Polish Urban Sprawl. An Economic Perspective

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A B S T R A C T

The research focuses on the economic aspects of urban sprawl while analyzing the population located in Zielonki suburban municipality of Krakow (Poland), one of the most developed residential areas contributing essentially to the urban sprawl. The conducted study shows a profile of society that enhances the phenomenon of urban sprawl, paying close attention to the economic side of the functioning of residents by presenting the costs associated with owning a suburban home and travel costs. The inference was based on a survey conducted on the newcomers, residents settled here between 2000 and 2013, representing triggering factors of urban sprawl. Among the conclusions of the study, we note that households in Poland are represented by well-educated, highly-waged, married persons, under the age of 40 with two children. These families live in average-size houses, which are often private propriety, with no mortgage. They form a society dependent on cars, yet mostly using inexpensive second hand cars. Thus, the choice of living in the suburban areas of Krakow proves to be driven by cost-efficiency and residential independency reasons, the distance to the city centre being easily overcome.

1. INTRODUCTION

This article aims to identify the problems of urban sprawl with particular focus on profiles of entities generating this phenomenon in Poland. The transformation of Polish cities is largely associated with suburbanization and a particular form of the so-called urban sprawl. The traditional approaches of urban sprawl have defined it mostly in relation with the land-use. „*Urban sprawl-related phenomena are generally evaluated negativly*" [28, pp. 102–135].

Moreover, the causes determining the negative side are mostly related to several aspects, such as: the lack of formulation and implementation of spatial policies by public authorities, contractors maximizing profits and consumer preferences [13].

Mostly the latter reason - consumer preferences - is important because they prejudge the phenomenon. From this perspective, urban sprawl is primarily the result of individual decisions in the field of population settlement [32].

In the case of the present study we considered the phenomenon of urban sprawl from the economic perspective of households. We will therefore attempt to answer the question to whom we are dealing with in the case of Polish conditions/residents? The response was generated based on the results of the survey carried out in a selected area - Commune Zielonki – a component of the Krakow Metropolitan Area (KMA), Poland, which has registered significant dynamics of indicators reflecting the phenomenon of urban sprawl.

2. THEORY AND METHODOLOGY

2.1. Urban sprawl and economics consequences

Spatial management is a long-term, expensive and, nowadays, very complex process. Its long-term character is related to the fact that the process of land-use planning, and, subsequently, the implementation of investments that are intended to regulate the space and attribute it with specific functions, takes many years.

Simultaneously, the preparation, resolution and implementation of planning documentation that administer the spatial development, generates significant costs (not only in the short but especially in the long run) which are mainly subsidised by public funds.

Urban sprawl is defined as a process of decentralisation of population and employment in the city to a larger number of suburban communes and, simultaneously, controlled to a very little extent by the regional land-use policy [27].

It is commonly indicated that areas affected by this process identify with a low rate of residence density, significant dispersion of buildings and also with the transportation based development. The international literature brings out two major characteristics of urban sprawl phenomenon [14]. The first one is low transportation accessibility of residential areas, and the second one is the functional inefficiency of open spaces.

Moreover, many land-use planning specialists suggest a working definition that summarises several approaches to define the phenomenon of urban sprawl as being: an unplanned, uncontrolled and uncoordinated process of land-use development that does not provide the possibility of diverse land usage and/or is not functionally related to the surrounding land usage. Apart from that, it occurs in various combinations as low density, 'ribbons', scattered, without spatial continuity or fully isolated development [22].

There are several occurrences that prove/determine the extreme complexity of urban sprawl. Firstly, land-use planning (actually its quality), which is of significant meaning in the analysed process, is managed on various levels of territorial administrative authorities. The competences of particular authorities are clearly defined by legislative regulations, still the implementation of effective land-use policy not always resulting in spatial harmony [The Concept of National Land-use Development 2030]. It is indisputably required that public authorities should conduct integrated and fully controlled actions in order to increase the quality of space. Secondly, effective land-use planning is a highly confliction, especially if it is supposed to limit the uncontrolled sprawl of urbanised structures. It is a well-known matter found in all areas where effective land-use policy is conducted, a problem which significantly moderates and impedes the implementation of this policy. Thirdly, for a more effectual land-use management, it should be correlated with other policy-related actions, such as: environmental preservation, regional and socio-cultural development, entrepreneurship enhancement [16]. In consideration to the above-stated and to the fact that the quality of land-use development (consisting of both functionality and aesthetics) [31] determines the socio-

economic development of any territorial units, land-use planning is of significant importance to the policies conducted by the most developed countries in the world [33]. The urban sprawl phenomenon is not only the issue and its subject matter nationally, but also internationally, which may be illustrated by numerous monitoring actions with advisory character undertaken by the European Union institutions [23].

