

HIDDEN PUBLIC VALUE IDENTIFICATION OF REAL ESTATE MANAGEMENT DECISIONS¹

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Abstract

Seeing as how cities nowadays have to face many challenges (such as: urban traffic management, revitalization, and adaptation to climate change.), different kinds of urban policies and actions are undertaken. Many of these actions result in changes that influence real estate, mostly by improving the conditions of public services. However, implementation of such urban policies is connected with significant costs that have to be covered by public funds. Therefore, the question arises how we can analyze the assumed benefits from the increase of real estate value? Which tool could allow stakeholders to search for potential added value?

The aim of this paper is to present the methodological approach to improving the communication between stakeholders for the visualization of relations between public actions and potential benefits. The analyses cover benefits that can occur both in public and private budgets. The focal point of this paper is the presentation of causal loop diagrams as a tool that could be incorporated for public value identification on specific investments. The application of the suggested approach is visualized on two examples of urban redevelopment activities. Causal loop diagrams are prepared for the construction of a metro system and implementation of a water retention facility. The results show that both types of urban redevelopment actions have an impact on the creation of value, which can be observed both in public and private benefits. However, not all kinds of activities impact an increase in the market value of real estate and can be measured as incomes in budgets.

Key words: public value, real estate market, urban design decisions, cause effect chain, causal loop diagram.

JEL Classification: H00, R38, R51.

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1. Introduction

Human development leads to new solutions, technologies and standards, but at the same time, we have to face new challenges in a more complex world. Constantly growing urbanized areas require new solutions in urban traffic management, both to transport their citizens (LETNIK et al. 2018), and to monitor urban transportation systems (KAMIŃSKA 2003). Social segregation between different districts of cities (FORYŚ, PUTEK-SZELAG 2017; ŚWIĄDER et al. 2016) influences the need for revitalization projects (KOSTOV et al. 2017) and social inclusion of vulnerable groups (SZEWRĄŃSKI et al. 2018a; VAN HOOFF, KAZAK 2018). Climate change threats require urban adaptation policies and plans (KIELKOWSKA et al. 2016), among others in the field of renewable energy (WOHLGEMUTH, WOJTKOWSKA-ŁODEJ 2003; BOERENFIJN et al. 2018; BAZAN-KRZYWOSZAŃSKA et al. 2018), pluvial flood management (SZEWRĄŃSKI ET AL. 2018b), and the thermal comfort of citizens (VAN HOOFF et al. 2017; KAZAK 2018). Many of those actions result in changes that influence real estates, mostly by improving the conditions of public services, but also by creating more comfortable conditions for the everyday activities of citizens (KUKULSKA-KOZIEŁ et al. 2019). In this way public authorities have an impact on the process of value creation (VARGO et al. 2008).

However, the implementation of urban redevelopment policies go along with significant costs. The construction of a new means of public transportation, and implementation revitalization projects or green infrastructure constitute significant expenses, even in the case of wealthy cities. Local authorities decide to invest public funds in order to improve the quality of life for their citizens (PRZYBYŁA et al. 2014). Based on classical economic valuation (BIEDA 2018) as well as the non-economic valuation approach, many techniques and methods are known worldwide to assess newly created value, and applied in practice (CHRISTIE et al. 2008). Some urban policies noticeably increase the value of real estates and can support expensive urban transformation decisions (D'ACCI 2018). Such a case could be, for instance, metro investment and its effect on the housing market (TROJANEK, GLUSZAK 2018). However, not all real estate features influence final economic value. Some aspects of real estate are not taken into account by potential buyers, and, therefore, are not reflected in the market value. Market value is a crucial element as economic systems in many countries are based on it (MANZHYNYSKI et al. 2018). This is why some decisions on real estate redevelopment actions do not guarantee an economic mechanism which would result in financial returns to public budgets, like higher taxes from increasing real estate market value (HEŁDAK et al. 2015), caused by the implementation of an urban redevelopment policy. Therefore, this paper deals with the issue of identifying hidden public value. The aim of the work is to present the methodological approach to improving the communication between stakeholders for visualization of relations between public actions and potential benefits. It would support decision-makers in determining: who really benefits from the implementation of these redevelopment policies, whether this is the public or private sector, and finally, which aspects of real estate management can be influenced by redevelopment activities.

