

Teresa Słaby^a

Housing needs of Polish seniors

Summary. The growing share of seniors in the population of Poland and the lack of systemic solutions in the field of social security, resulting from the lack of diagnosis of real needs of this group, imposes the extension of research tasks undertaken so far. Such diagnosis is needed to build a housing system for the Polish seniors. The objective of the article is to present selected results of research on the needs of people aged 60+ conducted in 2017. The study of quantitative and qualitative nature, was based on an online questionnaire (CAWI — Computer-Assisted Web Interview) as well as on a questionnaire distributed in paper form and individual interviews were also conducted (IDI — In-depth Interview).

The results of the quantitative research together with the recommendations included in the expertise can constitute a field for entrepreneurship at various levels of activities in construction and services related to facilities in the existing housing infrastructure. Senior housing requires sectoral cooperation, various forms of construction and financing models for housing construction.

Keywords: construction, needs of the seniors, intangible services, quality of life, housing conditions.

Potrzeby mieszkaniowe polskich seniorów

Streszczenie. Wzrost udziału seniorów w ludności Polski oraz brak systemowych rozwiązań w zakresie zabezpieczenia społecznego, co wynika z braku diagnozy rzeczywistych potrzeb tej grupy, dyktuje podejmowanie szerszych niż dotychczas zadań badawczych. Diagnoza jest potrzebna do stworzenia systemu mieszkaniowego dla seniorów. Celem artykułu jest prezentacja wybranych wyników badania przeprowadzonego w 2017 r. w zakresie potrzeb w tej dziedzinie życia osób w wieku 60 lat i więcej. Badanie miało charakter ilościowo-jakościowy; wykorzystano ankietę online (CAWI — Computer-Assisted Web Interview) i dystrybuowaną w postaci papierowej oraz przeprowadzono wywiady indywidualne (IDI — In-depth Interview).

Rezultaty badania ilościowego wraz z rekomendacjami zawartymi w ekspertyzie mogą służyć przedsiębiorczości na różnych szczeblach działań w budownictwie oraz w usługach związanych z udogodnieniami w już istniejącej infrastrukturze mieszkaniowej. Mieszkalnictwo senioralne wymaga współpracy międzysektorowej oraz różnych form budownictwa i modeli finansowania budowy mieszkań.

Słowa kluczowe: budownictwo, potrzeby seniorów, usługi niematerialne, jakość życia, warunki mieszkaniowe.

JEL: C19, D12, R11, R20

^a Wyższa Szkoła Menedżerska w Warszawie, Wydział Menedżerski i Nauk Technicznych.

Not only the possibility, but also the necessity of economic activity is opening up to Polish entrepreneurship, which is related to satisfying the needs of the rapidly growing Polish population aged 60+. Persons over this contractual number are referred to as seniors. In recent years, a further increase in the number of older people can be observed. In 2016, population of post-working age (60/65+) accounted for 20.2% of the total population and approached nearly 8 millions.

Even in the 1960s, ageing was the focus subject for only those demographers who were involved in the age pyramid in everyday life. Currently, not only various scientific disciplines, but also economic practice deals with the problems of the population ageing in Poland. In 1904, Edwin Hauswald, a pioneer of scientific management in Poland, formulated five principles of entrepreneurship, one of which entitled "Consumer is the one who feeds us" has become very current (Hauswald, 1904, p. 99). The Polish senior becomes a consumer who secures entrepreneurship in all its varieties.

In the period of 6 years (2010—2016), the number of people over 60 increased by 20 percentage points. Particularly rapid growth occurred in two subgroups. The population of Poland aged 60—69 increased by 35%, and at the age above 85 this increase amounted to 43%, which means the diversification of the business market in the production of tangible and intangible goods (services).

Ageing is a multi-dimensional concept, therefore changes in the biological and social structure must be accompanied, in economic terms, by the reconstruction of the production and consumption models as well as the saving and investment models. This peculiar kind of demographic revolution has taken place and will continue to evoke the need to answer the following questions: who is investing? who pays? who is responsible for what?

