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Identification of the key investment project management factors in the housing construction sector in Poland

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ABSTRACT

The aim of this paper is to distinguish a number of factors that allow for a better understanding of investment process management in the housing construction industry. The research work that we performed consisted in conducting a questionnaire survey. A total of 192 Polish companies dealing with housing construction took part in the survey. The collected questionnaire responses were then subjected to a thorough analysis and interpretation, with the use of a method called exploratory factor analysis (EFA). In a nutshell, our analysis consisted in reducing the number of survey variables (73) in order to identify a few pivotal factors (4) with the greatest impact on investment processes management in the field of residential construction in Poland. These factors include: the activity of companies in the market environment (1), pro-social policy of the state (2), highly advanced technologies (3) and the use of appropriate market relations (4). In our study, we aim to show how successful construction processes are perceived by industry professionals. The scientific method that we used allows for assignment of a certain order of priority to specific groups of questionnaire variables, dependent on the eigenvalues-related percentage of explained variation.

KEYWORDS

Project management; housing construction management; exploratory factor analysis

Introduction

The housing construction sector in Poland has been experiencing a real boom for several years now and despite weaker results in the period 2010–11, when the production fluctuation displayed the worst performance (Płaziak and Szymańska 2014; Sielewicz 2015), it is one of the fastest growing markets worldwide (Sobieraj 2020; Wielgo 2020). Housing construction industry has a leading position in total turnover in the primary property market in Poland, and accounts for approximately 40% of the whole construction market (Sobieraj 2020). Even in the worst year for construction industry, which was the year 2011, it contributed about 7.3% to Polish GDP (KPB 2012). Also, unlike other European countries, the housing market in Poland features with significant shortages. Analysing various indicators concerning the Polish housing stock, it can be concluded that achieving European averages in this regard requires an increase in the existing housing stock by about 26–36%, meaning that there is an unsatisfied demand for about 3.3–4.3 million housing units (Bankier 2020; Sobieraj 2020). The data presented by the Central Statistical Office for the period 2012–2019 shows, that the gap in housing shortages is slowly narrowing (Wielgo 2020).

When it comes to investment processes in Polish housing construction sector, it is associated with a whole sequence of different sets of activities, namely conceptual, analytical, design-related, economic, legal, financial, administrative, as well as those related to tender procedures, execution of construction works, commissioning of completed facilities for operation, and their subsequent use within warranty and guarantee periods. More importantly, the whole construction investment project itself

must consist in the realisation of all processes in accordance with applicable laws, within a specified time frame, limited financial resources and with a defined level of quality (Kulejewski 2008). Since as many as 35 up to 70% of all projects fail in some way, it is necessary to constantly improve the standards and methodologies of project management, and look for new solutions, taking into account the paradigm of constant dynamic changes in the market (Kulejewski 2008; Sobieraj 2019).

It is worth mentioning at least a few concerns that participants in the housing construction sector in Poland have to deal with during the implementation of construction housing projects/processes (Kulejewski 2008; Sobieraj 2020), namely:

- most of the project management solutions applied in the Polish housing construction industry are oriented towards the implementation phases, overlooking other phases that determine the success and quality of projects (Sobieraj 2017). For example, the preparation and adoption of feasibility and directional studies of local municipalities and/or local spatial development plans are rarely developed in close cooperation with urban planners, architects, potential investors and other stakeholders (Kulejewski 2008; Sobieraj 2017, 2020);
- the majority of activities related to the management of housing projects in Poland do not take into account the operation and use phase, which is perceived as a very important issue from the end-user perspective. The end-user (be it a housing cooperative, housing community, or an individual owner) must have a professional management system for the facility, housing estate or a group of housing estates so as to maintain technical performance of the buildings/facilities, infrastructure and their surroundings at an economically justifiable level of costs insofar

as the ongoing operation of the facility is concerned. All costs have to be affordable and acceptable from the end-user perspective (Sobieraj 2017);

- when managing housing projects, insufficient importance is given to the role of the initial phase (including preparation and planning), and one should be aware that this is a relatively least costly phase (Kulejewski 2008). The truth of the matter is that with good project preparation and planning, one can avoid unnecessary problems and costly mistakes during the implementation phase (Kapliński et al. 2011). Also, during the initial phase it is still possible to abandon the project without unnecessary further costs, for example the ones related to the purchase of land, especially if its implementation is burdened with an excessive risk or exceeds financial capacity of the investor or is unprofitable and economically unjustified (Sobieraj 2017).

Moreover, efficient and effective investment processes management is mainly the result of a variety of multidirectional and comprehensive activities in the area of creation of companies' intellectual capital and preparation of flexible plans and time schedules for investment projects implementation (Paslawski 2008). Integration of these elements makes a company's business activities stand out from its competitors and bring intended market effects and added value (Sobieraj 2020).

When analysing the problems occurring during the implementation of housing construction projects, attention should be paid both to internal factors, related to human resources and management, and to the impact of legal, environmental and economic environment (external factors). Both of these groups of factors exert an influence on investment processes, resulting in certain consequences that are often decisive and even predetermining the success or failure of multi-million or multi-billion-dollar ventures (Sobieraj 2020). The vast majority of errors in the implementation of investment projects could be avoided (or at least reduced) if an appropriate management approach was adopted towards the realisation of the entire construction process (Bryx 2006).