2. Methodological approach for hidden value identification

Studies on public value are an exploration of how public organizations are operationalizing the principles of public value. They focus on the role of public engagement and amplify the idea that public services are different from private competitive markets (YOTAWUT 2018). Public values are being incorporated into evaluation criteria in the management process (HARMAN, AZZAM 2018). The creation of public value can be driven by many elements. One of the main drivers controlled by public authorities are public procurements, which are assumed to influence more than 10% of the global Gross Domestic Product. They can be distinguished into goods and services contracts and public works contracts (MUÑOZ-GARCIA, VILA 2018). Especially the second group of contracts may constitute an important factor in the case of the value creation of real estates. As suggested by FOTINO and others (2018), a suitable approach to co-creating value in the context of urban public policy is a group of system approaches which allow for the description of a wider context of elements that are not recurrent in every case. The method used by ROBIN (2018) allowed for the identification of central actors of the redevelopment process in case of King's Cross Central in London (UK). For that purpose, she used network analysis, which clearly presents the linkages between key elements. However, a limitation of this approach is the lack of information on the influence of one element on another. Therefore, the result does not express the direction of interactions, which does not allow for the definition of the whole process of urban redevelopment.

In order to identify the hidden value of real estate improvements caused by redevelopment policies, the causal loop diagram analysis was adopted in this paper. The concept of a causal loop diagram is based on the cause effect chain. As DOBRUSSKIN (2016) stated *“the general purpose of cause effect chain analysis and similar tools is to investigate the underlying causes and their interdependencies for an observed effect and to visualize the result in a graphic way”*. The cause effect chain is helpful in identifying not only the direct impact of the analyzed action, but, like in the domino effect, it highlights possible implications for further effects of undertaken actions. Some of these effects might be observed with a delay in time, and it is therefore crucial to link them with real causes (BECKER et al. 2017). Hence, such methodology allows for the monitoring of interactions that can be observed on the real estate market, where actions and results might be separated in time. The formalized procedure of the use of cause effect chains is reflected in the causal loop diagram approach.

A causal diagram, in its basic form, is an oriented graph. Each arrow represents the cause-effect interaction between analyzed variables. Every link has a polarity, which denotes the type of influence (positive or negative). A plus with an arrowhead means that both variables change in the same direction – the increase in the cause increases the effect. A minus in the arrowhead means that the direction of change is opposite – the increase in the cause reduces the effect. The use of signs in a relation is useful to propose a dynamic hypothesis that will guide the construction of some scenarios. When a causal diagram is closed, the diagram presents a causal loop, which could be positive (feedback) and negative (balancing) (DELGADO-MACIEL et al. 2018). According to this approach, basic graphical elements can be distinguished in a causal loop diagram.

It is important to highlight that not all elements included in the causal loop diagrams have to be monitored in the case of similar real estate investments in other areas. However, diagrams present possible implications that can be observed, also depending on the occurrence of external forces, e.g. benefits from flood protection investments can be observed once extremal weather conditions arise in the analyzed area. The use of causal loop diagrams is a common method to visualize the analyzed issue to different groups of stakeholders. Due to its low complexity, this method is also used in workshops in developing countries, where the expected education level might be lower (INAM et al. 2015). It improves the clear communication of the obtained results, which might be very helpful for incorporating public value identification in analyses carried out by specialists from other domains. Therefore, the main objective of the paper is the application of the suggested method which might be helpful for implementing tools of public value creation in countries that have no experience in this area. Studies in this field are currently being undertaken within the COST Action 17125 Public Value Capture of Increasing Property Values.

The causal loop diagram approach was used during the focus group study. There were six participants within the focus group, all of whom are connected with the real estate domain. Two of them are responsible for real estate management and four of them work in real estate development projects in their professional life. All members of the focus group have at least three years' experience in these domains. During the focus group meeting, participants shared their ideas about possible implications of two kinds of urban redevelopment actions: the development of a metro system and implementation of a water retention facility. The focus group meeting lasted 45 minutes, and approximately 20 minutes were spent on each analyzed case.

3. Results

The causal loop diagram method was applied on two examples of urban redevelopment policies which impact changes in real estates. The following subsections present the case of metro system construction and the case of water retention facilities development.

3.1. Example of metro system

One well-known urban redevelopment project is the construction of a metro system. The biggest of cities have to deal with the issue of the high density of citizens, which leads to problems with transportation. In order to solve the problem of traffic congestion on the road networks, one of the possibilities is the development of alternative modes of rapid public transport, offering an alternative to private transport solutions. Therefore, many of the biggest cities in the developed countries invest significant funds in the development of metro systems.

Based on the system analysis, the causal loop diagram was prepared for metro system development (Figure 1). The study shows that metro system development can influence incomes for both private and public budgets. However, it is important to highlight that one of the causal relations defined in the diagram depends directly on the taxation legislation. The increase in the value of real estate may influence an increase in the real estate tax when such a mechanism is applied in law. Therefore, this element is additionally represented on the diagram by question mark.