During the period of centrally planned economy many crucial actions at the local level were aborted, such as: land-use planning, being understood as actions aiming at the balanced development and administration of open areas. Moreover, before 1990, land-use planning did not raise the national authorities' interest that would aim at achieving the broadly understood spatial harmony in the area of Poland. As a result of significant changes in the spatial structure, a relatively significant chaos still occurs in space, lowering not only the inhabitants' life quality, but also the attractiveness of the area for potential investors. Unfortunately, this chaos continuously becomes more intense and grows in strength. Despite the fact that the land-use policy has become an important issue for the authorities a dozen or so years ago, its long term character and high costs of implementation, the complexity of the process, market mechanisms along with the still unformed institutional solutions result in the fact that the issue of land-use development still remains a serious impeding factor for the conduction of an effective socio-economic policy in Poland [34].

This problem becomes particularly prominent in case of urban areas provide a number of functions, often being a showcase of a region and a driving force of regional development. The previously mentioned spatial chaos affects above all the urbanised areas that are densely developed and where the introduction of new spatial quality raising solutions is difficult and, often impossible on short term. At the same time, the topic of new urbanism paradigm is being discussed [29]. Studies on urbanised areas are often referred to the spatial changes as well as to the diversity of their forms of development [20]. The residential policy conducted at various levels of administration is often subject to analysis and assessment. Also the criteria assessing the quality of this space as well as typologies of urbanised areas are being searched for and the influence of local planning on the development of residential construction is being estimated [12].

Additionally, a new problem related to the spatial economy has been raised (the novelty factor mainly referring to the expansiveness and the significantly intensified consequences of the issue nowadays). It is the uncontrolled spread of construction. Urban sprawl is a phenomenon that, in time, will generate additional, continuously increasing costs for local governments (local communities) related to the provision of technical infrastructure

functionality, essential for living in a particular space [13].

Many authors have noticed the necessity to search for the critical point in terms of advantages of increasing density and the process of increasing the expenses and negative effects of this process. It may be assumed that the analyses on the influence that economic consequences have on the space are fragmentary and concern few chosen cases. It seems necessary to additionally define the directions and regularities influencing the single- and multi-family construction market.

At the European level, a significant role was played by *"The Green Paper on the Urban Environment",* document published by the European Commission in 1990 [CEC, 1990] which introduced the term of compact city as an archetype of a sustainable form of European cities. The concept of compact city raised a scientific discussion in which the advantages of introducing high rates of residence were considered [13].

Burton E. (2000) [4] made another attempt to define this concept as a city with high rates of residency and varied usage of space where the development is initiated within the borders of a city, not outside them. Moreover, efficient public transportation system is important for the compactness of the city as well as the size of space encouraging movement on foot or by bicycle. However, the idea of a compact city was often over-interpreted as too a high rate of residence [24] resulting in overpopulation, lack of open and greenery space as well as in the increase of prices of apartments. It should be indicated that many approaches to the definition of a compact city can be found in literature, approaches that highlight various elements of the concept [11].

The macroeconomic understanding of the empiric and meritorious issue of compactness is still relevant, and its extensively explained/debated byte publication entitled 'Compact City Policies: A Comparative Assessment' [26] in which it is indicated that, even currently, the definition of the compact city concept is problematic as no single (specific) model has been shaped yet. Because of that, the concept of a compact city is defined through its characteristics. An important trend in Polish studies concerning space, its development and layout is the already described process of urban sprawl as well as the co-occurring process city shrinking.

