

ADAPTING POLISH APARTMENTS TO THE NEEDS OF OLDER PEOPLE

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HIGHLIGHTS

- Statistical analyses confirm permanent demographic changes.
- Comparative method allows assessment of apartments quality.
- Qualitative assessment allows indication of apartments advantages and disadvantages.
- Research purpose is to assess the adaptation of apartments to seniors needs.
- Quality assessment supports methods of designing apartments for elderly.

ABSTRACT

Background: The construction of postwar housing in Poland does not meet the quantitative and qualitative needs of society. There is a shortage of thousands of apartments. The average apartment area is smaller than in other European Union countries. Increasing the supply of apartments and their availability for low-income society is achieved at the cost of lowering their quality and spatial standards and the lack of adaptation to the needs of seniors and the disabled. As a result of demographic and cultural changes, these groups are currently more visible in economic processes, including housing investments. **Material and Methods:** The article analyzes demographic processes (ageing of society) and lifestyle changes in Poland after World War II. They are the basis for studying the adaptation of apartments to the needs of older people. The following research methods were used: statistical, historical, and analytical-comparative. They were justified by available statistical data. Then analyses of representative plans of postwar Polish apartments were presented. The research aims to indicate the disadvantages and conditions for improving apartments' functional and spatial values for older and disabled users. **Results:** The topic of adapting apartments for seniors is current and necessary. Research shows the advantages and disadvantages of typical apartment plans. The functional and spatial quality of older and modern apartments is analyzed. The assessment was made in the context of changing lifestyles and housing needs. Recommendations for improving the quality of apartments were indicated. **Conclusions:** It is postulated to indicate possible functional changes to adapt existing and planned apartments to specific needs in the context of contemporary demographic trends. The recommendations take into account the specific needs of seniors and people with mobility impairments. They can also contribute to improving the functional quality of apartments for people who are still able to move. Med Pr Work Health Saf. 2025;76(4)

Key words: seniors, architecture, universal design, apartments interiors, people with mobility impairments, functional and spatial quality of apartments

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INTRODUCTION

Poland suffered huge population and material losses during World War II. The growth of the country's population and material wealth lasted for decades. Throughout this period, the construction industry was characterized by a shortage of housing. In addition, qualitative needs regarding, e.g., the area of apartments were not adequately met (and are not) [1]. Meeting housing needs is a major challenge for the country's economy in the coming years. Design and construction activities should take into account demographic trends and the aging of society.

Age structure of societies, change trends after World War II

During World War II, the nations of Central and Eastern Europe suffered many human casualties and material destruction [2]. Within the current territorial borders of Poland, >295 000 residential houses in cities and 467 000 farms in rural areas were destroyed [3]. Human losses in Poland amounted to 5.2 million people and constituted more than one-seventh of the population. They are still visible as a generation gap in the following decades. Its effect is the so-called demographic booms and busts [4]. Cyclic growth and decline of population size in specific age groups adversely

affect various sectors of the economy. This mainly concerns fluctuations, among others, in the labor market, education and training, health care, and housing. In the following generations, fluctuations in the number of the population, e.g., of school age or working people, will be smaller and smaller.

Along with economic development, there is a trend of growth in the number of single-generation households (1- and 2-person) [5]. They already constitute almost half of households. The reason for this trend is the increasingly frequent decisions by young people to abandon having children and raising them [6]. A further decline in the number of births can be expected in the coming years. The low long-term number of births leads to permanent changes in the age structure of the population and a decrease in its total number. Therefore, the population of Poland and other Central European countries is ageing. This process is also influenced by improving living conditions and the increase in life expectancy [7]. In the coming decades, these trends will lead to the depopulation of societies. The increase in the elderly group in relation to the entire population indicates that the importance of the specific needs of the elderly will increase in the coming years.