A number of occurrences that are likely to be encountered in the course of a construction project can be anticipated and adequately addressed and handled, for example by assuming additional time for their resolution or by effectively managing the risks in time schedules and/or by more accurate cost estimation (Paslawski 2008). It is also worth using the best practices that have already been tested in other countries (Sobieraj 2020). These include long and very thorough preparation of investment projects, elaboration of different scenarios (contingencies) of their implementation (Paslawski 2008), and standardisation of engineering documentation (Kapliński et al. 2011). The most appropriate project management methodology should be aimed at quick adaptation to changing environmental conditions (Sobieraj 2017). In particular, project/process management should be as flexible as possible, due to exceptionally frequent reorientations of legal, environmental and economic policies in Poland (Kulejewski 2008; Paslawski 2008; Sobieraj 2019).

The model of housing project management adopted should, above all, make it easier to anticipate changes and take appropriate measures to limit the impact of risks and take advantage of potential opportunities (Paslawski 2008). Another important aspect is a well-designed characteristic of a given construction process realised under certain conditions, which determines the intensity of the influence of various factors and so-called uncontrolled variables (Kapliński et al. 2011). There are countless examples of the impact of a dynamically changing environment

on construction processes in the Polish housing industry. Both analyses of individual processes and entire projects (Połowski 2007; Leśniak 2010, 2012; Leśniak and Plebankiewicz 2010; Tkaczyk et al. 2015) show that changes in the environment may lead to difficulties in the implementation of investment projects (for example problems of a legal nature, reduced quality, budget overruns, failure of the entire project, and so on) and to a significant exceeding of the originally planned deadlines for their completion (Kulejewski 2008; Paslawski 2008).

One of the main problems generating difficulties in the development of housing projects is flawed legislation and bureaucratic inertia (Kulejewski 2008; Sobieraj 2019, 2020). It should be made clear that the key moment for any investment project is to obtain administrative permits for its implementation.

In the literature, one can come across systemic approaches to the investment process. They refer to systems as such (Jemielniak and Koźmiński 2011), project management like, for example, PRINCE 2 methodology or PMBOK standard (Górski et al. 2010), project manager competences (Sobieraj 2020), for example IPMA - NCB Baseline (Trocki 2017), tools and approaches (for example agile management, lean management), overview of housing finance systems (Bryx 2006), risk-sided assessments (Bryx 2006; Skorupka 2008), flexibility (Paslawski 2008) and/or the legal perspective (Grzywiński 2015). There are also more comprehensive studies addressing housing projects management as a whole, and more specifically covering procedural approaches (which in our opinion are the most readable, especially for construction practitioners), for example: *The National system of management of construction investment projects financed with the participation of public and EU aid funds* (Kulejewski 2008) or the management of an investment project in the housing market. Also, it is impossible not to mention, that the whole housing sector is conditioned to a certain extent by the influence of macroeconomic factors which determine its functioning. This problem has been studied by Adams and Füss (2010), based on panel data covering 15 countries over 30 years. For comparison, Renigier-Biłozor et al. (2014) presented the importance of the macro environment for the condition of the local housing market.

To the best of the authors' knowledge, no one has so far undertaken a detailed study examining how to effectively manage housing projects. In this paper we try to fill this gap relying on existing dispersed knowledge, our own experience as practitioners running one of the housing construction companies, having experience in a number investment projects, and more importantly, resorting to a thorough survey conducted among the top level managers involved in housing projects in Poland. The survey itself has been designed by ourselves in such a way so as to address the most important problems of housing construction projects in Poland (it includes 73 variables contained in 12 questions).

Being aware of the problems in the housing industry, and more importantly noticing that there is a theoretical gap in this regard, and certain insufficiency of practical solutions in the market, is what has led us to face these problems and examine the factors underpinning success of investment projects in the housing industry. In particular, we have designed and conducted a survey, taking into account as many questions covering the problems of Polish housing construction as possible.

The questionnaire-based analysis of housing construction managers' opinions that we rely on in our study not only allows us to group many variables (behind successful management) into several factors, but also to look at these factors in terms of a certain hierarchy of importance. This hierarchy can be seen as a percentage of the explained variance, a measure that explains how much of the variation of the exogenous variable (the

phenomenon under study) can be explained by means of individual factors (i.e. from the perspective of managers in the industry) and what variables are hidden behind these factors. In other words, the aim of this study is to show how managers see the examined phenomenon and what is really important for them. And more importantly, what issues/problems they are paying attention to. This type of research constitutes certain value for both managers from construction industry who deal with this type of phenomena, but also for policymakers who make law, shape the housing construction-investment policies and have the power to improve certain issues, hopefully based on the knowledge that comes from this study, which shows what is important for professionals from the construction industry, i.e. specialists, experts, managers, project managers, site managers, and so on.