Nowadays, vast reserves of free areas suitable for residential construction can be still found in Polish cities; and the current situation allows for the rational acceptance of new construction and its future residents [21], [5]. Nevertheless, it is not always the case that fully-justified socio-economic factors would cause the intensification of the urban sprawl process. The 'New Urbanism' concept may seem kind of an antidote to the problem, offering alternatives, as opposed to the typical,

historically shaped model of a city with extensive suburbs (a model with low rates of residence), especially in relation to American cities. The concept of New urbanism is characterised by several rules such as: compact districts within a walking distance with clearly determined borders; a clearly defined city centre with public spaces, public buildings, trading (retail) businesses, city transportation stops; an interrelated street network forming consistent areas and lines of building facades rather than parking spaces; diverse activity (human, economic) opportunities as well as residential options; citizen spaces in visible and important parts of a city and the existence of open spaces within convenient locations allowing the inhabitants to use all districts of the city [19].

While conducting research in the field of connections and interrelations among the systematised land-use solutions, the concept of Transit Oriented Development should be noticed. The idea is contained in several major theses of the new urbanism concept. The range of it covers districts with areas of diverse usage purposes (places of work, residence, retail trade objects, schools, healthcare facilities, open and public spaces etc.). According to the concept, the diversity of residential, retail trade and service areas as well as open and public space, all within the walking distance, should altogether create a convenient area in terms of residence, commuting to work by city public transportation, by bicycle, by car or on foot. Also, the bus stops should be located within a walking distance of 600 metres on average [7].

There are three highly significant aspects to be noted in the case of urbanised areas growth: the economic practicability, the environmental responsibility and the social agreement [30]. And, to achieve these goals, it is important to stimulate development in areas where infrastructure is either planned or already existing. In these areas it is recommended to adjust to several: diverse use of space, walking communication and transit oriented development; investment stimulation; limiting the regulations concerning land-use development, as well as infrastructure investments from local, regional and national funds [25]. The concept of smart development has been a challenge already issued in the 1990s once with the introduction of a traditional approach towards land-use planning and technical zoning.

This concept assumes that development would occur as long as the number of population was growing/grew, as opposed to allowing the growth to occur in an unplanned and inefficient way in places outside the existing community.

The Polish case shows difficulties triggered on the one hand by the parties' interests in areas under development (i.e. commercial/trading companies) and also by the low level of reaction on behalf of the local authorities. This question is under public and scientific debate in different circles and on various levels of

administration (the analysis of local scope, general diagnosis of the country, single case studies etc.) [17].

Overall, the economic costs are first and foremost followed by the increase of public expenses covering construction, extension and maintenance of infrastructure and public services, extended commuting distance, the consumption of energy and market-related negative influence on the city [11]. Infrastructure development becomes averagely less expensive in relation to the increase of residence density. Simultaneously, infrastructure maintenance and use and also the provision of public services trigger economic inefficiency. Due to greater dispersion of residence, the costs of social infrastructure and public services grow in the suburbs while the financing trends indicate increase of taxes and local fees, generally independent of localisation, fact that leads to situations in which this form of land-use development is subsidised. Additionally, attention is given to the fact that increasing costs of maintenance of suburban infrastructure are not considered problematic within a particular suburban estate but they are rather treated as a derivative of the level of construction density in these estates. Analogous cogitations are present in the case of costs of public services provision.

On the other hand, urban sprawl as well as the development of city borders should also be analysed from the perspective of potential economic advantages. Such benefits have been noticed along with the development of mobile professions, working professionally in more than one city, internet and other means of telecommunication development of increasing economic importance. The above-mentioned conclusions are predominantly drawn from studies based on the principles of a polycentric city. Such opinions are especially formulated in the case when appropriate residence density (not always of high rate) is an optimum solution to land-use policy which may require the expansion of city boarders- not the restrictive approach. This may be illustrated by simulations conducted during the so called 'Chicago computer model of general balance' with an endogen traffic network. These simulations show that the average commuting duration in interrelated suburban residential areas remains at a constant level, even when the city sprawls, the home-work distance extends while the population and the GDP increase [1]. Next to the model simulation results, the national (American) data from the period of 1990-2000 related to the populations' commuting indicates that in cities that doubled their size, the journey from the place of residence to the destination (e.g. place of work) has increased only by 10% on average. Additionally, the research conducted in Beijing suggests that the solutions of the Transit Oriented Development concept (including the compact city concept) result in the sprawl of a city, not in the reduction of the sprawl [2].

Many economists have assessed urban sprawl mainly by interpreting its consequences as an unfavourable allocation of funds. In the 1970s the evaluation was based mainly on the monocentric city model. In these models all residents commute to the city centre to work which causes overpopulation and 'traffic jams'. The economists' adherence to this research approach was so persistent that the results of the studies started to be adopted in the planning practice.