Quantitative and qualitative housing needs in Poland

Housing resources constitute a significant part of Poland's assets. In the postwar period, houses were built according to administrative "spatial standards." The criterion for the allocation of an apartment was the size of the family. The specific needs of the elderly and disabled were not taken into account. Currently, spatial standards do not apply, and most apartments have private owners. The size of apartments is determined by economic considerations and the wealth of buyers. The high demand for apartments does not favor the creation of a more diversified offer, especially aimed at users of different ages and abilities. Apartments are designed primarily with the needs of young people, the still able-bodied majority, in mind. The needs of people in different age and ability groups are increasingly taken into account in building regulations, but still less often in the total number of housing resources in Poland.

Their design may be supported by more detailed legal and normative guidelines. Adapting space to the mobility needs of older people and other disabled people is of particular importance.

MATERIAL AND METHODS

The article attempts to assess the functional and spatial quality of apartments built after World War II. The analyses were conducted in the context of the special needs of the elderly and those with mobility impairments. The spatial and quality standards of apartments are affected by the shortage and high price of apartments in the real estate market [1]. The focus was on evaluating the functional and spatial plans of the apartments, their area and the proportions of the rooms with respect to the needs of the elderly. The research was preceded by an analysis of demographic trends and ageing in Polish society. These trends are characteristic of most European countries.

In the field of demographic analyses, data from the Central Statistical Office were used [4,5]. The interpretation of the data is the basis for assessing the quality of the apartments and their adaptation to the current needs of the users. More attention was paid to the specific needs of the elderly and those with mobility impairments, which constitute an increasingly large group in society.

Historical, analytical, and analytical comparative methods were used to assess the functional and spatial quality of apartments built after World War II. The article analyses characteristic apartment plans that were implemented in Poland under various socio-economic conditions. The focus was on the methods of organizing functional zones in the interiors of apartments to integrate or isolate household members to avoid conflict and stressful situations. The limited mobility of older residents was taken into account to assess the quality of communication spaces. Accessibility issues to various areas of the apartment were discussed, which are derived from the size and proportions of the rooms, and especially the arrangement of furniture.

The results of research on apartments built throughout the postwar period were synthesized and their low spatial and functional standards were confirmed. Their functional and spatial arrangements adversely affect, among others, communication spaces (especially for people with limited mobility) and the freedom to arrange furniture equipment.

Ergonomic studies of apartments are justified in the context of the growing importance of the needs of an ageing society. They were preceded by literature research and the author's experience in designing residential architecture. The assessment of the utility quality of apartments and the description of design recommendations is a case study.

The main objective of the research is to indicate architectural methods of improving the functional quality of relatively small apartments while maintaining accessibility for all users. Possible changes in their functional and spatial arrangements were suggested. The role of reducing the number of household members in individual apartments in improving their spatial standard was also indicated.

Demographic trends and functional and spatial shaping of apartments

The ageing of society is already one of the permanent trends influencing the real estate market. In the coming decades, it will force a change in investment strategies and the functional and spatial design of the apartments themselves. The basic tasks of the construction industry include meeting the demand for housing. This has not been achieved to date, despite significant systemic and socio-economic changes.

Residential construction in the 1950s and 1960s

The aim of the state's housing policy after World War II was to include residential construction in the system of a centrally planned and managed economy and to provide the population with a sufficient number of apartments. The housing market was subject to state regulations, and the size and population of apartments were subject to "spatial standard." First, war damage and, later, an inefficient construction economy were the cause of a permanent housing deficit [8].

Since the mid-1950s, mass construction of houses using industrialized technologies has been undertaken. High prefabricated building systems were to be the best way to meet the quantitative and qualitative housing needs. The quickly constructed buildings were an expression of modernity, prestige, and even social advancement at that time.