In the current demographic situation, the restructuring of the economy in a favourable institutional and social environment is possible only if it is based on a diagnosis of the needs of the elderly. Such diagnosis in relation to housing for seniors was made in autumn 2017 by a team of 11 people, including the author of the article.

HOUSING NEEDS OF POLISH 60+ SENIORS — THE COURSE OF THE STUDY

The aim of the article is to present selected results of the diagnosis concerning housing needs of elderly people and their preferences, reflecting the currently unmet needs of people aged 60+ in terms of housing conditions (*Ekspertyza...*, 2017)¹. Thematic scope of the expertise was related to the construc-

¹ Expertise concerned the analysis of housing needs of seniors and indication of significant problems and deficits in senior housing prepared by: the National Institute for Senior Management, Fundacja Laboratorium Architektury (LAB60+), PCG Polska Sp. z o.o and Centrum Amron on commission of the Ministry of Infrastructure and Construction, Department of Housing, in 2017.

tion of a housing ecosystem model for seniors, improving their quality of life by introducing solutions that allow the longest independence of an elderly person. There were considered such solutions as access to a virtual doctor or the introduction of additional elevators in four-storey buildings as well as the elimination of architectural barriers for elderly people with health problems. The selected results presented below come from the implementation of research intensions in a quantitative study. The qualitative study included 7 in-depth interviews (IDI) with seniors aged 74—84 and 85+, 2 interviews with representatives of non-governmental organizations (NGOs), acting for the benefit of seniors and 3 interviews with entities implementing municipal housing projects for the benefit of seniors. According to the Author, too small number of respondents in qualitative research cannot serve as a sufficient source for diagnosis of a housing situation diversified by many features of the population subgroups, which constitute elderly people.

The primary quantitative empirical study was carried out by PCG Polska (Public Consulting Group) in October 2017 in all voivodships of Poland. The study was not random. The data was obtained in two ways, namely, by completing an online survey (the link was distributed by the partners of the National Institute of Silver Economy through internal mailing lists) and by correspondence with people associated in the seniors organisations such as universities of the third age, pensioners and retired unions.

The conducted research identified the current housing situation of seniors and their plans for changing the place of living in the near and distant future. Thus, a diagnosis of the structure of demand for new apartments and services modernising currently inhabited premises and buildings was obtained. In addition, opinions about the needs to adapt the flats and buildings in which the seniors live today, in the context of their health condition and financial situation, were obtained. Therefore, obstacles preventing the conversion of flats were diagnosed.

Quantitative and qualitative research was carried out. In the part concerning spatial and architectural issues of construction for the needs of senior housing research was based on a number of both Polish and foreign sources. Such a research methodology allowed for the triangulation of data in order to enrich the knowledge gained with the desk research method. Quantitative research was conducted among respondents attending classes of several universities of the third age and meeting in the seniors clubs with the use of traditional means. Filling in online questionnaires on the website [MieszkanieDlaSenioraTypeform.com/to/ey8oBY](https://www.MieszkanieDlaSenioraTypeform.com/to/ey8oBY) was also used.

In the quantitative research, the questionnaire contained 6 questions in addition to the personal data (metric), whereas the extensive set of answer variants allowed for obtaining 51 individual distributions detailing the answers to the main questions, which made it possible to learn many conditions of the respondents'

answers. The surveyed group included 215 respondents, the number of correctly completed questionnaires was variable (from 210 to 215), therefore the empirical frequency of responses indicating the variants expressed in percent were counted in relation to *n*-valid surveys. Qualitative research was based on a total of 10 individual in-depth interviews with the seniors from the "Nestor" group (aged 75–84), employees of non-governmental organisations working for the seniors, and aimed to identify the needs of a group of seniors aged 75+.

The territorial distribution of responses was varied. The largest number (57 respondents) represented Mazowieckie voivodship, while the smallest (from 1 to 4 people) Podkarpackie, Podlaskie, Świętokrzyskie and Śląskie voivodships. Thus, unfortunately, the situation in the so-called "Poland B" was not included. The author examined the situation in this part of Poland by implementing in 2014 a project financed by the National Science Centre (NCN) related to exclusion of elderly people in rural areas. The results of this study, based on a sample of 400 respondents, illustrated the difficult, real living conditions of indigenous villagers in this part of Poland (Dąbrowska, Gutkowska, Janoś-Kresło & Słaby, 2016).