Nowadays, the polycentric model with diffused places of work is also researched. It is generally accepted that the optimum urban form of a city can be achieved by city sprawling. In many cases city sprawl proves meaningful in relation to: holding the commuting costs at a stable and low level, limiting overpopulation, efficient economy. Moreover city sprawl may appear beneficial, considering the opportunity to relocate the workplaces outside the overpopulated and expensive centre- which shows its implementation in practice. Such conclusions were formulated on the basis of simulations conducted in the USA while analysing a model of two areas: the city and the suburbs [1]. It was initially assumed that all workplaces are situated in the city centre and that overpopulation occurs when labour efficiency is dependent on the localisation of the place of work. Apparently, the development of motorways and express roads caused the relocation of workplaces to the suburbs, consequently, reducing the commuting average duration.

This effect will reduce overpopulation in the city but will also increase the scale of the city sprawl phenomenon. In this case sprawl appears to be advantageous when considered in relation to commuting costs. On the other hand, research based on the polycentric city model [3], where places of work and of residence can be freely located without any spatial limits, indicated that the city sprawl measured by costs of commuting to work can be assessed as more beneficial than in the case of their centralisation. In this research, it was proved that the situation in which a city is transformed from the polycentric system to the monocentric one (e.g. the implementation of the compact city concept), the commuting to work-duration will increase by 9.1%.

Moreover, a strong tendency of dispersion characteristic of places of work was noticed. Among the influencing factors, the following are indicated: the effect of labour force substitution related to the change of localisation or the fact that labour efficiency is defined by payment. Practically, workplaces can be interrelated in case of positive external effects that stimulate the relocation of centre-situated workplaces. However, if the efficiency of labour decreases significantly as a result of leaving the centre, then workplaces will not be relocated by the employer. This

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argument also sets the basis for the employee to decide whether to change the place of residence to one nearer to the place of work. At the same time, the literature gives several arguments judging spatial decentralisation as a positive phenomenon.

First of all, workplaces show the tendency to disperse towards peripheral areas as a result of lower renting costs and extended space assigned to one labourer, which increases labour efficiency. Therefore, the advantages of business entities' proximity to the city centre are balanced by the increase in labour efficiency in the suburbs.

Secondly, customers prefer making transactions in places characterised by high concentration of entities due to the possibility of comparing their business offers.

The situation in which the concentration of places of work is monocentric causes trading entities to decide on location in centres because commuting to the shops is not expensive and, additionally, localisation in the centre is beneficial for the agglomeration. When density increases along with the negative effects of overpopulation, commuting costs also grow and therefore business entities relocate to peripheries and increase the distance to customers and employees at the same time. In such case, giving up the agglomeration advantages is less significant than the increased density, which increases commuting expenses/costs.

Historically, the reduction of transportation costs, the development of communication technologies and of the internet and the increased significance of interrelations among cities have weakened agglomeration advantages. Nonetheless, the inversion of this trend seems unlikely; therefore these advantages will no longer be of such significant importance that would lead to the restoration of monocentric analyses' importance.

2.2. Study methodology

Methodological explanations are presented in three main parts referring to: (1) the essence of subjectivity generating urban sprawl and how to identify the (interested) parties; (2) the conditions for selecting the area under study, and (3) the research tools. The first aspect that requires reflection is to identify the purposes of research –understanding urban sprawl and which of the households would cause this phenomenon. Considering urban sprawl is the process of development in a particular way in rural areas outside the compact zone more intensively used in the suburban area [18, p. 229]. This location is characterized by the dispersion of homes, combined with non-functional and over-developed network of roads, yet the residents of these areas being heavily dependent on cars as means of transportation. Our research aim was to identify the dynamic phenomena that would influence the development state of the selected villages (Bibice and Węgrzce) in 2013 as compared to 2003 by using aerial photographs.

These villages belong to the Municipality Zielonki, which is located in the neighbourhood of Krakow City. Krakow City and 50 other municipalities create The Krakow Metropolitan Area (KMA) in Lesser Voivodship, Poland.

Fig. 1. Location map of study area (Poland and Lesser Voivodeship with KMA).

Moreover, landscaping features of Bibice and Węgrzce refer to the quoted definition and it should be added that both of the villages under study are typical suburban areas of KMA.