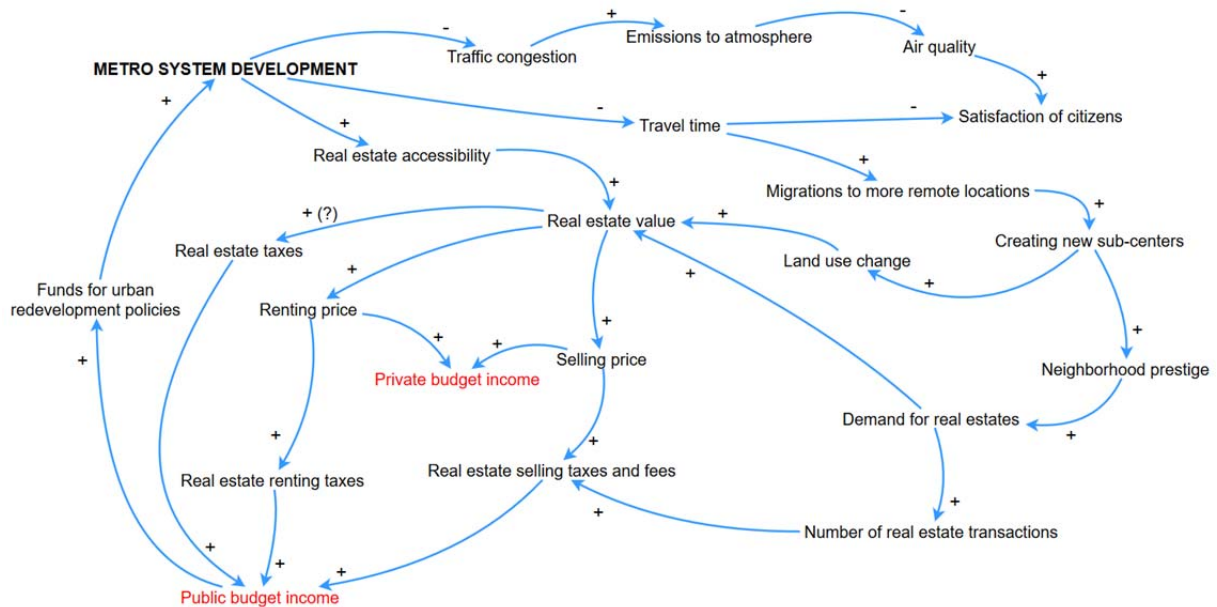


Fig. 1. Causal loop diagram for metro system development. *Source:* developed by participants of the focus group.