Statistical analysis of responses in the quantitative study was carried out based on the construction and description of the structure of individual distributions. It allows to assess the variation of responses depending on the characteristics of the respondents and the numerical evaluation of correlative relationships between the variants of answers to questions contained in the questionnaire and the "metric data" characteristics of the respondents.

CHARACTERISTICS OF RESPONDENTS

The surveyed group of 215 respondents was dominated by women (73%). In the 5 age groups (60–64; 65–69; 70–74; 75–84 and 85 and over), two of them, namely 60–64 and 65–69, were represented in almost the same percentage of approx. 30%. Slightly fewer seniors (21%) were aged 70–74. Other people — in descending order — were seniors aged 75–84 (15%) and the oldest aged 85 and over (6%). Thus, the answers obtained mostly described the housing situation of younger seniors, with potentially higher demand for a new flat adapted to the needs of elderly people.

Definitely the highest number of respondents (60%) lived in cities with more than 100,000 inhabitants (people from the largest cities with over 500,000 inhabitants did not take part in the research). 15% of respondents lived in small cities and 8% in the smallest ones. A relatively large number of responding seniors lived in rural areas (17%).

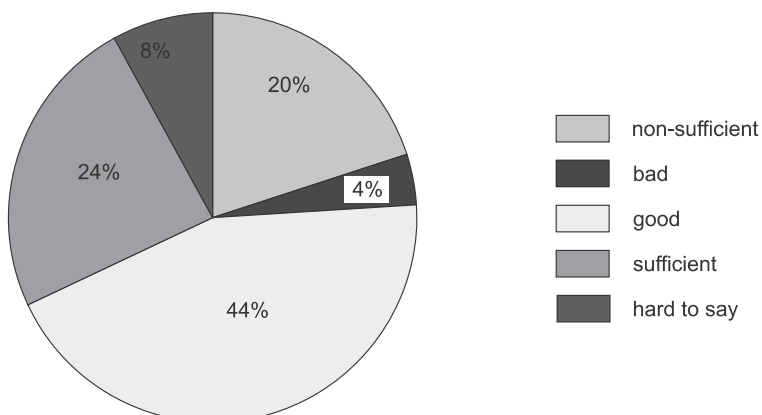
On the basis of the responses obtained in the quantitative study, it was found that almost half (49%) of respondents live with a spouse/partner, 35% live alone. Only 10% live with children and only 1 person with grandchildren. A few persons

(2%) indicated that they would live with their children and grandchildren as well as with a curator or in a private nursing home. The vast majority (82%) owns a flat that is not indebted. Few responding seniors lived in a flat/house with a mortgage loan. A similar percentage of seniors (5%) had tenant flats. Three people rented a flat from a private person.

EVALUATION OF THE CURRENT HOUSING SITUATION OF SENIORS

Considerations on the potential demand for new housing, including its private and institutional structure, which depends on the age structure of seniors, their income and health situation, should be preceded by the diagnosis of seniors' current situation. It can be assumed that younger seniors (aged 60–69) may be interested in new, privately financed apartments. Less wealthy can be supported by local governments in exchange of flats. However, in the case of seniors aged 80+, there may be a greater demand for houses with differentiated structure of necessary medical care, and in such situations, the funds from budgets of local self-governments can be expected. Figure 1 illustrates the assessment of facilities in a residential building in the context of adapting to senior's health condition. The distribution of responses, considered in the context of the demand for the equipment of existing buildings, indicates that a total of 24% of seniors rated facilities (lift, rails, descents, wide door and lighting, wall colour) negatively. The share of the older respondents who positively assessed the building's adaptation according to their health status and needs respectively decreased.

