ARCHITECTURE CIVIL ENGINEERING ENVIRONMENT
The Silesian University of Technology No. 2/2022

doi: 10.2478/ACEE-2022-0012

RESIDENTIAL SATISFACTION IN MULTIFAMILY ESTATES OF MASS HOUSING ERA

Anna OSTAŃSKA *

*DSc, PhD, Eng.; The Lublin University of Technology, Faculty of Civil Engineering and Architecture, ul. Nadbystrzycka 40, 20-618 Lublin, Poland
E-mail address: *a.ostanska@pollub.pl*

Received: 4.04.2022; Revised:20.04.202; Accepted: 7.06.2022

Abstract
The infrastructure and buildings of housing estates need to be maintained to stay operational as well as modified to answer current needs of the inhabitants. To set goals of the estate maintenance and development, the estate management is expected not only to monitor the technical condition of the assets to undertake necessary repairs, but also to plan improvements. The author investigates the residents' point of view on the development of a particular housing estate in Lublin using face-to-face interviews. The questions concerned accessibility, deficiencies in local amenities, the condition of the estate's infrastructure, buildings and flats, and opinions on priorities of improvement measures. The survey results are intended as input for planning the modernization of the estate.

Keywords: **Resident opinion survey; Housing development rehabilitation; Prefabricated buildings; Activity monitoring.**

1. INTRODUCTION

A considerable portion of Poland's housing stock consists of "complexes of apartment blocks of low aesthetic appeal, but satisfactory technical condition; with poor offer of retail, services and public spaces, but still offering decent social amenities and access to green areas" [1]. This refers mostly to the products of industrialized construction and mass housing projects undertaken between nineteen-sixties and nineteen-eighties. Despite functional deficiencies, and due to affordability, apartments in this stock are considered attractive in Polish housing market, where the supply cannot satisfy the demand [2].

As early as in nineteen-eighties, the relatively new „prefab" apartment blocks were subject to first modernization measures [3] focused on improving or complementing the technical infrastructure [4] and reducing the energy demand for heating and cooling (insulating envelopes, adding vestibules) and thus the maintenance costs borne by the inhabitants [5]. Though much has been done in terms of improving energy performance and the buildings are generally well maintained [6], the "prefab" estates inevitably age. Technical, functional, and social issues become more striking over last decade [7, 8]. Moreover, demographic changes and social problems are not being monitored, which makes it impossible to effectively counteract unfavorable social phenomena and processes [9]. The managers of housing estates rarely take the effort to recognize the changes of the resident's needs [10, 11], which hinders targeting of interventions [13]. Corrective actions in the built environment require a comprehensive diagnosis [12], not only at the scale of buildings, but also at the scale of the entire housing estate [6].

Komar [14] investigated into maintenance and investment strategies of housing cooperatives (these organizations were the founders and still manage the housing estates of the considered period) using the example of Katowice Housing Cooperative, established in 1957, in the onset of industrialized housing. The devel-

opment of a proper strategy is logical to be preceded by the recognition of the current state of the assets. This inclused collection of reliable data, available from municipalities [15] as well as from documents in possession of the estate managers [16], and confirmed by "in situ" inspection [17] using thermographic techniques [18]. The social aspects of the estate population can be investigated into on the basis of a face-to-face interviews, helping identify changes in needs and expectations, including the willingness of the inhabitants to spend on renewable energy sources. In the region of Małopolska, no cases of installing renewable energy sources in multi-family prefab housing estates have been reported so far [19]. In contrast, in the Lublin region, solar collectors were installed in Zamość [20], using two sources of funding.

The aim of the research, conducted as a direct survey among the inhabitants of the housing estates, was twofold. First, to gain insight into the estate inhabitants' opinion on the quality of their living environment, its perceived deficiencies, and ideas what and how can be improved. Second, to draw their attention to the fact that their opinion, if explicitly expressed, matters. They are able to affect the maintenance and investment decisions related, for instance, with improving energy performance [21, 22] and quality of the residential environment [23]. Additionally, prioritizing the planned works with the inhabitants, gives the manager certainty about the good direction of the tasks selected for the revitalization programs and empowers them to seek external funds [24]. This can be a contribution to revitalization programming for entire urban areas [25, 26].

The analysis presented in this paper focused on defining current needs of the inhabitants and the perceived urgency of changes. The object of research was a particular housing estate located in Lublin.

2. METHODS

2.1. The object of research

The object of study was a housing estate located in the city of Lublin, south-eastern Poland. The estate is a part of large multifamily housing district erected in the second half of the nineteen-eighties. The estate is composed of 13 apartment blocks, all of them build of large panel (precast concrete elements) of the W-70 system. It is a home for approximately 4,200 people. The estate covers an area of 176,943 m^2. Out of it, commercial premises occupy 2,980 m^2, and service premises 216 m^2. Social amenities include two kindergartens and a large school. Apartment blocks are sparsely distributed over the area, offering the inhabitants large green spaces between buildings.

2.2. The questionnaire

The research used patterns of social survey [27], enriched with methods and techniques derived from social experience discussed by Sztumski [28] and the author's fifteen years of experience in multidisciplinary social surveys (2004–2019) [24, 29]. The data were gathered periodically in direct questionnaire-based interview with the estate's inhabitants. The questions concerned: perceived deficiencies of the estate, buildings, and dwellings; the resident's expectations on future improvement actions; and the opinions on actions actually taken. The survey was intended to supply the estate managers with up-to-date information on the residents' backing for more ambitious (and costly) modernization measures. This may be useful in preparing the estate's maintenance and improvement strategy to improve the quality of life of residents. Moreover, the survey was to supplement the information on the work carried out in the apartments by the residents themselves.