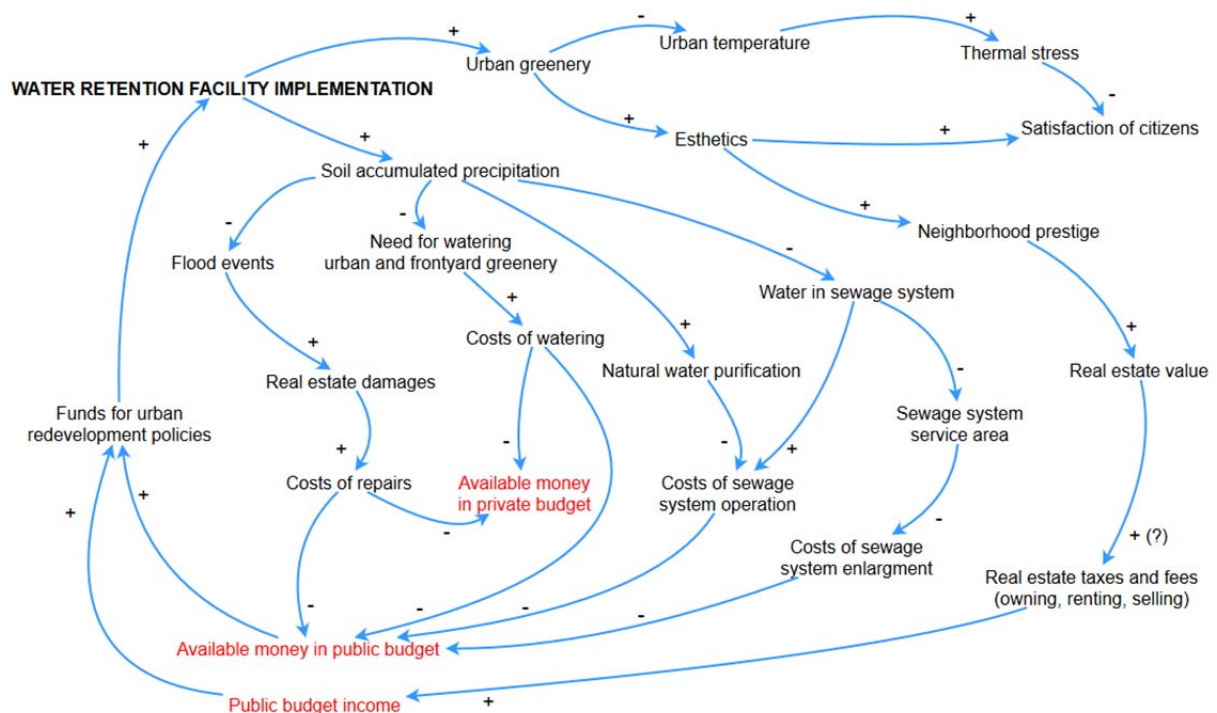


Fig. 2. Causal loop diagram for water retention facility implementation. *Source:* developed by participants of the focus group.

3.2. Example of water retention facilities

The second analyzed urban redevelopment action was the construction of water retention facilities. Current climate changes result in more frequent extreme weather conditions. In addition to thermal stress caused by heatwaves, one of the major challenges is the new structure of rainfalls. Naval storms that can be observed worldwide result in precipitation that exceeds the abilities of sewage systems, which ultimately cause pluvial floods. In order to overcome socio-environmental problems caused by such floods, public authorities in cities try to diversify the rainwater sewage system and develop alternative solutions for purposes of water retention. These can include both, typically artificial constructions like the Dutch example of water squares (FRANCESCH-HUIDOBRO et al. 2017), or Polish nature-based solutions like wetlands systems (OBARSKA-PEMPKOWIAK et al. 2011).

The causal loop diagram for water retention facility implementation shows (Figure 2) that this type of urban redevelopment activity does not guarantee direct income to private or public budgets. However, there is an impact on the limitation of costs that have to be covered by both private and public budgets. Therefore, the implementation of such a facility does not influence direct benefits that can be observed by the owners. However, those investments indirectly support budgets, even if such income cannot be registered as a direct income.

4. Discussion and conclusions

The results of the causal loop diagrams present benefits of urban redevelopment policies in a clear way, which intuitively shows the possible implications of real estate situation and the economic conditions of the owners of real estates. Depending on the participants of the focus group, different implications might be highlighted based on the stakeholders' experiences and points of interests. In current research, the participants were specialists from the field of real estate management and real estate development projects. The requirement of at least three years of experience in these professions influenced their cause-effect way of thinking and allowed ideas on potential implications of the analyzed urban redevelopment investments to be collected. Both cases, which are described in the paper, result in benefits for both private as well as public budgets. Direct public benefits, identified in the metro system development, are connected with the increase in taxes from real estate rental, taxes and fees from real estate sales transactions and property taxes. As mentioned in the results, some of those benefits are strongly related to legislation, depending on whether public budget incomes are based on market value. In the case of private benefits, direct incomes can be observed in cases when real estate is an investment. The income can come from a higher real estate renting price or selling price. In cases when real estate is not an investment but residence, more favorable conditions will influence the quality of life of the owner. In the case of the implementation of a water retention facility, the main benefits that were identified in the study are connected with the limitation of costs. These costs can be connected with regular maintenance costs, such as the costs of watering urban and front yard greenery, the costs of sewage system operation, or the limitations of sewage system enlargement, both for urbanized areas as well as new areas predesigned for highly developed purposes. Additionally, such facilities can also influence irregular events, such as real estate damages caused by flooding, which influence the costs of repairs of real estate. Due to such irregularity, it is difficult to precisely measure their impact on the economic conditions of private and public budgets. The existence of water retention facilities might influence market value, depending on how it is viewed by potential buyers. Therefore, it is an optional factor of the valuation process. If pluvial floods are a problematic issue in a specific location and people consider existing water retention facilities to be an important factor, such an element might also have a direct impact on public and private budgets (KROPP 2015). In cases when these facilities are connected with the enlargement of urban greenery, the improved esthetics might positively influence the prestige of neighborhoods and, therefore, have an impact on public budget incomes. All in all, both types of analyzed actions have an impact on private and public budgets and, by their positive influence, they can constitute a financial support for future urban redevelopment policies. Besides the impact on budgets, it is important that participants highlighted that, in both cases, the urban redevelopment policies influence the satisfaction of citizens by improving the quality of life. It was stated during a focus group meeting by its participants that, even if the impact on the economic factors is not that direct and they do not see the reason to connect it with public budget, it might also influence the improvement of the city brand and create positive socio-economic conditions (ZASINA 2018).