FIG. 1. THE STRUCTURE OF ANSWERS TO THE QUESTION "HOW DO YOU ASSESS THE ADAPTATION OF THE BUILDING IN WHICH YOU LIVE TO YOUR HEALTH STATUS AND NEEDS"



Demand for new flats is conditioned by the income situation of the seniors. Most respondents owned a proprietary, unindebted flat, which after sale could significantly affect the interest in buying a new, smaller one. The surveyed seniors were above all retired ones (68%) and only 5% were disability pensioners. The subjective assessments of the financial situation compared to the declared amounts for rent and utilities was quite surprising, as only 2% of seniors chose the answer "I live poorly". Over 44% stated that they live modestly but have enough money for daily expenses, nevertheless they must save for more serious purchases. Almost one third of the respondents answered that they live well (without saving), and a dozen or so people (7%) live very well, even with a little luxury. However, assessments of the financial situation of elderly people are treated with some caution in social studies, because older people do not want to admit to difficult living conditions due to low incomes. Some seniors (16%) had income from two sources (e.g. retirement and self-employment). The quoted declarations on the financial situation has not changed in Poland over the years. The results obtained in the years 2009 and 2010 in the study of demand for various services for seniors living in Warsaw are again confirmed (Bombol & Słaby, 2011, p.163).

Declarations concerning the maximum amount of money that seniors could spend on a new place of residence (rent and utilities fees) are an important opinion for investment planning in the field of residential construction for seniors. The numerical values of basic measures are presented in Table 1.

TABLE 1. DESCRIPTIVE MEASUREMENTS OF THE DISTRIBUTION OF DECLARED AMOUNTS FOR A NEW FLAT (question: "What are the maximum monthly housing costs (rent, utilities fees) you would be able to pay for a flat that meets your needs?")

Measure	Value
Arithmetic average in PLN per person	814,92
Median in PLN	675
Lower (first) quartile in PLN	500
Minimum in PLN	0
Maximum in PLN	3500
Upper (third) quartile in PLN	1000
Coefficient of variation in %	65,49
Skewness	2,19

S o u r c e: *Ekspertyza...* (2017, p.152).

In view of the high, positive asymmetry of distribution caused by a small group of people who could face high costs per month in a new place of residence, the average monthly cost of just over 800 PLN should be considered somewhat overstated in relation to the amount of pensions.

The differentiation of the declared amounts was not large, but the numerical level of the asymmetry index indicates that declarations with relatively low amounts prevailed (one quarter of respondents would not spend more than PLN 500), half declared more than PLN 675, and a quarter of seniors over PLN 1,000. The decision to change the flat can be accelerated by health status, lack of support from the family and neighbours or other people. Access to medical and care services, which can be provided within the housing community, can play a big role. More than half of seniors assessed their health condition as good and very good (56% in total), about 30% were not determined to assess it unambiguously. Health is the main cause of the seniors' anxiety. The lack of possible independence deprives them of a sense of security and increases their interest in living in private nursing homes.

It is obvious that the buildings with flats adapted to the diverse needs of residents and located on different floors could be a real implementation of the saying that "The apartment follows the age" by Marzena Rudnicka from the Polish Institute of Silver Economy². This thought can be described as a real estate management paradigm in relation to the rapidly growing group of people aged 60+. Such conceived senior housing is also the essence of hope for young people, their families and members of elderly people's households, who would not live in such structured buildings in the company of only similar age people. As Wilk, Szymczak & Witkowski (2010, p. 8) notes, the seniors do not want to be thrown away as well as they do not want to be "retired users of reality, deprived of login and password and access to active life".

SENIOR CITIZENS' PLANS FOR CHANGING THEIR PLACE OF RESIDENCE

The demand for new flats is conditioned by the current equipment of the inhabited apartments. The quantitative study lists a set of 21 facilities. The distribution of answers in Table 2 plays a dual role in the analysis — it diagnoses the satisfaction of needs and at the same time illustrates the demand for the scope of possible intangible services, the provision of which can be activated by entrepreneurship in this market segment. It also depicts the desired infrastructure in the surroundings of newly constructed buildings intended for housing for seniors (e.g. balcony, garden, common room for meetings — also with people from outside).

The highest percentage of seniors indicated such facility access as: internet, help from curator or nurse, balcony and proximity to shops, public transport and park or walking areas. It is worth noting that half of the seniors who would be favourably disposed towards a positive assessment would need a handrail in the

² Krajowy Instytut Gospodarki Senioralnej — <https://kigs.org.pl/o-instytucie/wladze-institutu>.

bathroom/apartment (55%), common room / meeting place with neighbours (53%), backyard garden (50%), elevators (42%), wide entrance to other rooms (46%), driveway to the main entrance door (42%).