Due to the wide scope of information to be gathered, the survey questionnaire contained 19 questions, including ten closed-ended (single choice questions), eight semi-open-ended questions (cafeteria of conjunctive answers), and one open-ended question.

2.3. The sample

The target population were adult (over 18 years of age) inhabitants of the estate. The population was considered in three age groups: 18–25, 26–45, 46–65 and over 66. The survey was to be conducted in the form of a direct interview, and the respondents were to be approached at home.

The answers were thus obtainable from the estate inhabitants present at home and willing to give answers. To avoid bias, the interviewers approached the potential respondents at different times of the day (to include people of different life styles and occupational status). Only one person per apartment was asked to give answers. The initial part of the interview was to inform the potential respondent on the purpose of the survey and data confidentiality (collected only to create statistical summaries). Considering the complexity of the questionnaire, the direct interview was selected to enable the interviewer to immediately clarify issues not understood by the respondent.

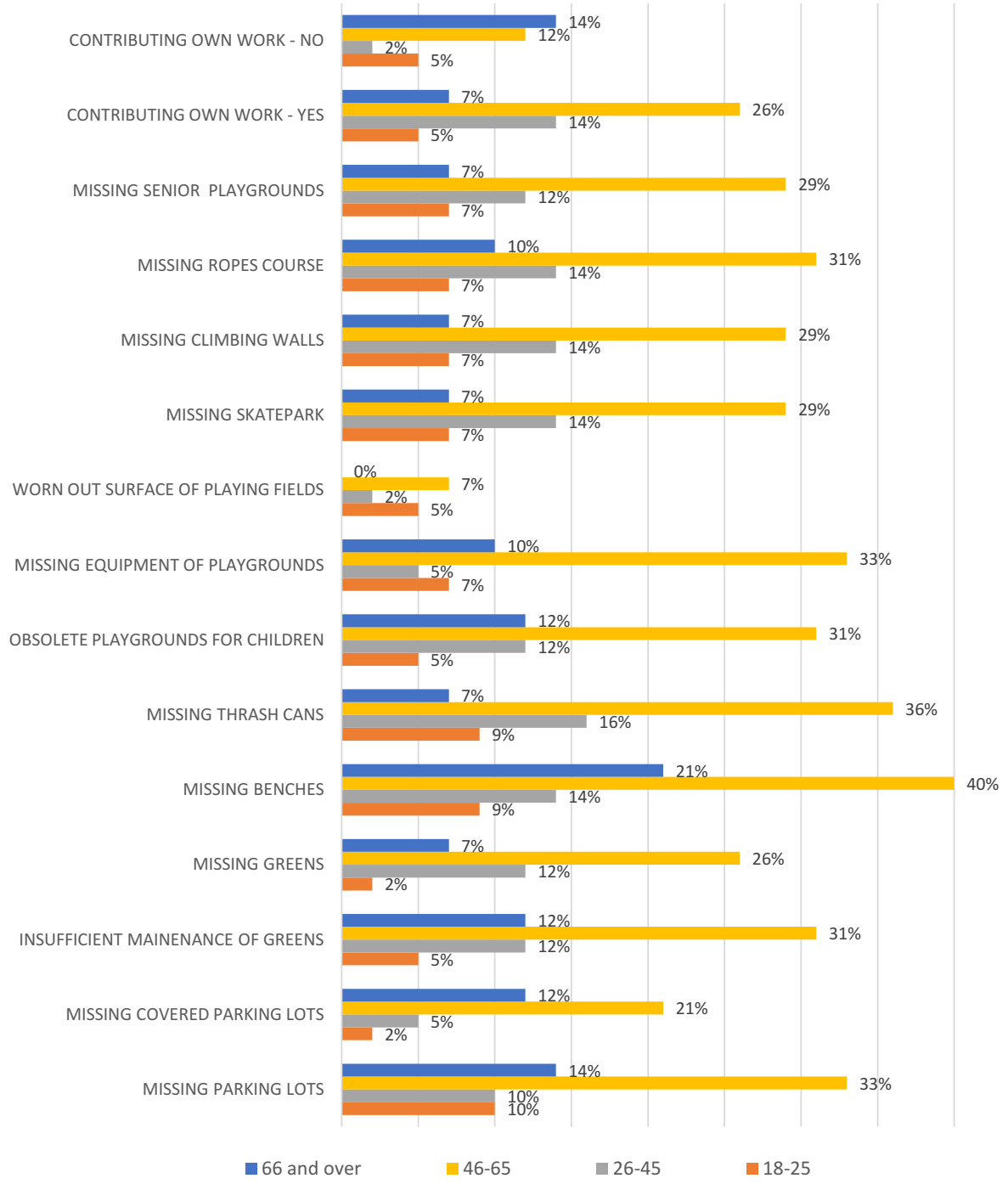

Figure 1.
Declaration to contribute own work towards improvement in the estate and deficiencies of the estate in the eyes of survey respondents (elaborated by A. Ostańska)

2.4. The interview

The survey was conducted on January 27–28, 2014 in two rounds: 9 a.m. till 2 p.m., and 4 p.m. till 7 p.m.

Trained interviewers pre-screened the respondents for two criteria: place of residence, and age, following the sampling strategy.