The findings of the research are coherent with other studies proving that infrastructure investments influence both public and private values (HENDRICKS et al. 2017). As discussed above, not all investments have a direct impact which is possible to quantify. Quite well measured is the impact of metro systems worldwide. A case study in Tianjin (China) shows that prices of properties within a distance of 1 km from metro stations increase by almost 10% (SUN et al. 2016). Higher real estate prices gradually decrease along with further distance from metro stations, which can be quantified. In Warsaw (Poland), an increase in the distance from the metro stations influences a decrease in housing prices by 3% per kilometer (TROJANEK, GLUSZAK 2018). Studies show that the drop of real estate value is related to the accessibility to central business districts. In the case of Rome (Italy) this influence is reflected in a loss of 0.6% of total value per minute of journey, while in the case of Santander (Spain), it reaches as much as 1% per minute of journey (CORDERA et al. 2018). The influence of the rapid public transport system also differs for other kinds of land uses. As an analysis carried out in/ Dubai (UAE) proved, an increase in value was recorded in the radius of 1 km for residential properties, while in the case of commercial properties, the radius was 1.5 km (MOHAMMAD et al. 2017). The construction of a metro system influences property prices even before the system is finished. In the case of Helsinki (Finland), a positive price premium that converges to around 4% in the case of proximity to new metro stations was recorded as early as five years before the metro became operational (HARJUNEN 2018). In Santiago (Chile) the average apartment price rose by between 4.2% and 7.9% after construction was announced, and by between 3.1% and 5.5% after the location of the stations was specified (AGOSTINI, PALMUCCI 2008). However, a multivariable study in Seoul (Korea) proved that, even if proximity to the underground leads to increased property prices, factors such as the size of the unit, quality of the school district or proximity to high-status subcenters have higher impacts (BAE et al. 2003); real estate value is always a result of many factors. As GLUMAC and others (2019) proved, the proximity to transportation facilities can have a high correlation to other variables. Therefore, the concept of expecting an exact increase of market values based on a specific urban redevelopment activity is flawed.

A review of the studies mentioned above shows that, even for such a well-known investment like a metro system, the diversity of cities and their local conditions do not allow for standardizing a single universal impact of the investment. As metro systems might play a different role in individual cases, the impact on market value is different as well. The example presented in Figure 1 shows the possible implications, without assessing the exact value. A significant example is the impact of real estate value on real estate tax. In each case, this depends on the taxation legislation system. Therefore, in the case of our study, causal loop diagrams present only possible implications, which should be verified in each case if the relation exists. However, it is important to highlight that, based on the group of participants, the obtained diagrams might differ. For instance, metro system development influencing migrations into more remote locations might be also be analyzed from the point of view of negative socio-economic phenomena (TANAŚ, TROJANEK 2014). Therefore, depending on the point of view of stakeholders, side effects can also be presented in this methodological approach. A similar situation may be observed in the case of water retention facilities. Depending on the local situation, the proximity to solutions meant to protect real estates from flooding might be perceived by potential buyers as a crucial element and thus have a significant impact on the market value. On the other hand, the fact that such infrastructure is not used frequently may prevent it from being reflected in market value. However, this fact should not be a reason not to implement such redevelopment actions, also taking into account the benefits that can be observed in public budgets.

The proposed approach of hidden public value identification by the use of causal loop diagrams does not support decision makers in terms of quantitative analyses. It allows for understanding the way of thinking of stakeholders who are familiar with the analyzed processes. It is also important to highlight that the obtained results might be biased, based on the experiences of specific interest groups. Serving as such an example is, for instance, be the proximity to an airport. On the one hand, such proximity might be beneficial to industrial and commercial buildings seeing as how the economic activity of these objects might be connected with air traffic (BATÓG et al. 2019). However, on the other hand, the same airport might reduce the value of houses (TROJANEK 2014). Therefore, the selection of participants might influence the identified positive impacts as well as side effects. The use of this method is, however, useful in qualitative evaluation, which might help to avoid a situation where the existing implications of redevelopment actions are omitted. A better understanding of

potential benefits of urban redevelopment activities by the stakeholders boosts the decision-making processes in urban management and allows for the implementation of sustainable development in practice (MANZHYNSKI et al. 2016). The identification of a wider context of urban redevelopment policies may play a significant role in the intensification of public activities, resulting in changes in the urban structure (TREMBECKA, KWARTNIK-PRUC 2018). The findings concerning the use of causal loop diagrams may constitute a valuable input to a redevelopment planning support system, which has become more popular in the recent years (WANG et al. 2018) and, in that way, they can improve the quality of investment recommendations that are used in the decision making process in management (KOWALSKI 2018; KOWALSKI 2019). Hidden value identification could be assessed on a specific case study, for instance by using the hedonic urban land price index (GLUMAC et al. 2019). This tool can capture the value of large-scale urban development projects which effectuate an improvement in neighboring areas. The use of causal loop diagrams might also be useful for identifying possible implications of activities in urban space and developing tools for public value creation, where such kind of incremental value can be observed.