TABLE 2. DISTRIBUTION OF VARIANTS OF ANSWERS TO THE QUESTION: "WHAT FACILITIES DO YOU HAVE IN YOUR PLACE OF RESIDENCE?"

Facilities	I have		I do not have and I need it		I do not have and I do not need it	
	N	in %	N	in %	N	in %
Elevator in the building or other solutions to climb the stairs	69	33	52	24	88	42
Wide entrance to the house	119	59	28	13	55	27
Wide entrance to other rooms	74	36	36	18	95	46
Driveway to the main entrance door	81	38	42	20	88	42
Intercom, videophone or door-keeper	158	76	11	5	39	19
Handrails in the apartment/bathroom	52	25	42	20	114	55
Seat in the bathtub/shower	118	56	54	26	39	18
Bathroom fully adapted for people with limited mobility	136	65	20	10	52	25
Bed with a comfortable mattress	142	68	41	20	27	13
Bed with an electric adjustable headrest	154	73	46	22	10	5
Light switched on by the motion sensor, i.e. automatically	149	71	15	7	45	22
Internet	183	87	6	3	22	10
Air conditioning	154	73	11	5	46	22
Help from curator/nurse	179	85	22	10	20	5
Telecare / telemedicine system with the possibility of calling for help with the use of button	172	81	9	4	31	15
Balcony or terrace	177	83	14	7	21	10
Backyard garden	75	35	30	14	107	50
Lounge / meeting place with neighbours	50	23	50	23	113	53
Proximity to shops, service points	170	82	30	14	8	4
Proximity to the public transport stops	172	81	12	3	28	13
Park or walking area with benches to relax	162	77	20	9	29	14

Source: *Eksperytyza...* (2017, p.154).

Based on the results of the study, the so-called infrastructure conducive to staying in the current place of residence can be highly estimated, although the seniors have indicated several devices that would make their lives easier. These facilities include, above all, wide entrances and elevators. However, such a diagnosis should be formulated rather cautiously, as it does not reflect the real situation where, e.g., air conditioning can only be installed in private nursing homes or in apartments of wealthy younger seniors. Further research in numerically much larger samples and depending on the size of the place of residence can provide more reliable data. Supplementary conclusions on the diversity of opinions depending on the characteristics of the respondents were obtained based on an in-depth statistical analysis. The results illustrating the impact of

the most differentiated responses according to the features of seniors are presented in Table 3.

TABLE 3. NUMERICAL RATINGS OF CRAMER'S DEPENDENCY POWER FACTOR

Assessment	Sex	Age	Material status	Currently living with others
How do you assess the adaptation of the building in which you live to your health status and needs?	0.11	0.09	0.23	0.18
Do you consider changing the place of living?	0.17	0.15	0.23	0.16

Source: *Ekspertyza...* (2017, p.163).

It should be emphasized that the results obtained in the study concern all respondents, without age differentiation. Slightly more information was generated by the numerical assessment conditioned by respondents' features, the opinion on facilities and plans for possible changes, which was estimated based on correlation tables enabling the use of the measures (Cramer's coefficient) of the dependence force (Luszniewicz & Słaby, 2008, p. 284). This measure can take a value from the range [0; 1], i.e. the weaker the dependence, the closer to 0 is the value of the coefficient. In the surveyed group, the variations in response patterns by gender, age, financial situation, and living together with a close family member were not strong. Relatively the strongest, which seems obvious, both the assessment of facilities and plans to change their place of residence were dependent on the material situation.