There were 186 apartments in the analyzed buildings, out of which the survey was conducted in 34 apartments. All rules of random selection were kept, the

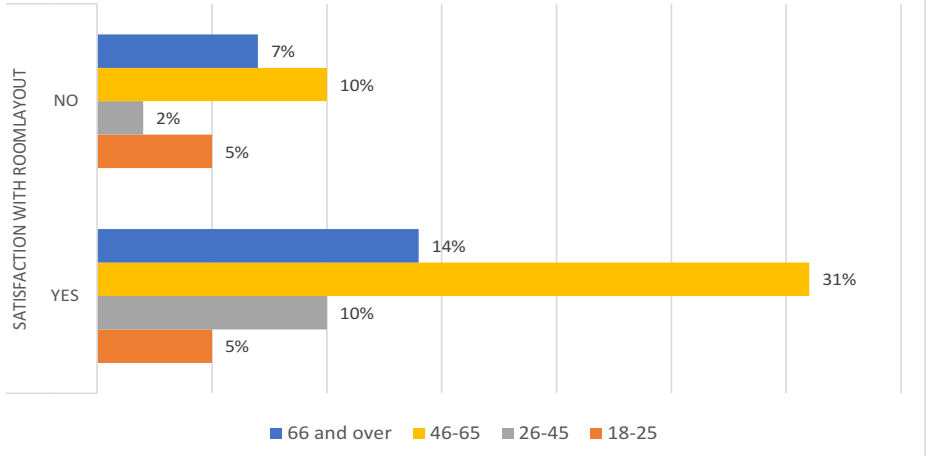

Figure 2.
Judgements on functionality of apartment layouts (elaborated by A. Ostańska)

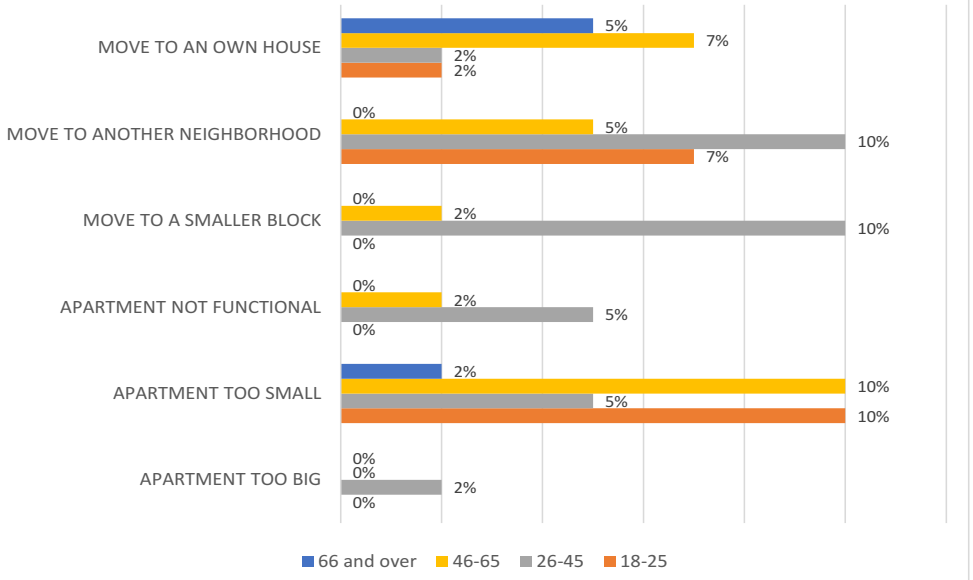

Figure 3.
Reasons to move out of current apartment and target destinations (elaborated by A. Ostańska)

willingness or unwillingness of the residents did not influence the selection of the sample. The response rate is considered high (over 18%), and sufficient for further analyses.

The survey provided information on:

– current demographic structure of the residents, such as age, education, migration, and declared willingness to participate/contribute to improvement measures;
– current opinions on the quality of the living environment and residents' expectations towards its changes, with a specification of perceived deficiencies in buildings and apartments; the questions included an analysis of technical problems identified by residents and the resulting necessary repair works, as well as the needs for proposed modernization.
– works carried out in the apartments by the residents themselves in order to raise the standard of the apartments.

It is worth noting that the survey was preceded by an expert survey of the technical condition.

The collected data were coded, verified and then subjected to statistical analysis.