In the 1950s and 1960s, design standards concerning the size of apartments were introduced and changed. Regulations from the early 1960s, in particular, contributed to a significant reduction in the usable area of newly built apartments. It was necessary to build quickly and in large quantities, even at the cost of lowering the spatial standard [8]. In the years 1959–1970 the average area of apartments decreased by 5 m² and finally reached 43.7 m². For cost-saving reasons, the apartments were designed in a specific way. The rooms were small, narrow, and often walk-through. At the same time, even in walk-through rooms, a permanent place to sleep was provided (Figure 1a; for comparison, changes in the layout of rooms in 1970s construction – Figure 1b). The proportions and

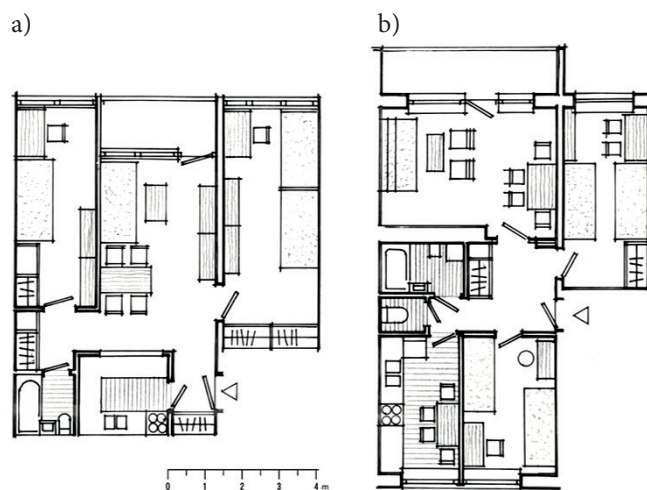


Figure 1. Small, multi-room apartments in Poland built in the 1960s and 1970s: a) an enfilade apartment for a family of 4 with a walk-through room and a dark kitchen from the 1960s and b) a three-room layout apartment for a family of 4 with a bright kitchen from the 1970s

small area of the rooms limited the freedom of their furnishing. For example, it was difficult to place a bed across the room (e.g., a double bed or one accessible to a disabled person from 3 sides). The bedrooms were only slightly wider than 200 cm. In small and dark kitchens, it was difficult to prepare meals for a larger family. In cramped bathrooms, there was no space for a washing machine. Also, too little space was reserved to store belongings. This situation resulted in reduced living comfort and limited intimacy in the apartment.

The apartments were mainly dedicated to young couples and two-generation families. A common family model was a married couple with 2 or even more children. Families often lived together with grandparents. The presence of seniors in the household was caused in those years by the migration of people from the countryside to cities and the desire to receive an allocation for a larger apartment. The restrictions in space had an adverse effect on the freedom of use of the apartment by the elderly. Overcrowded housing was often the cause of generational conflicts. Conflicts concerned especially the third generation, i.e., seniors (grandparents), who usually did not own new apartments. The situation was also worsened by the social changes at that time. The nuclear family model was gaining popularity. After reaching adulthood and taking up employment, the children tried to migrate to other apartments and live independently. At the same time, the pension system gave seniors a certain economic and social independence, who expressed their needs and ambitions more boldly.

A small apartment required a change in traditional (rural or petty bourgeois) customs [9]. Double marital

beds were replaced by single-person couches. There was no space in the kitchen for informal meals. The dining area in the cramped living room was too small to organize a formal dinner for a larger group of guests. The spatial possibilities to meet many needs were limited. This resulted in the concentration of various functions in a very limited area. On the other hand, the small usable area of older apartments can currently be sufficient for single users or couples living without children. It can also be appropriately adapted to the daily life of people with reduced mobility.

In the 1960s, large, pre-war furniture was still being placed in cramped, small apartments. It was not adapted to the special needs of the elderly and disabled. However, e.g., the “granny armchair” was associated with the elderly – a large, thickly upholstered armchair with a high backrest and ears. At the same time, modern furniture was being produced. It was expensive and hard to find in stores. Its production could not keep up with demand. Therefore, furniture dedicated to small apartments was a scarce, or even luxurious, commodity [10].

The new furniture was small, compact, and carefully designed for its function in small apartments. In the early 1960s, wall unit systems for small apartments became popular. The idea of modular panel furniture gained widespread acceptance and was introduced into mass production. Sectional furniture was a popular piece of home equipment.