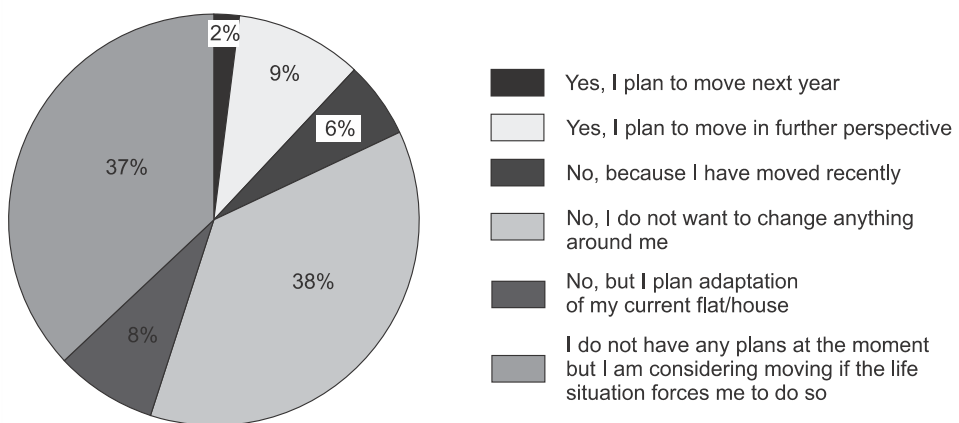
Figure 2 illustrates the structure of the share of individual responses, proposed in the survey, about seniors' plans for changing the housing situation. The respondents who chose the negative answers accounted for a total of 89%, but the refusal response was decided only in 38% of cases. Some of the seniors do not plan to make changes, but want to adapt the place of living to the needs (8%), some of them recently just changed their place of residence (6%). Over one third (37%) would change a flat only in a compulsory situation. 11% of respondents planned a change of place of residence, with only 2% deciding to change it next year.

An important issue in the context of future demand was the question about the most-desired new housing situation, provided that the seniors have enough income, a convenient family situation and relatively good health. The following set of responses (in %) illustrates the positive plans for the specific situations and the intensity of the choices concerning possible change in the near or distant future (*Ekspertyza...*, 2017, p. 156):

- to a smaller flat/house (26%);
- to a larger flat (11%);
- to a tailored flat (44%);
- to another district (17%);

- to another city (14%);
- to the countryside (10%);
- to a residential group / house for seniors (16%);
- for independent living with support services (31%);
- to a private nursing home (7%);
- to a public nursing home (4%).

FIG. 2. THE STRUCTURE OF ANSWERS TO THE QUESTION "DO YOU CONSIDER CHANGING YOUR PLACE OF RESIDENCE?"



Source: *Ekspertyza...* (2017, p.155).

The above presented data indicate that the relatively highest number of investigated seniors prefer to move to a flat adapted to the needs of elderly people, additionally enriched with special services taking into account the needs of people aged 60+.

Moreover, the seniors were asked a question: "What features should have new homes that you dreamt of?". In the ranking, the most common characteristics that would reflect the new, dream place of residence were listed in the following order (*Ekspertyza...*, 2017, p. 159):

- 1) have an own flat (91%);
- 2) have people of different ages in their neighbourhood (87%);
- 3) be able to order additional services (59%);
- 4) not necessarily have nurse availability / nurse support (44%);
- 5) prepare meals by yourself in own kitchen (43%);
- 6) live with a spouse/partner (42%);
- 7) live in a big city (36%);
- 8) have access to medical staff 24 hours a day (31%);
- 9) live in a two-room flat (28%).

Most respondents indicated the ownership of the flat, which perhaps stems from three premises, namely ownership is a sign of their life achievements, gives a sense of security and fulfills the wish to leave some property for their children or grandchildren. Dreams are associated with emotions and thus subjectively determine components of quality of life. The above ranking of dreams reflects, first of all, the desirable living conditions that would be met by new housing conditions in accordance with various conditions.

CONCLUSIONS

In Poland, there is a lack of research on the current housing conditions of seniors and — in particular — their preferences. What is more, available data are fragmentary. The article presents selected results from the extensive expertise (*Ekspertyza...*, 2017), which were formulated on the basis of a quantitative study of 215 respondents aged 60+ (which to a large extent consisted of women). Therefore, the results may provide indicative knowledge, but also can fill the research gap in the diagnosis of housing needs of elderly people. They can be a source of knowledge about the scale of these needs for decision-making entrepreneurs in many areas of the Polish economy.