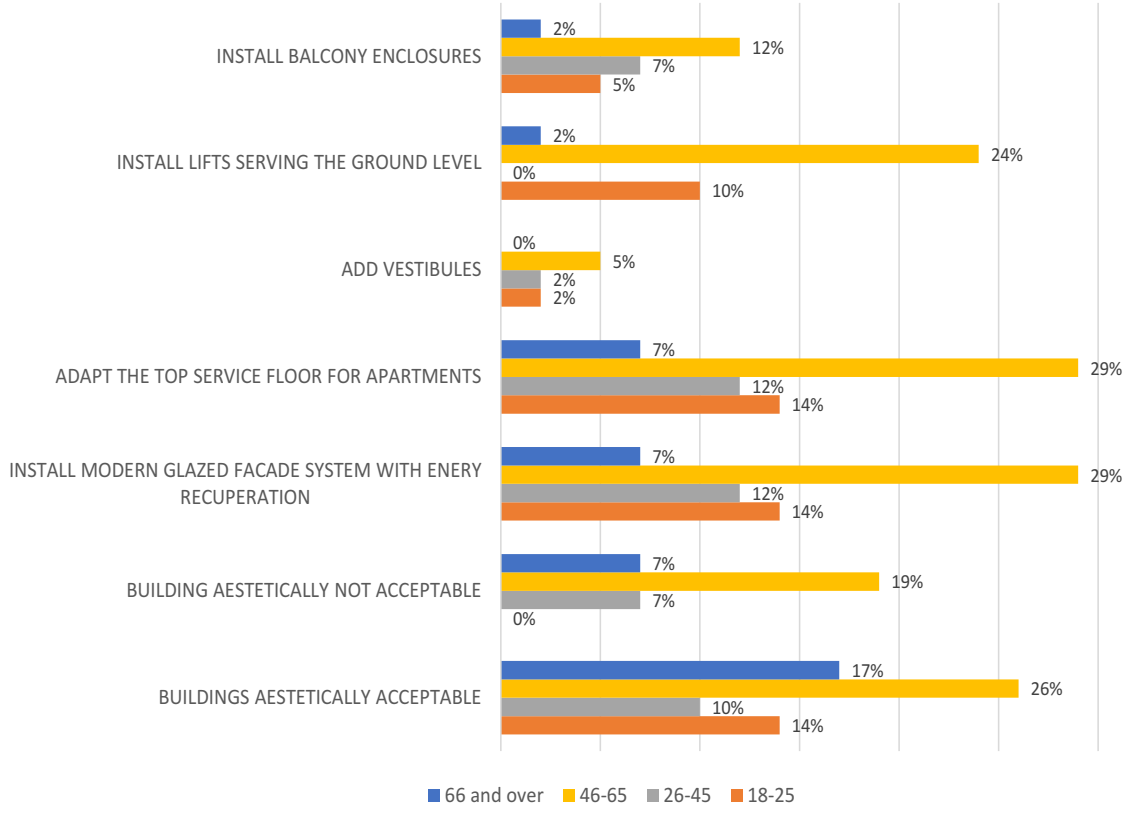

Figure 4.
Recommendations for building improvements and overall opinion on the aesthetics of the buildings (elaborated by A. Ostańska)

3. RESULTS

3.1. Condition of the estate's facilities

The opinion of residents on their willingness to contribute their work to improvements of the estate spaces, as well as perceived deficiencies in the estate's facilities is shown in Fig. 1. Interestingly, more than 50% of the respondents declared to offer their work for the sake of the estate's community. The most active group of residents was those 46-65 years old. The facilities missed the most were: benches (84%), trash cans (68%), parking lots (67%), and a ropes course (62%).

3.2. Quality of the buildings and the apartments

The survey indicates that the majority of the residents (60%) are satisfied with the layouts of their apartments (Fig. 2).

If they considered moving out in search for better accommodation (Fig. 3), it would be primarily due to the small size of apartments (27%). The youngest group (18–25) would search for more comfortable accommodation in another neighborhood and choose an apartment in a block, whereas those 46-65 of age would prefer to build their own house. Residents aged 26–45 would be most likely, if they could afford it, to migrate to another neighborhood (22%), their own house (16%) or just to a block with less stories (12%). Those over 66 are not interested in either moving to another neighborhood nor a lower block. Living in a tall building seems not to be a problem for the youngest.

The analysis revealed that the majority of the residents (67%) are satisfied with the aesthetics of their living environment (Fig. 4). Installation of modern glass façades with heat recovery systems and adapting the top story for apartments (currently top floors contain common access utility rooms, hardly ever used) were the most frequently recommended improvements to buildings (62% each). An elevator to serve the ground level would be welcome by 36% of the respondents: currently to access the elevator, one needs to climb one flight of stairs. Enclosing balconies was a good idea for 26% of respondents.

