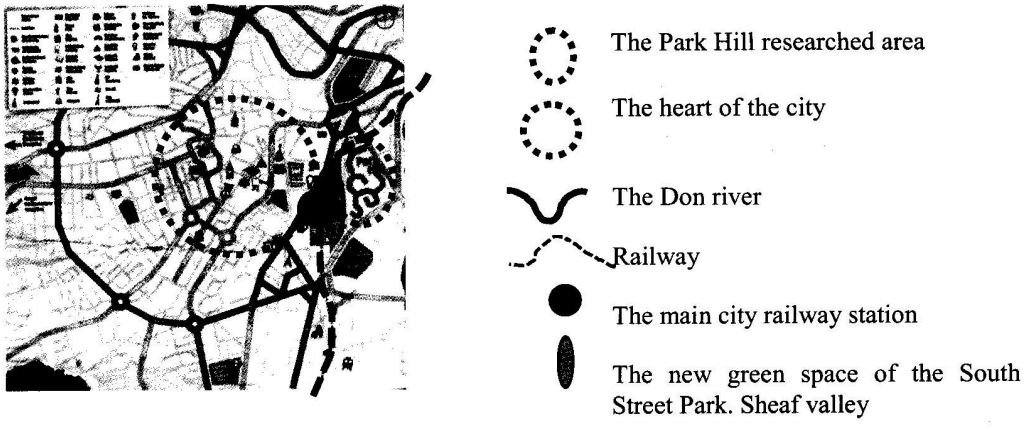


Figure 7 : The location of the analyzed area of Park Hill and the most significant elements of the urban land-use of Sheffield city centre. Source: Analysis of A. M. Włodarczyk on the basis of a map from [13].

Block houses of the Park Hill built around 1960s are at present destroyed, need modernization and adaptation of the existing flats to new building, technological, and technical situation. At the same time, they are under conservation (protection of monuments), which is the basic condition for their renovation, instead of demolishing and building a new housing estate. The existing outer elevations and the details which indicate that the building is abandoned (Figure 8) undergo the conversion process in which new materials and colours are used (Figure 9). The new design of old flats, which thanks to its modernity wakes up new aesthetic emotions, and contrasts the past with the inspiring possibilities of flexibility (Figure 10).

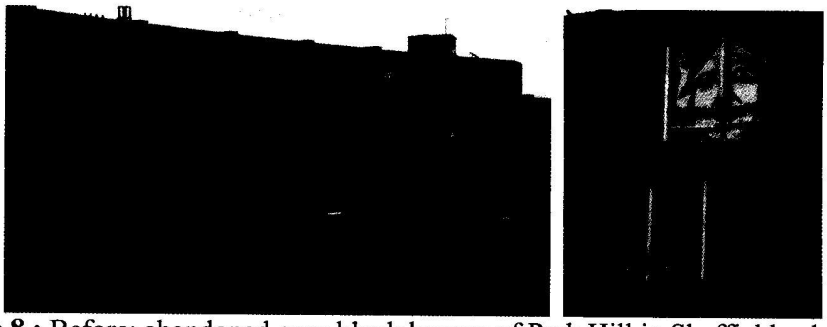


Figure 8 : Before: abandoned grey block houses of Park Hill in Sheffield, where the architectural style of 1960s named brutalism is recognizable; (a) the whole empty block and (b) a detail: destroyed windows covered with wooden boards. Photos: A. M. Włodarczyk, 2014

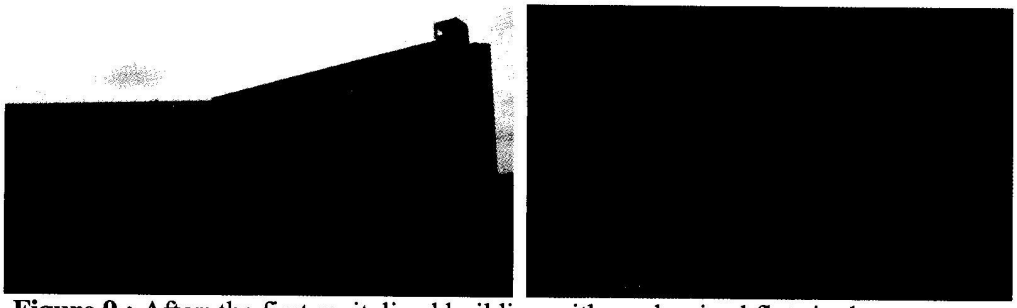


Figure 9 : After: the first revitalized building with modernized flats in the upper part and the new function of offices in the lower part (a). One of the means to revive the block are new materials and distinctive colours on the elevation (b). Another way is to suggest the renovated and modern interior design, which shall attract new inhabitants and the one who lived here before (Figure 10). Photos: A. M. Włodarczyk, 2014

Figure 10 : A proposal of a new design in modernized apartments. This kind of clean, fresh, and up-to-date interior arrangement shall encourage inhabitants to come back or to start living there and to forget about the bygone bad fame of grey blocks. Source: [13]

The adapted flats are diversified as far as the needs of future users, dimensions, and equipment are concerned: from a single flat of 52 square meters, through two-bedroom 71 square meters, reaching finally the three-bedroom-type of 95 square meters. It makes together 10 types of modernized apartments [13]. The important aspect is also the green space project right in front of the house, giving the necessary public open space for inhabitants for relaxation and sport. This space is a sign of the new and better life quality, which, next to sustainability, is the basic purpose of the revitalization of the existing architecture.

Conclusions

"Silver" or "gray" generation exerts large pressure in the area of housing needs. Its main consequences have been illustrated in the Table 1. Moreover, as far as the flexibility of housing and heritage is concerned, it has to be noted that during the remodeling process of the existing buildings the design guidelines shall not be the same as in the case of new buildings. The conversion of "old" into "new" requires concessions and good will, which is actually the basic condition for project success and its acceptation. Architectural adaptation often means that some inner equipment of flats or rearrangement of walls, escape routes, lightening of interiors, or the keeping of other rules demanded by the universal building law are not possible to obey. In these cases some settlements (give-and-take rules) should be created, in order to make the existing situation more flexible and to carry out the adaptation process successfully. Furthermore, Le Corbusier's idea of the skeleton construction, as well as facades, without a supporting function, allows to change elevations in a flexible way. Besides, the surroundings of a given adapted housing area determines its variability and its further liveliness. Thereby, the originality and artistic features matched with technical and technological elements of the design are meaningful. Therefore, one of the basic goals of the adaptation (flexible re-use) is sustainable development, preservation of the heritage, and last but not least, better life quality for all age-groups of inhabitants.

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