Furniture was often designed as multifunctional [11]. It was supposed to perform various tasks. A single piece of furniture was supposed to take up little space in the apartment. This had certain consequences. On the one hand, space was saved by using, e.g., wall units and couches. On the other hand, multifunctional furniture required daily maintenance. This included folding and hiding bedding in a box under the couch. During the day, the couch acted as a sofa to sit on. Similarly, multifunctional wall units were not only used to store various items but also as furniture for work. Built-in bureaus were a complement to shelves and cabinets. The lowered doors served as a worktop to perform various office-related tasks. Using such furniture can be a burden even for an average person in full health. Not everyone has the desire and strength to put away and unfold heavy bedding or work accessories every day.

The purpose of reducing the communication space and including it in the walk-through living room was to reduce the usable area of the apartments. Currently, some residents are making functional changes to adapt older apartments to modern needs. For example, small,

dark kitchens can be combined in a single space with an adjacent room by demolishing partition walls. Therefore, the kitchen space can be individually adapted to special needs. Combining 2 narrow rooms creates 1 large room with a large area and proportions close to a square.

Residential construction in the 1970s and 1980s

The constant demand for housing in the 1970s was so great that it was decided to introduce even more unified and mass construction. Houses were built using the so-called large-panel technology. Large housing estates (so-called block estates) created urban and architectural monocultures. The estates were built on the outskirts of larger cities and even in smaller towns. They were characterized by a very large urban scale and anonymity of the buildings. The creation of architectural monocultures was the result of industrialized construction technology and savings in investment processes.

Monotony in urbanized space has an adverse effect on social relationships, especially for the elderly and those with perception disorders. It does not facilitate orientation in the area and identification of the place. It can cause disorientation, especially in people who have difficulty remembering space and, e.g., finding the right entrance to a building. Currently, in thermal modernization works and renovations of facades of large houses, concepts of colour diversity and expressive visual information systems are increasingly being designed. However, they can be an effective way to diversify the space and counteract its anonymity (Figure 2).

In the 1970–1990 the average usable area of the apartments increased from 54.3 to 78.5 m². However, it was smaller than in other countries. For example, in 1990 in West Germany, the average size of apartments was 86.5 m² [8]. These indicators were influenced by the change in the “spatial standard” in 1974, which provided a larger unit of living area per person and a greater share of large apartments in the total number of apartments [8]. The improvement in the area and functional standard concerned the size of the rooms and a bright kitchen with a window. In the bathrooms, there was a place for a washing machine [12].

In large-panel systems, layout plans of apartments were used. Commonly criticized enfilade system with walk-through rooms were no longer implemented. The area and functional and spatial plan of apartments were derived from the large-panel system. Only 1 type of sanitary unit was provided for a given system. It was used regardless of the size of the apartment and, therefore, the size of the family. The kitchen and bathroom

were located next to each other (in large apartments, additionally a separate toilet). Such a plan caused disruptions in the functional division into day and night zones in the apartment. Figure 1b shows the location of the bedroom near the entrance and the bathroom at the back of the apartment. These functional defects resulted from the need to place rooms requiring water and sewage installations in 1 place. They did not favor maintaining the intimacy and independence of the residents. This led to a conflict between generations of seniors living together with their children and grandchildren.

A particularly weak point of apartments are very small bathrooms. The possibilities of moving around in them are limited. Enlarging bathrooms and adapting them to the needs of people with reduced mobility is almost impossible. The installation cores, the position of the walls of the rooms, and adjacent communication routes make it difficult to make any changes. Regaining maneuvering space usually involves the use of compact bathroom equipment and overlapping functional spaces.

There are additional disadvantages in the interiors of large-panel apartments. Rigid structural systems limit the possibility of transforming the interior according to changing needs. Concrete technology limits the possibility of demolishing internal walls, which is technically difficult to implement.

As before, in the years 1970–1989 multifunctional furniture was produced. Furniture units, shallow wardrobes, and shelves that cover the entire surface of the wall were popular. Folding couches and sofa beds were also very popular, taking up less space during the day when folded. As mentioned above, such furniture is difficult for the elderly and disabled to use. Their operation requires a lot of effort and leads to monotony in everyday household chores.