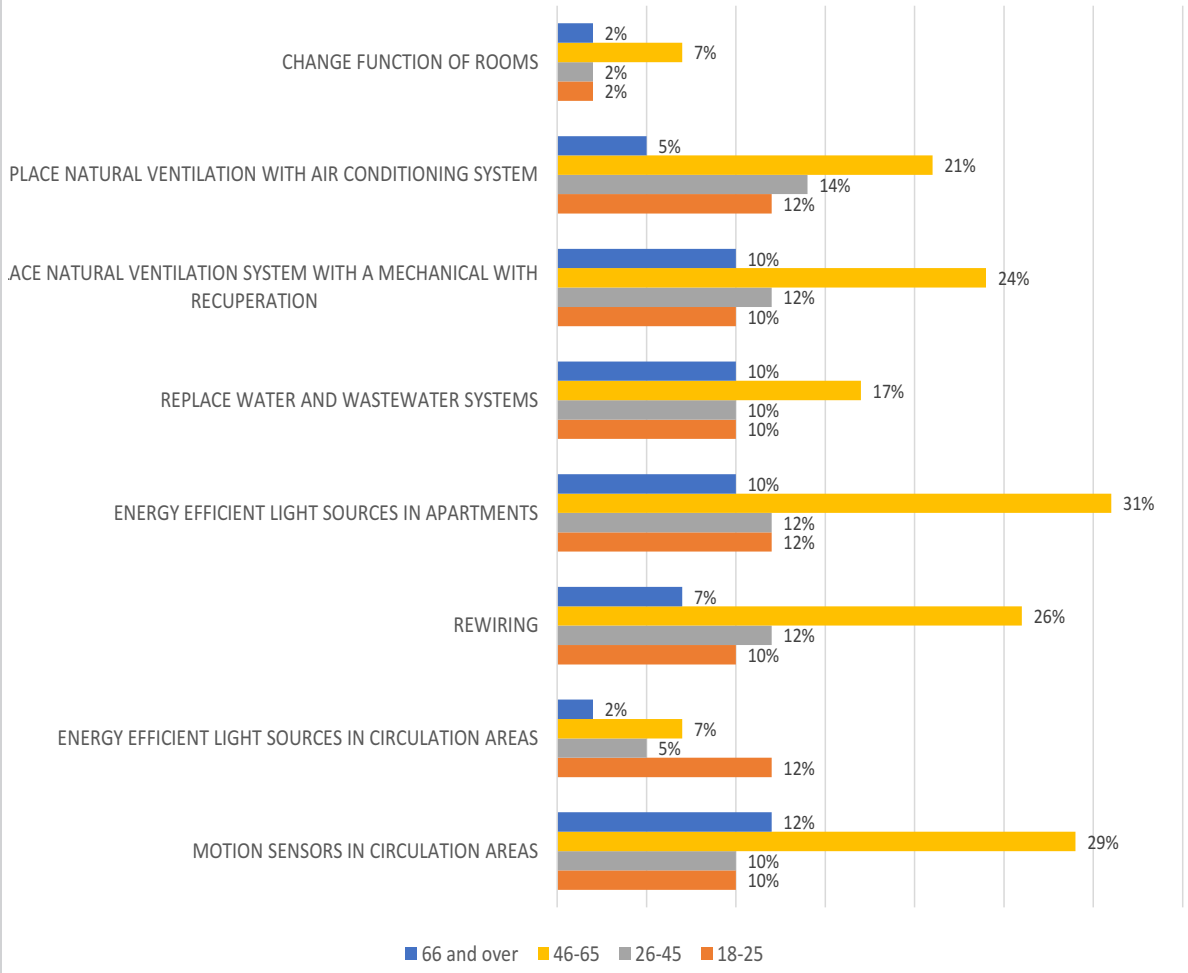

Figure 5.
Support for building modernization measures to improve functionality (elaborated by A. Ostańska)

The estate residents would welcome (Fig. 5) installation of energy-efficient lighting (65%), installation of motion sensors to circulation areas of the buildings (61%), and modernizing the natural ventilation system in the apartments (56%). Rewiring the apartments seems a less popular idea (55%).

The greatest potential in energy savings (Fig. 6) is seen in the installation of heat pumps, solar collectors and photovoltaic panels (86% each), the secondary hot water circulation (71%), and the central heating control system (50%).

The most urgent interventions to the buildings (Fig. 7) were: painting staircases (53%), installing elevators serving the ground level (50%), and electrical systems (44%). Improvements imply spending money. Only some residents declared to pay extra towards financing works (however, only those they personally think are most reasonable); 33% of respondents would pay an extra PLN 500 PLN per year towards modernizations. Only 7% would agree to pay PLN 1000 a year, whereas 4% even 1500 PLN/year. It should be noted that the residents made such declarations in addition to the maintenance fee that includes a sinking fund.

4. SUMMARY

The survey was carried out in a particular housing estate in Lublin among the inhabitants of a one type of buildings – W-70-system large panel blocks constructed in the second half of nineteen-eighties. The results provided insight into the user point of view on functional, technical, and energy performance deficiencies that remained, or were caused by, modernization measures applied so far. The conclusion is that the improvements made so far are insufficient in terms of adapting the prefabricated housing estates to the current requirements of the users. Therefore,