When it comes to the issue of the suburbanites' *"dependency on cars"* – the phenomena can be analysed to a certain extent by examining the accessibility to public transportation. The availability of public transportation in the study area is relatively low, as it can be deduced by analysing the distribution stops and their schedules. The present study analyses two nearest stops to each of the houses taken into account by the study (provided that the stop is located no more than 2 km away from the home). The test results are shown in Table 1.

In addition to the definitional aspects considered in the selection of research area, of great importance was the decision in the selection of subjects (households). From this perspective, any household that hypothetically generates urban sprawl is a household of immigrants that after year 2000 relocated to a newly built house (single family house, duplex, town house). The accepted definition has the following consequences in the research: (1) Inferences were based on the opinion of households settled in the newly built houses; (2) The presentation of the results is presented in accordance with the answers of households which settled on the outskirts for the first time, omitting/excluding the answers of indigenous people.

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Table 1. The availability of public transportation in the area covered by the analysis.

Indicators		Average	Median	Mode	Standard deviation	min.	max.
Distance to the nearest bus stop [m] *(the average of the two closest)*		626	675	718	270	172	1550
Distance to the first bus stop [m]		527	425	665	379	65	1500
Distance to the second bus stop [m]*		769	770	770	387	80	1600
Number of bus service lines [pcs.]		5	5	7	2	2	7
Number of bus service lines N-S [pcs.]		5	4	4	2	2	7
Number of bus service lines W-E [pcs.]		1	1	1	0	0	3
Frequency of journeys N-S [pcs./day]	Workdays	49	48	58	27	27	73
	Weekends and holidays	25	25	25	16	16	32
Frequency of journeys W-E [pcs./day]	Workdays	14	14	1	0	0	25
	Weekends and holidays	5	3	1	0	0	17

* 32% do not have access to the second bus stop

Another aspect of the research method was the area covered by the analysis. KMA was the analysed area excluding Krakow City. The available resources did not allow the authors to examine the whole, or even most of the metropolitan area but only a smaller part of it. At the same time, authors opted to focus their research on a smaller area (possibly with the highest particularity degree of the households surveyed) than decide for the distraction test (selecting individual actors from the villages of KMA), which would impose a certain randomness of the results. In addition, based on the Polish Central Statistical Office, the data describing Zielonki Municipality during 2003-2013 showed that communities of KMA recorded the highest population increase - (above 30%); the highest level of incoming populationfrom the cities - more than 6,000 people; the highest level of newly built houses - 2,400. As compared to the neighbouring municipalities of Krakow, between 2003 and 2013 the Municipality of Zielonki, registered the largest surface of land excluded from agricultural production/use in residential areas (nearly 106 hectares). Subsequently, the observation of authors that showed the fact that Zielonki has been the choice of many Krakow's families as a new place to settle proved again the suitability of the selected areas for our research. Based on these, it was assumed that for the period of 2003 - 2013 this was an area where the phenomenon of urban sprawl occurred most significantly.

Thirdly, the proposed methodology included employing a survey in the field. Due to the economic profile of research emphasizing on household budgets, the authors used a questionnaire in which a substantial number of questions referred to the economic costs and benefits of households resulting from their suburban location. The design of the survey was elaborated following the main results of researches on economic issues related to the urban sprawl phenomenon [2],[6], [8], [15], [26], [24], [35]. The survey covered 578

households from the villages of Bibice and Węgrzce. The selection of respondents was limited by the definition implications of urban sprawl, since not all of the newly built houses we relocated in the definitional framework of the phenomenon. Thus, the results of our study were concluded from the 127 households that participated in the survey[1].

3. RESULTS AND DISCUSSION

3.1. Demographic profile

The community analysed consists of households that are represented by families in their late 30s and early 40s, with 2 primary-school children on average. The husbands are generally highly qualified specialists (computer scientist, engineer, manager), while the wives voluntarily become housewives. The average monthly household income of such families is of € 2,088 (net wage) (median = 2,036 €). The detailed statistics characterizing the households are shown in tables 2-4.

Among the generalized inferences it should be emphasized that the households causing the phenomenon of urban sprawl are primarily represented by families in which the parents are relatively young (40 years of age) and have more than one child. As it was mentioned, men are generally highly qualified specialists in the field of information technology, finance or construction (27%), or self-employed (27%) or manual workers (23%). Women are either housewives (30%) by their choice (70%) or are forced to unemployment (30%). Women who are economically active are primarily workers in public services (23%), which include work in public administration or public education.