5. References

- AGOSTINI C.A., PALMUCCI G.A., 2008, *The Anticipated Capitalisation Effect of a New Metro Line on Housing Prices*, Fiscal Studies, no. 29(2), pp. 233-256.
- BATÓG J., FORYŚ I., GACA R., GŁUSZAK M., KONOWALCZUK J., 2019, *Investigating the impact of airport noise and land use restrictions on house prices: Evidence from selected regional airports in Poland*, Sustainability, no. 11(2), 412.
- BAZAN-KRZYWOSZAŃSKA A., SKIBA M., MRÓWCZYŃSKA M., SZTUBECKA M., BAZUŃ D., KWIATKOWSKI M., 2018, *Green energy in municipal planning documents*, E3S Web of Conferences, no. 45, 00006.
- BAE C.H., JUN M.J., PARK H., 2003, *The Impact of Seoul's Subway Line 5 on Residential Property Values*, Transport Policy, no. 10, pp. 85-94.
- BECKER M., DASARI D., MUBEEN S., BEHNAM M., NOLTE T., 2017, *End-to-end timing analysis of cause-effect chains in automotive embedded systems*, Journal of Systems Architecture, no. 80, pp. 104-113.
- BIEDA A., 2018, *Conditional Model of Real Estate Valuation for Land Located in Different Land Use Zones*, Real Estate Management and Valuation, no. 26(1), pp. 122-130.
- BOERENFIJN P., KAZAK J.K., SCHELLEN L., VAN HOOFF J., 2018, *A multi-case study of innovations in energy performance of social housing for older adults in the Netherlands*, Energy and Buildings, no. 158, pp. 1762-1769.
- CHRISTIE M., FAZEY I., COOPER R., HYDE T., DERI A., HUGHES L., BUSH G., BRANDER L., NAHMAN A., DE LANGE W., REYERS B., 2008, *An Evaluation of Economic and Non-Economic Techniques for Assessing the Importance of Biodiversity to People in Developing Countries*, CR 0391, Final report, Report to Defra, London.
- CORDERA R., COPPOLA P., DELL'OLIO L., IBEAS Á., 2018, *The impact of accessibility by public transport on real estate values: A comparison between the cities of Rome and Santander*, Transportation Research Part A: Policy and Practice, [in press].
- D'ACCI L., 2018, *Quality of urban area, distance from city centre, and housing value. Case study on real estate values in Turin*, Cities, [in press].
- DELGADO-MACIEL J., CORTÉS-ROBLES G., ALOR-HERNÁNDEZ G., GARCÍA ALCARÁZ J., NEGNY S., 2018, *A comparison between the Functional Analysis and the Causal-Loop Diagram to model inventive problems*, Procedia CIRP, no. 70, pp. 259-264.
- DOBRUSSKIN C., 2016, *On the Identification of Contradictions Using Cause Effect Chain Analysis*, Procedia CIRP, no. 39, pp. 221-224.
- FORYŚ I., PUTEK-SZELAG E., 2017, *The Impact of Crime on Residential Property Value - on the Example of Szczecin*, Real Estate Management and Valuation, no. 25(3), pp. 51-61.
- FOTINO F., CALABRESE M., LETTIERI M., 2018, *Co-creating value in urban public policy contexts: A different approach*, Land Use Policy, no. 79, pp. 20-29.
- FRANCESCH-HUIDOBRO M., DABROWSKI M., TAI Y., CHAN F., STEAD D., 2017, *Governance challenges of flood-prone delta cities: Integrating flood risk management and climate change in spatial planning*, Progress in Planning, no. 114, pp. 1-27.
- GLUMAC B., HERRERA-GOMEZ M., LICHERON J., 2019, *A hedonic urban land price index*, Land Use Policy, no. 81, pp. 802-812.