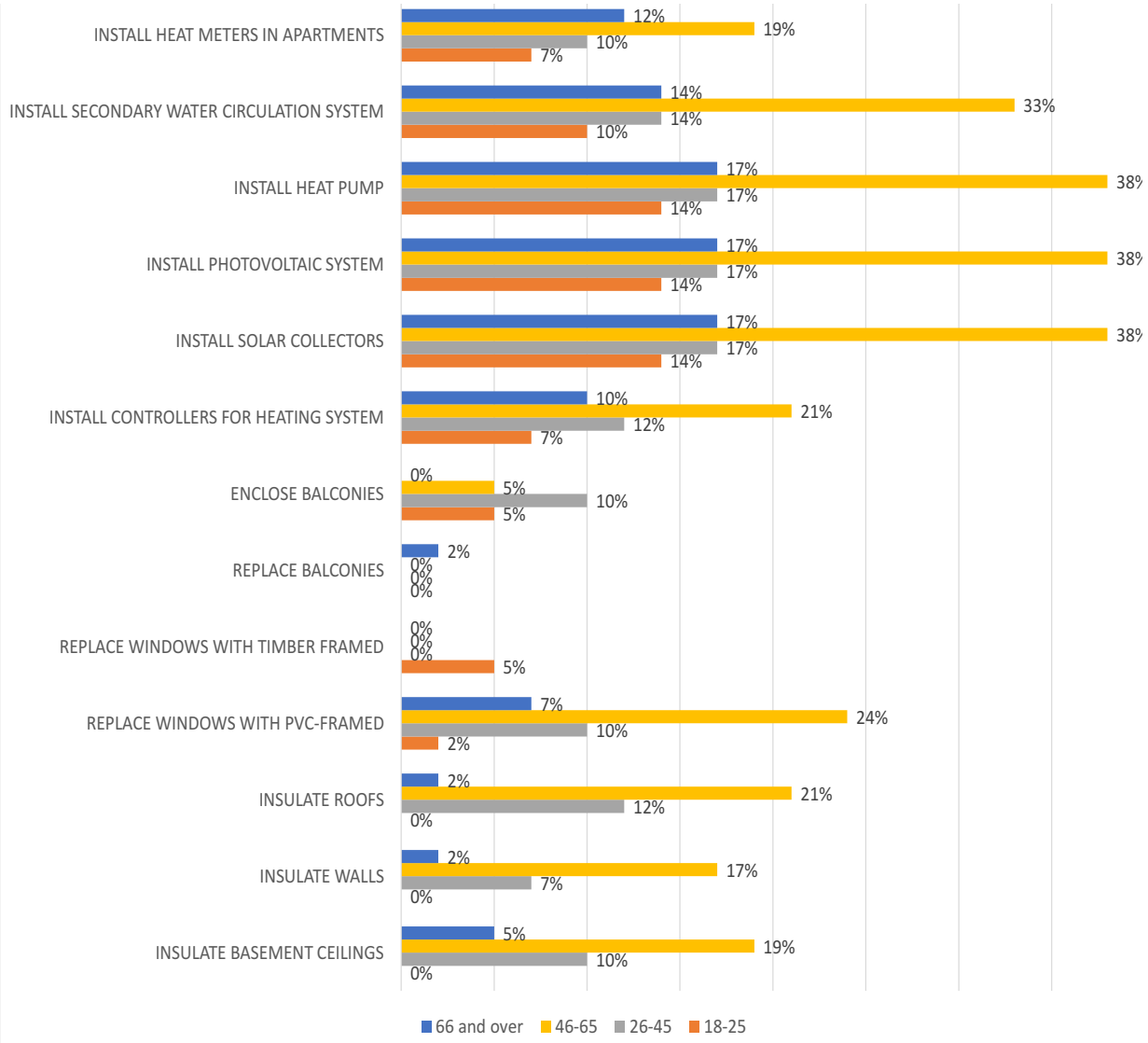

Figure 6.
Support for building modernization measures to improve energy performance (elaborated by A. Ostańska)

further modernization actions are necessary.

Therefore, further modernization activities are necessary.

The analysis of the survey results confirmed that the residents are generally satisfied with their place of residence (60%). Only a few complained about functional deficiencies of their apartments (7%). Most residents stressed the need to enhance the building's equipment, and replace or repair worn-out systems.

As a result of surveys carried out in the Lublin housing estate, in a face-to-face interview, among the residents of prefabricated residential buildings, three out of eleven proposed priorities for modernization works were selected, which also included a voluntary declaration by the respondents expressing their willingness to pay on top of the usual maintenance fee that includes a sinking fund.

The most urgent actions that would get voluntary financial backing from some residents, were those considered to improve aesthetics of the residence simply by painting the staircase walls (53%), improve accessibility by installing an elevator taking passengers from the ground level (supported by 50% of respondents, mostly by the age group of 46–65), and increasing user safety by replacing obsolete electrical system (44%).

Though the "standard" measures towards improving energy performance of the buildings had been com-