In the 1990s, the housing market changed. Former administrative decisions were replaced by the financial capabilities of participants in the investment process and property rights. Apartments became not only a consumer good, but also a means of capital accumulation. Marketization of housing prices significantly reduced the possibility of buying them. Most often, apartments are purchased for ownership thanks to loans offered by the banking sector. However, the credit policy contributes to the increase in their prices. The housing rental market is developing slowly.

Housing construction in a free-market economy

In the last 30 years, the number of apartments in Poland per thousand people has increased. The average usable



Photo: Przemysław Nowakowski

Figure 2. Colour diversity and a clear visual information system on the renovated facade of a block house from the 1970s in Poland

area of the apartments has also increased. At the same time, the average number of people per apartment has decreased. The Polish housing economy has a larger number of properties. According to statistics, apartments are larger and less populated on average [1]. For many years, a gradual improvement in the housing situation has been observed, which is the result of the construction of new apartments, the renovation of existing stock, and unfavorable demographic processes (depopulation), which partially reduce the demand for new apartments.

Despite the general improvement in the housing situation, the Polish housing market does not meet the needs. Quantitative and qualitative indicators are still less favorable than housing conditions in the European Union (EU). Apartments are difficult to access, as there is a shortage of about 1.5 million of them [1]. The average area of an apartment is 75.5 m². In the EU countries, it is larger and amounts to 96.5 m². The average area of a flat per person in Poland is 31.6 m², while in Europe it is 42.6 m². It is approx. 10 m² smaller than in other countries [13]. The average number of rooms per person in Poland is 1.1 and is 0.5 lower than the EU average. Approximately 35.8% of the Polish population lives in overcrowded apartments, which is 19% above the European average [1]. Poland is one of the countries with the least attractive housing conditions in Europe. Combined with high housing costs, this is a serious obstacle to achieving an adequate standard of living at home.

Newly built housing estates are often still characterized by typification and monoculture. An important design

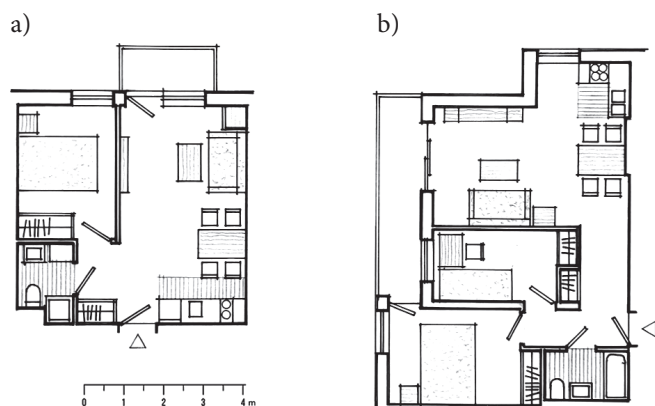


Figure 3. Examples of apartment plans for a family of 3 built in Poland after 1990: a) the open living room contains kitchen space and communication spaces connecting other areas of the apartment and b) the small width of the bedroom makes it difficult to position and access the bed freely

criterion is the “usable living area” in relation to the size of the investment area. The high intensity of development causes deterioration of lighting, and especially sunlight in apartments. It can also cause orientation problems in the area and difficult identification of the place.

In the functional and spatial plans of new apartments, old mistakes are often repeated – dark kitchens and walk-through rooms (Figure 3a). Such concepts result, among others, from cost-saving reasons. The apartments have characteristic proportions. They are very narrow on the side of the window and deep inside the building. The kitchen spaces are far from the windows. Walk-through rooms allow for the inclusion of communication space in other rooms and a reduction of the usable area. The small width of the rooms makes it difficult to arrange the beds freely (Figure 3b). This is especially problematic in the case of double beds.