- HARMAN E., AZZAM T., 2018, *Incorporating public values into evaluative criteria: Using crowdsourcing to identify criteria and standards*, *Evaluation and Program Planning*, no. 71, pp. 68-82.
- HARJUNEN O., 2018, *Metro Investment and the Housing Market Anticipation Effect*, Working Papers 2018:2, Urban Research and Statistics/Aalto University, Helsinki.
- HELDAK M., STACHERZAK A., BAUMANE V., 2015, *Real Estate Value Tax Based on the Latvian Experience*, *Real Estate Management and Valuation*, no. 22(4), pp. 60-67.
- HENDRICKS A., KALBRO T., LLORENTE M., VILMIN T., WEITKAMP A., 2017, *Public value capturing of increasing property values – What are „unearned increments“? A comparative study of France, Germany and Sweden*, Hepperle E., Dixon-Gough R., Mansberger R., Paulsson J., Hernik J., Kalbro T. (eds) *Land Ownership and Land Use Development – The Integration of Past, Present and Future in Spatial Planning and Land Management Policies*, European Academy of Land Use and Development, pp. 257-282.
- VAN HOOFF J., SCHELLEN L., SOEBARTO V., WONG J.K.W., KAZAK J.K., 2017, *Ten questions concerning thermal comfort and ageing*, *Building and Environment*, no. 120, pp. 123-133.
- VAN HOOFF J., KAZAK J.K., 2018, *Urban ageing*, *Indoor and Built Environment*, no. 27(5), pp. 583-586.
- INAM A., ADAMOWSKI J., HALBE J., PRASHER S., 2015, *Using causal loop diagrams for the initialization of stakeholder engagement in soil salinity management in agricultural watersheds in developing countries: A case study in the Rechna Doab watershed, Pakistan*, *Journal of Environmental Management*, no. 152, pp. 251-267.
- KAMIŃSKA J., 2011, *Big cities influence on accident prediction modeling results for the whole country*, *Procedia Social and Behavioral Sciences*, no. 20, pp. 752-760.
- KAZAK J.K., 2018, *The use of a decision support system for sustainable urbanization and thermal comfort in adaptation to climate change actions-the case of the Wrocław Larger Urban Zone (Poland)*, *Sustainability*, no. 10(4), 1083.
- KIELKOWSKA J., TOKARCZYK-DOROCIĄK K., KAZAK J., SZEWRĄŃSKI S., VAN HOOFF J., 2018, *Urban adaptation to climate change plans and policies – The conceptual framework of a methodological approach*, *Journal of Ecological Engineering*, no. 19(2), pp. 50-62.
- KOSTOV I., PALICKI S., RACKA I., 2017, *The Activities of Local Governments in the Revitalization of Public Space in Bulgaria and Poland*, *Real Estate Management and Valuation*, no. 25(1), pp. 103-111.
- KOWALSKI M.J., 2018, *Quality of investment recommendation – evidence from Polish capital market, income approach*, Wilimowska Z., Borzemski L., Świątek J. (eds) *Information Systems Architecture and Technology: Proceedings of 38th International Conference on Information Systems Architecture and Technology – ISAT 2017*. *Advances in Intelligent Systems and Computing*, vol 657. Springer, Cham, pp. 57-66.
- KOWALSKI M.J., 2019, *Quality of investment recommendation – evidence from Polish capital market, multiples approach*, Wilimowska Z., Borzemski L., Świątek J. (eds) *Information Systems Architecture and Technology: Proceedings of 39th International Conference on Information Systems Architecture and Technology – ISAT 2018*. *Advances in Intelligent Systems and Computing*, vol 854. Springer, Cham, pp. 60-70.
- KROPP S., 2015, *Climate Change and Risk of Flooding in Germany – Consequences for property values*, Hepperle E., Dixon-Gough R., Mansberger R., Paulsson J., Reuter F., Yilmaz M. (eds) *Challenges for Governance Structures in Urban and Regional Development*, European Academy of Land Use and Development, pp. 155-160.
- KUKULSKA-KOZIEŁ A., SZYLAR M., CEGIELSKA K., NOSZCZYK T., HERNIK J., GAWROŃSKI K., DIXON-GOUGH R., JOMBACH S., VALÁNSZKI I., FILEPNÉ KOVÁCS K., S., 2019, *Towards three decades of spatial development transformation in two contrasting post-Soviet cities – Kraków and Budapest*, *Land Use Policy*, no. 85, pp. 328-339.
- LETNIK T., MARKSEL M., LUPPINO G., BARDI A., BOŽIČNIK S., 2018, *Review of policies and measures for sustainable and energy efficient urban transport*, *Energy*, no. 163, pp. 245-257.
- MANZHYNski S., SINIAK N., ŻRÓBEK-RÓŻAŃSKA A., ŻRÓBEK S., 2016, *Sustainability performance in the Baltic Sea Region*, *Land Use Policy*, no. 57, pp. 489-498.
- MANZHYNski S., ŻRÓBEK S., BATURA O., ZYSK E., 2018, *Why the market value of residential premises and the costs of its purchase differ: The examples of Belarus and Poland*, *Land Use Policy*, no. 71, pp. 530-539.
- MOHAMMAD S.I., GRAHAM D.J., MELA P.C., 2017, *The effect of the Dubai Metro on the value of residential and commercial properties*, *Journal of Transport and Land Use*, no. 10(1), pp. 263-290.