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[1] Conducting surveys in 2014 were significantly limited by the big social campaign all over Poland which was related to safety: "Do not know, do not open doors".

Table 2. Marital status and number of children.

Indicators	(%)
Marital status	
Single	5
Married	95
No. of children	
None	14
One	24
Two	40
Three	20
Four	2

Table 3. Age and occupation of respondents.

Age	Men (%)	Women (%)
25-30	10	15
31-35	15	23
36-40	31	27
41-45	19	20
46-50	18	10
51-55	2	0
more 55	5	5
Occupation	**Men (%)**	**Women (%)**
Lawyers	2	2
Physicians	9	6
Business owners	27	12
Public officials	2	23
Specialists	33	18
Construction workers*	23	18
Retired persons	3	3
Unemployed	0	30

* Mostly self-employed.

Table 4. Households' monthly net income.

Monthly earnings intervals (€)*	(%)
289-602	2
603-963	12
964-1325	6
1326-1687	23
1688-2048	10
2049-2410	23
2411-3012	10
3013-3614	10
More than 3614	6

* Polish currency is PLN, intervals resulting from the conversion PLN to € (1 Euro = 4.15 PLN).

Having in mind the level of monthly income, it should be noted that the respondents are part of the relatively highly paid category of professionals for the Polish standards. The minimum monthly wage in Poland is of 298 Euro, while the average monthly wage is of about 600 Euro. This means that nearly 80% of the respondents have wages that range from more than the national average monthly income up to more than its double.

3.2. Terms and costs of living

Based on the findings, it can be formulated that on average the surveyed families in the area understudy live in comfortable conditions.

Table 5. Selected aspects of houses size

Indicators	(%)
House type	
Single family	80
Duplex	12
Townhouse	8
Plot area	
Up to 500 m^2	13
501-1000 m^2	65
1001-2000 m^2	17
More than 2000 m^2	5
House area	
Up to 100 m^2	14
101-150 m^2	43
151-200 m^2	30
More than 200 m^2	13

Table 6. Houses amenities.

Indicators	(%)
House equipment	
AC	17
Garage	96
Own bedroom per person	87
Office	45
Garage size	
1 car	76
2 cars	22
3 cars	1

They live mostly in single family houses, situated on an area of 900 m² (median 900 m², the average 1000 m²). The total house area is generally of 150 m² (median 150 m²; mean 160 m²). The houses are well equipped: 87% of them have a separate bedroom for each family member, and nearly half of them also have an extra office. In the Polish climatic conditions, a home equipped with air conditioning can be considered a luxury, and in our case, 17% of the analysed homes were equipped with such a system. Answers of respondents also show that the vast majority of households (87%) are equipped with a car garage, a quarter of which with space for 2 or more vehicles. Tables 5 and 6 present the details.

From the results it can be concluded that the use of the house by inhabitants is very high. Before surveying, it was expected that population living in these residential areas, known as "Krakow's bedroom", would use their houses only at night time. The test results clearly did not confirm this assumption. An average of 7 hours per day is the expected average time

spent at home, resulting in 35 hours per a working week. In contrast, the findings indicated that the average weekly time spent at home is of 43 hours (median 47.5 hrs). This means that the use of homes by suburban residents is very high, which could also be explained by the fact that a significant share of the population is represented by non-working women staying at home. This above described phenomena also includes the persons who are occupationally active at home: part of the population can perform professional tasks at home after working hours, and some others perform all the work at home - which also extends the use of the house. Nearly 30% of them work professionally at home (4-8 hrs intervals + more than 8 hrs.) while more than 50% of them perform some professional tasks at home - 3 hours per day on average. Table 7 presents the phenomenon.

Table 7. Time spent at home.

Indicators	(%)
Time spent at home per work week	
Up to 15 h	18
16-25 h	13
26-40 h	17
More than 40 h	52
Daily work time at home	
0 h	20
Up to 2 h	31
3-4 h	21
5-8 h	21
More than 8 h	7

The answers to the question regarding the reasons to choose the suburban area as a place of residence also provide interesting conclusions. In this case, the economic preferences of the residents are as important as the subjective ones.