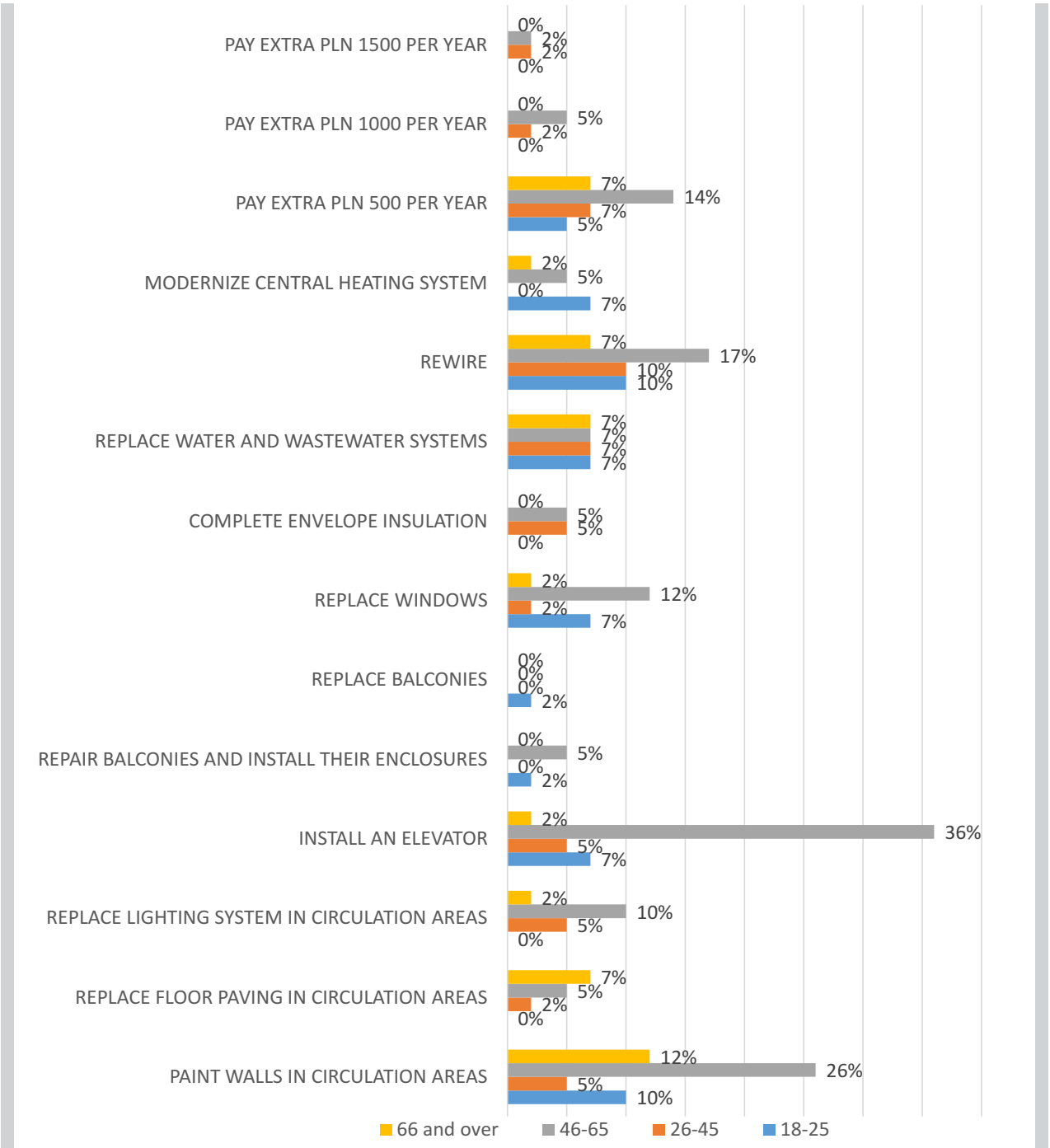

Figure 7.
Declared scale of financial participation in modernization measures and opinions on most urgent improvements (elaborated by A. Ostańska)

pleted (i.e. the envelopes had been insulated), the inhabitants report new or unsolved problems with respect to energy efficiency. Moreover, as renewable energy systems (RES) are becoming more and more available and affordable, the inhabitants would welcome installing them in their estate, as they associate them with savings on energy bills as well as environment protection. However, this requires a direction of consistent action in built areas and the need to introduce a new quality to design.

It is worth noting that a considerable share of respondents (50%) declared to contribute their voluntary work to support maintenance of the estate. In addition, over 40% of the respondents would agree to pay extra for improvements of their liking, thus increasing the estate's yearly budget. However, to use the potential of such contributions, it must be fostered by the estate management with care, and the improvement programs prepared with the involvement of the inhabitants.

5. CONCLUSIONS

The survey indicated that the senior estate inhabitants (the age groups of 46–65 and over 65) pay more attention to the aesthetics of the buildings (painting). On the other hand, residents in the 18–25 and 46–65 age groups focus more on accessibility (elevators) and safety (electrical installation) issues.

Moreover, the analysis confirmed that there is a potential in user involvement in the decision-making process, as long as the rest of the active tenants in the housing estate are not lost. This is extremely important, especially in times of pandemic and increasing gentrification of entire urban neighborhoods.

The approach proposed in this study helps to gain insight into the residential satisfaction, the problems and current needs of the housing estate users. This was possible by means of directly conducted multidisciplinary research. The analysis of the research results gives the manager the certainty of setting directions for improvement programs that correspond to the user expectations. Such synergy can be the beginning of effective planning of remedial interventions in housing estates and, as a consequence, a kind of improvement in the quality of life in the built environment.

Problems with multifamily housing are not only characteristic of the estate selected for analysis in this paper, but also to other locations. This means that, in principle, the proposed methodology for investigating the residential satisfaction in the built environment can be applied not only to "prefab estates", but also in any other housing estate, of course after prior implementation of certain principles that are given in this paper (p. 2).

REFERENCES

[1] Sepioł J. z zespołem koordynatorów (2014). Przestrzeń życia Polaków, Raport opracowany przez zespół niezależnych ekspertów z inicjatywy Prezydenta RP Bronisława Komorowskiego (Poles' living space, Report prepared by a team of independent experts on the initiative of the President of the Republic of Poland Bronisław Komorowski), 28 sierpnia, Warszawa, 188.

[2] Zyga J. (2014). Ocena budownictwa wielkopłytowego przez pryzmat rynku nieruchomości (Evaluation of large-panel construction through the prism of the real estate market), *Budownictwo i Architektura, 13*(3), 57–64.

[3] Runkiewicz L., Szudrowicz B., Prejzner H., Geryło R., Szulc J., Sieczkowski J. (2014). Diagnostyka i modernizacja budynków wielkopłytowych, cz. 1, miesięcznik PZiTB, *Przegląd budowlany* 7–8, 54–60. (Diagnostics and modernization of large-panel buildings, part 1), PZiTB monthly, *Construction Review* 7–8, 54–60.

[4] Stevenson F., Baborska-Narozny M. (2017). Forthcoming special issue: Environmental Performance of Buildings: Festschrift for Ray Cole Housing performance evaluation: challenges for international knowledge exchange, *Journal Building Research & Information Latest Articles*, https://doi.org/10.1080/09613218.2017.1357095.

[5] Baborska-Narozny, M., Stevenson, F., & Grudzinska, M. (2017). Overheating in retrofitted flats: Occupant practices, learning and interventions. *Building Research & Information, 45*(1–2), 40–59. doi: 10.1080/09613218.2016.1226671.

[6] Ostańska A. (2016) Resident opinion surveys as a contribution to improved housing stock management. *Architecture Civil Engineering Environment, 9*(2), 13–19.

[7] Wójtowicz M. (2014). Wielka płyta – problem techniczny czy społeczny?, w: Budownictwo na obszarach zurbanizowanych: nauka, praktyka, perspektywy (Great slab – a technical or social problem?, in: Construction in urban areas: science, practice, perspectives), Halicka A. (ed.), Monografie – Politechnika Lubelska, Lublin, 329–340.

[8] Zaniewska H., Thiel M. (2010). Rewitalizacja Miast Polskich, w: Instytut Rozwoju Miast (Revitalization of Polish Cities, in: Institute of Urban Development).

[9] Komar B. (2014). Współczesna jakość spółdzielczej przestrzeni osiedlowej w świetle zasad rozwoju zrównoważonego na wybranych przykładach (Contemporary quality of cooperative housing space in the light of sustainable development principles based on selected examples), Wydawnictwo Politechniki Śląskiej, Gliwice.