- MUÑOZ-GARCIA C., VILA J., 2018, *Value creation in the international public procurement market: In search of springbok firms*, Journal of Business Research, [in press].
- OBARSKA-PEMPKOWIAK H., GAJEWSKA M., WOJCIECHOWSKA E., 2011, *Constructed wetland systems for serial runoff treatment in the gulf of Gdansk region*, Annual Set The Environment Protection, no. 13(1), pp. 173-186.
- PRZYBYŁA K., KULCZYK-DYNOWSKA A., KACHNIARZ M., 2014, *Quality of life in the regional capitals of Poland*, Journal of Economic Issues, no. 48(1), pp. 181-196.
- ROBIN E., 2018, *Performing real estate value(s): real estate developers, systems of expertise and the production of space*, Geoforum, [in press].
- SUN H., WANG Y., LI Q., 2016, *The Impact of Subway Lines on Residential Property Values in Tianjin: An Empirical Study Based on Hedonic Pricing Model*, Discrete Dynamics in Nature and Society, 1478413.
- SZEWAŃSKI S., ŚWIĄDER M., KAZAK J.K., TOKARCZYK-DOROCIAK K., VAN HOOFF J., 2018a, *Socio-Environmental Vulnerability Mapping for Environmental and Flood Resilience Assessment: The Case of Ageing and Poverty in the City of Wrocław, Poland*, Integrated Environmental Assessment and Management, no. 14(5), pp. 592-597.
- SZEWAŃSKI S., CHRUŚCIŃSKI J., VAN HOOFF J., KAZAK J.K., ŚWIĄDER M., TOKARCZYK-DOROCIAK K., ŻMUDA R., 2018b, *A location intelligence system for the assessment of pluvial flooding risk and the identification of stormwater pollutant sources from roads in suburbanised areas*, Water, no. 10(6), 746.
- ŚWIĄDER M., SZEWAŃSKI S., KAZAK J., 2016, *Spatial-Temporal Diversification of Poverty in Wrocław*, Procedia Engineering, no. 161, pp. 1596-1600.
- TREMBECKA A., KWARTNIK-PRUC A., 2018, *An analysis of the changes in the structure of allotment gardens in Poland and of the process of regulating legal status*, Sustainability, no. 33(2), pp. 359-384.
- TANAŚ J., TROJANEK R., 2014, *Changes in land use structure in suburban zones in Poland after the 90*, Journal of International Studies, no. 7(3), pp. 81-89.
- TROJANEK R., 2014, *The impact of aircraft noise on the value of dwellings – The case of Warsaw Chopin airport in Poland*, Journal of International Studies, no. 7(3), pp. 155-161.
- TROJANEK R., GLUSZAK M., 2018, *Spatial and time effect of subway on property prices*, Journal of Housing and the Built Environment, no. 10(11), 3829.
- VARGO S.L., MAGLIO P.P., AKAKA M.A., 2008, *On value and value co-creation: A service systems and service logic perspective*, European Management Journal, no. 26(3), pp. 145-152.
- WANG T., HAN Q., DE VRIES B., 2018, *SIRPSS - Sustainable industrial site redevelopment planning support system*, F. Dargam, P. Delias, I. Linden, & B. Marechal (editors), Decision Support Systems VIII: Sustainable Data-Driven and Evidence-Based Decision Support: 4th International Conference, ICDSST 2018, Heraklion, Greece, May 22-25, 2018, Proceedings Lecture Notes in Business Information Processing, vol. 313, pp. 3-14.
- WOHLGEMUTH N., WOJTKOWSKA-ŁODEJ G., 2003, *Policies for the promotion of renewable energy in Poland*, Applied Energy, no. 76(1-3), pp. 111-121.
- YOTAWUT M., 2018, *Examining progress in research on public value*, Kasetsart Journal of Social Sciences, no. 39(1), pp. 168-173.
- ZASINA J., 2018, *The Instagram image of the city. Insights from Lodz, Poland*, Bulletin of Geography, no. 42(42), pp. 213-225.