The economic considerations are significant (46%), including mostly aspects such as: the cost of land, buying a home, receiving the home as a donation. But of no less importance are the conditions referring to the subjective preferences of consumers (47% of households) in respect of: owning a home with a garden, environmental or aesthetic values of the area, size of the house, etc., which in the study. This also confirms the answer to the next question, which is whether the respondents considered the relocation to the city? The vast majority answered negatively. This issue is displayed in table 8. Having in mind the level of monthly income, it should be noted that the respondents are part of the relatively highly paid category of professionals for the Polish standards. The minimum monthly wage in Poland is of 298 Euro, while the average monthly wage is of about 600 Euro. This means that nearly 80% of the respondents have wages that range from more than the national average monthly income up to more than its double.

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Table 8. Reasons to choose place to live.

Indicators	(%)
Reasons to choose suburbs	
Land price	21
House price	12
Natural environment	10
Distance to work	5
Neighborhood aesthetics	23
House size	14
Heritage	13
Other	2
Considering relocating to the city	
Yes	83
No	17

The economic aspects of the study include household budget components, namely the costs for purchasing and maintenance of a suburban house. It should be noted that despite the high salaries of suburban residents, they decide buying an economic house in terms of the cost to purchase and maintain. However, results of the study show the preference for expensive homes as well. When it comes to the cost of purchasing or building a house, the survey took into account a so-called "developer" – status house, which in Poland refers to an unfinished interior, the house not being ready to be lived in.

Table 9. Financial aspects of owning a house.

Indicators	(%)
Expenditure on house construction or price of a house buying*	
Up to 72 k €	37
73 k-120 k €	26
121 k-167 k €	18
More than 167 k €	18
Having a mortgage	
Yes	42
No	58
Monthly housing costs	
Up to 240 €	50
241-480 €	20
481-720 €	3
More than 720 €	27

* Polish currency is PLN, intervals resulting from the conversion PLN to € (1 Euro = 4.15 PLN).

Based on the study, an average house costs about € 113,000 (€ median 96,000, min. € 67,000; max. € 361,000). A large share of homes (37%) is represented by expensive or very expensive houses (range from 120,000 to 167,000 euro and to even more than 167,000). It is also surprising that nearly 60% of homes are not on mortgage, the reason being the possibly high level of income residents in the particular area. When it comes to home maintenance costs

(heating, gas, electricity, water and sewage, garbage, fees), they are relatively low, because half of the respondents located there mentioned costs of no more than 240€ per month (median 236 €, mean 431 €). Table 9 presents the details of the above presented descriptions.

3.3. Means and costs of transportation

The study confirms the assumption that suburban society is dependent on cars. In this study there were not any households that did not own a car. Generally, each household has one car (median = 1, mean =1.5). A very large share of the households (43%) is owns 2 cars. The expenditure on the purchase of cars averages €12,000 (median = 9.6 thousands euro) and they are second-hand cars. However, more than half of the cars are relatively inexpensive, most of them being evaluated/sold at costs up to 9.6 thousands euro. These expenses incur every 7 years on average (median = 7 years). Details of the presented topic are presented in table 10.

Table 10. Selected aspects of owning a car.

Indicators	(%)
The number of cars per household	
1 car	53
2 cars	43
3 cars	2
4 cars	2
Frequency of a car purchasing	
Up to 2 years	5
3-5 years	7
6-8 years	44
More than 8 years	44
*Prise of a car buing**	
Up to 4.8 k €	26
4.9 k-9.6 k €	28
9.7 k-14.4 k €	16
14.5 k-19.2 k €	19
19.3 k-24 k €	5
More than 24k €	5

The above statistics can be complemented by the result of a separate response to the question whether the respondents would need a car, if they lived in the city.

Responses are divided in half. Half of them indicate that they wouldn't need two or more cars, whereas households that have one car, they still prefer this situation. While the second half of the respondents argued that they need a car because of convenience, the first half of the respondents would be willing to give up two or more vehicles.

These responses together with results mentioned in the methodology about the public transportation system in study area, indicate a car dependent society. In this case, dependency is defined as the need for a vehicle to travel due to the lack of appropriate public transportation connections.

Table 11. Frequency of public transportation use.

Frequency	(%)
Every work day	43
Several times per week	11
Several times per month	6
Rarely	26
Not at all	14

Table 12. Job locations.