[10] Fross K. (2014). Badania jakościowe w projektowaniu architektonicznym na wybranych przykładach (Qualitative research in architectural design using selected examples), Wydawnictwo Euro Projekt, Gliwice, 1–300.

[11] Niezabitowska E.D. (2014). Metody i techniki badawcze w architekturze (Research methods and techniques in architecture), Wydawnictwo Politechniki Śląskiej, Gliwice.

[12] Nowogońska B., Mielczarek M. (2021). Renovation Management Method in Neglected Buildings, Sustainability. doi: 10.3390/su13020929.

[13] Baranowska A., Frankowski J., Grabkowska M., Sagan I. (2014). Miejska obywatelskość; w: Przestrzeń życia Polaków, Raport opracowany przez zespół niezależnych ekspertów z inicjatywy Prezydenta RP Bronisława Komorowskiego (Metody i techniki badawcze w architekturze), Warszawa. (Urban citizenship; Report prepared by a team of independent experts on the initiative of the President of the Republic of Poland Bronisław Komorowski. Research methods and techniques in architecture), Warsaw.

[14] Komar B. (2011). Katowice Housing Co-operative-Strategies and Investments. *Architecture, Civil Engineering Environment*, *4*(3), 15–24.

[15] Komar B. (2020). Selected determinants of multi-family housing in Katowice in the 2030 perspective. Lublin, T*eka Komisji Architektury, Urbanistyki i Studiów Krajobrazowych 16*(3), 74–83.

[16] Radziszewska E. (1999). Inwestycje termomodernizacyjne w spółdzielniach (Thermomodernization investments in cooperatives), *Forum Budowlane*, 12, 22.

[17] Fic S., Szeląg M., Szewczak A. (2014). Problemy eksploatacyjne budynków wielkopłytowych na przykładzie obiektów na terenie Lubelszczyzny (Operational problems of large-panel buildings on the example of facilities in Lublin region), *Budownictwo i Architektura, 13*(3), 7–14.

[18] Ostańska A.E. (2021). Propozycja metody oceny diagnostycznej w podczerwieni termomodernizowanych budynków wielorodzinnych (Proposal of a method for infrared diagnostic evaluation of thermo-modernised multi-family buildings), Builder Science. Warszawa, 290, 9, 35–37.

[19] Skalska-Schneider G. (2012). Zrównoważone środowisko mieszkaniowe. Społeczne-Oszczędne-Piękne (Sustainable Residential Environments. Social-Saving-Beautiful), Wydawnictwo Politechniki Krakowskiej.

[20] Ostańska A., Czarnigowska A. (2016). Solar collectors in a prefabricated housing estate: lessons learnt after four years of operation [W]: Sustainable Built Environment Conference 2016 in Hamburg: Strategies, Stakeholders, Success factors, 7th–11th March; Conference Proceeding, 1060–1067.

[21] Ostańska A. (2016). Wielka płyta: analiza skuteczności podwyższania efektywności energetycznej: termomodernizacja, termografia, wytyczne naprawcze (The Great Plate: Analysis of the effectiveness of energy efficiency upgrades: thermo-modernisation, thermography, remedial guidelines). Warszawa: PWN.

[22] Radziszewska-Zielina E., Gleń M. (2014). Zrównoważone budownictwo szansą dla budownictwa mieszkaniowego z prefabrykatów, monografia – Wybrane zagadnienia z budownictwa ogólnego (Sustainable construction as an opportunity for prefabricated housing, monograph – Selected issues in general construction), Sobocińska A. i Pisarski M. (Ed.), Europejska Uczelnia Społeczno-Techniczna w Radomiu, Radom, Instytut NaukowoWydawniczy SPATIUM, 195–210.

[23] Ostańska A., Czarnigowska A. (2016). Rehabilitation of public and semi-public space of housing estates: the case of Lubartow. [In]: Sustainable Built Environment Conference 2016 in Hamburg: Strategies, Stakeholders, Success factors, 7th–11th March; Conference Proceeding, 972–981.

[24] Ostańska A. (2018). Programowanie rewitalizacji osiedli mieszkaniowych z zastosowaniem modelu PEARS (Programming the revitalization of residential areas using the PEARS model). Lublin. Warszawa: Polska Akademia Nauk.

[25] Biliński T. (2018). Kryteria i uwarunkowania programowania przedsięwzięć rewitalizacji obszarów miejskich (Criteria and conditions for programming urban regeneration projects), Artykuł na IX Konferencję Naukowo-Techniczną. Renowacja budynków i modernizacja obszarów zabudowanych, Uniwersytet Zielonogórski, Zielona Góra, maszynopis, p.1–6.

[26] Miedviedieva A., Ostańska A. (2021). Proposal for modernisation of large block system buildings (LBS) – facades. *Civil and Environmental Engineering Reports*. *Zielona Góra*, *31*(3), 235–250.

[27] Gruszczyński L. A. (2001 and later). Kwestionariusze w socjologii. Budowa narzędzi do badań surveyowych (Questionnaires in sociology. Construction of survey research tools). Wydawnictwo Uniwersytetu Śląskiego, Katowice,. 33–34, 38–39, 98–99.

[28] Sztumski J. (1976). Wstęp do metod i technik badań społecznych (Introduction to social research methods and techniques). Uniwersytet Śląski Zeszyt 136. Katowice.

[29] Ostańska A. (2011). Problemy energooszczędności w obszarach zurbanizowanych na przykładzie Lublina (Problems of energy efficiency in urban areas on the example of Lublin). *Miesięcznik PZiTB*, *Przegląd Budowlany* 4, 182–185.