In new apartments, it is recommended to design a separate and bright kitchen. An additional work room can focus on daily household chores and informal eating (only with household members or alone). However, construction solutions should allow the kitchen to be combined with the adjacent living room. It is also recommended to design bathrooms with more space for a washing machine and more maneuvering space, especially for people with mobility disabilities.

RESULTS

Statistical and literature studies indicate the growing social and economic role of the elderly. Seniors, with their specific needs, are an increasingly important group in the housing market.

The article presents the evolution of the functional and spatial plans of apartments built in Poland after World War II. It is discussed in the context of demographic and cultural changes. The number and areas of apartments are compared with foreign data. Studies have shown that there is a constant shortage of new apartments in the Polish real estate market. The spatial standard is lower compared to the general housing area in other countries.

Popular apartment plans built in different periods were compared and analyzed. Various functional defects resulting from space and technical and economic limitations were noted. Despite this, the apartments have quality potential. Even minor construction changes allow them to be adapted to the needs of different user groups, including the elderly and people with mobility impairments.

DISCUSSION

Houses built before 1990 constitute a significant part of the Polish housing stock. They are in fairly good technical condition and will be used for decades to come [14]. Currently, cramped apartments from the 1960s are often still occupied by older couples and single seniors who received such apartments in their youth (50–60 years ago). They are perceived differently and better assessed because fewer people live in them.

Currently, there is a change in lifestyle. Societies and individuals are more independent, but also increasingly lonely. Younger generations want to create separate households and live without their parents. This is the result of the popularization of the nuclear family model [5,6]. Elderly people often live alone in apartments from the times of their youth. Even apartments with several rooms are inhabited by only single people. The ownership structure of real estate, the lack of apartments dedicated to seniors and old habits do not favor changing apartments to prolong the independence and autonomy of seniors, who lose intellectual and motor skills over time.

The cramped apartments from the 1960s are gaining value in terms of quality. Their small area and functional and spatial plans are similar to those of the apartments built today. However, older apartments are usually better located in the urban and communication structure of cities.

Housing estates and large-panel buildings from the 1970s are still associated with the anonymity of residence and lack of social ties. The situation is worsened by generational change and migration of younger gen-

erations of users. Groups of the oldest residents are becoming less noticeable and insignificant among the young and foreign majority. On the other hand, older housing estates are gaining importance for older people. They usually have good communication connections with the city centers. Additional service functions appear in the urban space and the greenery is more mature. Buildings are modernized and more visually diversified.

Older apartments are often adapted to modern needs. Various renovation works are carried out to improve the functional and spatial plan. These works are very difficult to implement in large-panel apartments. The new standard of equipment (new furniture) carries certain functional consequences. Modern furniture often does not fit small apartments as it is too large. This results in, e.g., difficult access to a double bed or a lack of space for a seating area with a sofa and armchairs.

The compact furniture was not adapted to the specific needs of older people, especially those with disabilities (e.g., with difficulty moving, reduced gripping power, or obesity). This furniture is still often used. It comes from the youth of today's seniors. It is gaining a second life because it fits better into small apartments. Additionally, it is gaining historical, collectible, and sentimental value. Its compact dimensions and multifunctionality can be a model for furniture produced today.

CONCLUSIONS

The small living space of an elderly person can be the cause of a faster loss of independence and autonomy in the event of reduced mobility. On the other hand, a senior or disabled person's apartment does not have to be large. Superficial thinking that a larger space (more living space) is better is not always rational. Maintaining a large apartment economically and in daily life is a huge burden for users. Therefore, well-designed functional apartments that are susceptible to spatial transformations are recommended. Thanks to this, interiors can be adapted to meet the basic and specific needs of people with ageing and mobility problems.

The results of studies of apartments built throughout the postwar period are the recognition of their low spatial standard. This statement may be true in the context of the size of the traditional 2-generation family. Currently, ensuring a sense of comfort for a 4-person family requires building multi-room apartments with a much larger surface area. Apartments with a number of rooms

equal to the number of household members or apartments with a number of rooms greater than the number of tenants by 1 are accepted [15]. Demographic data show that the number of households is decreasing. An increasing group consists of families of 2 people and single people [5]. It can be assumed that the demand for large apartments will also decrease.