Locations	(%)
City	*81*
Downtown	70
Before downtown	20
Outside downtown	10
Suburbs	*19*
Towards the city	70
Around the suburbs	5
In the opposite direction to the city	25

Table 13. Commuting to work.

Indicators	(%)
Means of transport	
Car	79
Bus	15
Tram	3
Bike	3
Commuting time	
Up to 15 min.	12
16-30 min.	37
31-45 min.	31
46-60 min.	11
61-75 min.	3
More than 75 min.	7
Distance	
Up to 5 km	8
6-10 km	32
11-15 km	22
16-20 km	19
21-25 km	12
More than 25 km	7

The need to use public transportation or posses more than one car is primarily due to the fact that the large majority of respondents (81%) work in the city of Krakow, of which 70% in the centre; 20% a bit nearer, as in the city but not quite the centre, while 10% work in the city, but in a functional area around the city centre. On the other hand, those who work outside the city of Krakow, 70% of their jobs are located outside the city borders. Details are provided in table 12. It should

be noted that 80% of those working in the suburbs use cars as a means of transportation to work. Driving time is relatively short, 38 minutes on average (median = 35 min.), especially in the context of the distance to the job, which is of 16 km on average (median = 15 km). Details are shown in table 13. In addition to commuting to work, the use of means of transportation is also determined by taking children to school. In this case, all the children whose age does not allow them to travel to school on their own, their parents are forced to use cars, and this is the case of about 57% of the total.

Table 14. Children transportation means to school.

Children transportation means	(%)
Car	57
Bus	40
Tram	1
Bike	2

It can also be assumed that the persons in the study area do not spend much time in traffic jams. Taking into account the results of the distance to work, driving kids to school on the average time per day spent in traffic at 33 minutes (median = 20 min.) does not seem long. This is compatible with the results for commuting time. Details in table 15.

Table 15. Daily time spent in "traffic jams"

Time in "trafic jams"	(%)
Up to 10 min.	34
11-20 min.	23
21-30 min.	11
31-45 min.	12
46-60 min.	9
More than 60 min.	11

Table 16. Monthly expenditure on transportation

Expenditure on transport (€)*	(%)
Up to 72	12
73-144	15
145-216	31
217-288	19
289-360	15
More than 360	8

Polish currency is PLN, intervals resulting from the conversion PLN to € (1 Euro = 4.15 PLN)

The last aspect of the study is the level of monthly household expenditure incurred in relation to traffic needs. It is not only the fuel costs and tickets, but also about car maintenance costs, repairs, insurance, etc. (Table 16). On average, a suburban household spends €231/month on fuel and vehicle depreciation, insurance, public transportation tickets (the amount does not include the purchase of a new car). This

amount represents less than 11% of the average monthly family budget, which does not seem much.

4. CONCLUSION

When it comes to households causing urban sprawl in study area (Krakow Metropolitan Area, Poland), it can be demonstrated that: they are represented by two-children families, with parents in their late 30s, and primary school children, with a monthly household budget of about €2,000. The husband is usually a highly qualified specialist (IT, engineer, etc.), manager or owner of a company. The woman is either a housewife by choice or employed in public services (i.e. teacher in educational facilities).

The choices made by households in terms of location and type of the house are mostly imprinted economically and rationally, despite the high revenues for several different reasons, such as: the actual/real/calculated needs of space for everyday functioning; relatively low costs of housing; private property without mortgage; second-hand cars. The immigrant community in the study area generally prefers medium-sized houses (150-160 m²) on an plots of 900-1000m², with garage. The price (without equipment) fluctuates around an average of €113,000.

It is a "car-dependent society" in the sense of the need to have a vehicle to travel to and from home, for familiar and professional purposes (school, work), on an average distance of about 16 km. The dependence on cars results also from the lack of an alternative option i.e. suited to the consumers' needs of public transportation, which would make the need of a car less important and the choice of having a car to the convenience of the people.

The transportation share of transportation costs in the household budget (purchase and maintenance of the car, ticket expenses) is not high in relation to the relatively high income, although consumers declared that if they lived in the city, it would be lower. These potential savings are not however influencing the decision to abandon the location of the house in the suburbs. The decision about relocating in a suburban residence is highly determined by the cost of building/purchasing of a house, besides the aesthetic and environmental preferences (against high level of air pollution in Krakow).

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