Presented experts' opinions were based on a number of available sources, which combined with the results of the research by their own team made it possible to formulate the following conclusions (*Ekspertyza...*, 2017, p. 141):

- "early" seniors need mainly independent flats, which is valuable information for developers on the market of new flats. Moreover, currently inhabited premises require facilities, which can activate the intangible services market;
- "mature" seniors need homes where assistance in running a household, access to medical care is available, ensuring their security;
- the oldest seniors need housing with a much wider dimension of overall care.

The lack of a senior housing policy hinders entrepreneurship in the construction and material services sector. The expertise, which provides the basis for the presented conclusions, is an example of research useful for the preparation of social policy of the government/local governments for actions aimed at improving the life situation of elderly people in Poland. It also contains specific architectural solutions that can be used by developers, especially for the group of younger seniors aged 60—70. The group of seniors is becoming more and more diverse and difficult to classify clearly, therefore the proposed age category of crediting to the period of early old age is conventional. Lack of the possibility to change the housing situation in various areas is caused, by bad material situation, especially of older seniors but above all, by absence of concrete proposals from the construction industry and lack of adaptive services in existing apartments and buildings.

Many younger seniors could benefit from private initiatives in the housing market, for instance by selling apartments that are already too large and not

adapted to the needs of the elderly and by buying a private flat, built and equipped for people whose physical fitness has decreased significantly. However, in relation to older seniors, especially those aged 80+, the real estate market will depend on the initiatives of local governments, which can be described as a social obligation. In both these areas, the activity of entrepreneurs, its intensity and diversity can be practically unlimited and dynamic.

Recommendations, formulated in the conclusions of the expertise, concerned primarily the striving to diversify the projects for various groups of recipients, such as the seniors aged 80+ or people with disabilities. There is a need to modify the conditions of actually existing apartments. Financial and organisational assistance in the adaptation of flats is necessary, as well as the combination of social and spatial policies in order to revitalise districts for the needs of the seniors, and to build housing at prices lower than market prices.

Further research on housing needs, more detailed in the geographical (local) context, should activate local government authorities to improve housing conditions, assist in the installation of facilities, move and build new premises according to the preferences of older people, whose number in Polish society will grow dynamically.

REFERENCES

- Bombol, M., & Słaby, T. (2011). *Konsument 55+ wyzwaniem dla rynku*. Warszawa: Oficyna Wydawnicza SGH.
- Dąbrowska, A., Gutowska, K., Janoś-Kresło, M., Słaby, T. (2016). *Wykluczenie społeczne — jakość i godność życia osób w wieku 60+ rdzennych mieszkańców wsi w Polsce*. Warszawa: Oficyna Wydawnicza SGH.
- Ekspertyza dotycząca zbadania potrzeb mieszkaniowych seniorów oraz wskazania istotnych problemów i deficytów w obszarze mieszkalnictwa senioralnego* (2017). Przygotowana przez: Krajowy Instytut Gospodarki Senioralnej, Fundację Laboratorium Architektury (LAB60+), PCG Polska Sp. z o.o; Centrum Amron na zamówienie Ministerstwa Infrastruktury i Budownictwa, Departament Mieszkalnictwa. Retrieved from: <http://lab60plus.pl/ekspertyza-dotyczaca-zbadania-potrzeb-mieszkaniowych-seniorow-oraz-wskazania-istotnych-problemow-i-deficytow-w-obszarze-mieszkalnictwa-senioralnego>.
- GUS. (2017). *Ludność i ruch naturalny w Polsce*. Warszawa: GUS. Retrieved from: <http://stat.gov.pl/obszary-tematyczne/ludnosc>.
- Hauswald, E. (1904). Organizacja i zarząd przedsiębiorstw przemysłowych. *Czasopismo Techniczne*, 22(6—7).
- Luszniewicz, A., & Słaby, T. (2008). *Statystyka z pakietem komputerowym STATISTICA PL. Teoria i zastosowania*. Warszawa: Wydawnictwo C.H. Beck.
- Wilk, P., Szymczak, K., & Witkowski, M. (2010). Starość jest nielegalna. *Rzeczpospolita*. Plus minus. Retrieved from: <https://www.rp.pl/artykul/495917-Starosc-jest-nielegalna.html&cid=44&template=restricted>.