"Flexible apartments" are recommended. They can be used for various types of interior reconstruction and adaptation work in order to adapt them to changing needs. The most popular are the separation or opening of kitchen space, removal of partition walls, corrections to the plan of functional zones (changes to the position of walls inside the apartment). At the same time, large apartments do not have to be fully accessible to people with advanced mobility disabilities. Some zones can only be used by residents who are still able-bodied.

REFERENCES

1. NatKa, Ciasne, ale własne. Mieszkamy w małych, przeludnionych lokalach [Internet]. Warszawa: Business Insider; 2024 [cited 2025 Jan 15]. Available from: <https://businessinsider.com.pl/nieruchomosci/polskie-mieszkania-na-tle-ue-ciasne-i-drogie/z0fgkr8>.
2. Center for Information on the Victims of World War II [Internet]. Warszawa: Institute of National Remembrance; 2024 [cited 2025 Jan 15]. Available from: <https://ofiary.ipn.gov.pl/>.
3. Kuzak R, Polskie straty materialne w wyniku II wojny światowej [Internet]. Warszawa: Wielka Historia; 2024 [cited 2025 Apr 30]. Available from: <https://wielkahistoria.pl/polski-straty-materialne-w-wyniku-ii-wojny-swiatowej-znany-ekonomista-oblicza-je-na-62-biliony-zlotych/>.
4. Wysocka A, editor. Demographic situation in Poland up to 2023. Warszawa: Główny Urząd Statystyczny; 2024, p. 10–25.
5. Bielak R, editor. Polska w liczbach 2022. Warszawa: Główny Urząd Statystyczny; 2022, p. 10.
6. Cieślińska B. Bezdzielnosc jako styl życia. In: Żelazny W, Biłous M, editors. Pogranicze. Studia Społeczne. Białystok: Institute of Sociology, University of Białystok; 2014, vol. XXIV, p. 287.
7. The Government Population Council. Demographic situation of Poland. Report 2023–2024. Warszawa: The Government Population Council; 2024, p. 16–17.
8. Krause Ph, Weber K. Transformation der Wohnungswirtschaft in Polen. Stuttgart: Deutsche Verlags-Anstalt; 1994, p. 24–36. German.
9. Kruk M. Wpływ środowisk twórczych na sposób użytkowania i aranżacji mieszkań w budownictwie wielorodzinnym

- w Polsce w latach pięćdziesiątych i sześćdziesiątych XX wieku. Część I – Rozwój architektonicznej myśli projektowej. Lublin: Budownictwo i Architektura; 2019;18(2). p. 76, 80–81, 82–83, 85.
10. Kowalski J. Meble Kowalskich. Ludzie i rzeczy. Poznań: Debogora; 2014. p. 191, 215, 232.
11. Jasiołek K. Asteroid i półkotapczan. O polskim wzornictwie powojennym. Warszawa: Marginesy; 2020. p. 78–83, 203–204, 218–229.
12. Bielobradek A. Systemy budownictwa mieszkaniowego i ogólnego. Warszawa: Arkady; 1974, p. 12–88.
13. Narodowy Bank Polski. Raport o sytuacji na rynku nieruchomości mieszkaniowych i komercyjnych w Polsce w 2023 r. Warszawa: Departament Stabilności Finansowej; 2024. p. 7–8, 15.
14. Mm. Tyle lat wytrzyma jeszcze wielka płyta [Internet]. Warszawa: Business Insider; 2024 [cited 2025 Jan 15]. Available from: <https://businessinsider.com.pl/poradnik-finansowy/tyle-lat-wytrzyma-jeszcze-wielka-plyta-ceny-wystrzelily/26ns3j1>.
15. Sochacki M. Szacunek potrzeb mieszkaniowych Polski i stopień ich zaspokojenia; Warszawa: Instytut Gospodarki Mieszkaniowej; 1992. p. 22–27.