Literature review

In a project-oriented industry such as construction in its broadest sense, an adequate knowledge of effective project management is an absolute must (Isik et al. 2009). The key to success for any construction project is to identify and understand the factors that affect it. Such knowledge and proper management allow project managers and project teams to significantly increase their chances of achieving successes in project implementation (Zwikael 2009).

The term CSF or CPSF (Critical Project Success Factors) was first introduced by J.F. Rockart in the early 1980s (Rockart 1982) and in essence, refers to the factors determining projects' success. The topic was later addressed by several scientists who studied the construction industry (Sanvido et al. 1992; Metri 2005; Toor and Ogunlana 2009; Banihashemi et al. 2017). In general, the most important CPSFs are those that are related to professionals working on projects' preparation and implementation (for example site manager, project manager, and so on), factors related to projects' procedures, project management with all related activities, and all factors associated with external environment (i.e. so-called non-controllable variables).

Managing investment processes in the housing construction has always been quite of a challenge for the building sector. There are not that many studies in the literature, however, which analyse the issues related to housing construction industry in more detail. Nevertheless, a few studies deserve to be indicated. For example, Jaafar et al. (2016) examined internal factors of Malaysian residential developers, and more specifically their particular management capabilities. They highlighted limited interest of construction analysts and experts in strategic management issues related to housing construction. In order to obtain relevant data for their qualitative study, they conducted 10 partially structured snowball type interviews. They pointed out that the categories of residential developers' opportunities include planning and business strategy, marketing, project management, financial management and networking. The interviews that they conducted shed new light on the capabilities of housing construction practitioners. The study argues the need to combine the use of intangible assets in order to maintain the highest efficiency possible. It also highlights the importance of the impact of management capabilities of residential developers on the success of their activities.

In turn, Sobieraj (2011) portrayed an example of such infrastructural PPP project implemented on the Polish residential market. He noted that despite the amendment of the Public-Private Partnership Act in 2008, the cooperation of public and private partners in the implementation of joint infrastructural projects in Poland still arouses controversy and resistance. On

the one hand, this is due to officials who are afraid to take the appropriate risks and responsibilities, but on the other hand, it is due to a lack of knowledge of how such organisationally complex projects are implemented. In fact, the importance of PPP projects has been highlighted by scientists from various parts of the world. Kavishe et al. (2019) pointed to the importance of public-private partnerships (PPPs) for the housing construction sector, particularly in the developing countries such as Tanzania. They stressed the relevance of the impact of costs, affordability, sustainability and related benefits on the implementation of PPP housing projects (PPPH). With regards to the sustainability factors mentioned above, the great advantage and benefit is the mere embarkation on a sustainability assessment from the feasibility phase. Kavishe et al. (2019) also highlighted the advantages of taking into account the durability of construction works when assessing the feasibility of a project. In their article they relied on a survey involving the participation of 28 stakeholders operating on Tanzanian market. They used frequency analysis and individual t-tests to rank and identify relevant factors and results of PPPH implementation. Among other things, they pointed out the superiority (advantage) of building with the use of the public procurement method under PPP in comparison with traditional methods, inter alia, by generating greater savings thanks to such public-private partnerships. Moreover, they argued that PPPs achieve much better price-to-quality ratios and better results in shaping the supply of housing estates themselves. In other words, PPPs allow more housing to be finalised faster and delivered to the market in a much shorter timeframe. Kavishe et al. (2019) also stressed the importance of such critical success factors (CSFs) for housing projects as participation of the private sector in innovations, development of management skills, risk management, achievement of appropriate price-quality ratios, which, in their opinion, can be achieved better and faster thanks to public-private partnerships. The results of Kavishe et al. (2019) study provide better understanding of relevant PPP policies, while practitioners can better understand the key success factors of PPP housing projects. It is also worth recalling the study of Muhammad and Johar (2019), who, similarly to Kavishe et al. (2019), investigated the use of public-private partnerships for housing projects, and found that application of PPP strategy does not necessarily produce better results. In their opinion, in order for a project to be successful, very specific contextual and environmental issues turn out to be relevant, dictating relative importance of the common strategic framework for PPP, which becomes particularly important in the case of developing countries, such as Malaysia or Nigeria. More importantly, Muhammad and Johar (2019) emphasise the importance of the context specificity of various administrative conditions, which is also the case in Poland, where legal-administrative and environmental issues (i.e. those that depend to a large extent on public administration, and proper implementation of executive acts) play a key role in successful implementation of construction projects. Muhammad and Johar (2019) relied in their study on the case study approach and analysed similarities and differences of the critical success factors affecting satisfactory completion of housing construction projects. Their study showed contextual results i.e. different for Nigeria and different for Malaysian market. In the case of the former, for example, it seemed that the CSFs were such as 'equitable risk allocation', 'stable political system' and 'reputable developer', and in the latter case CSFs included 'action against errant developer', 'consistent monitoring' and 'house buyer's demand'. In other words, these were the CSFs that had the greatest impact on the successes of housing projects in the above-mentioned countries. Muhammad and Johar's (2019) study also shows that construction market is so complex

that scientists cannot find consensus with respect to the list of common factors determining the success of housing construction projects. In other words, success should be considered contextually and, ideally, researchers should seek for commonalities between different environments (i.e. different countries). Therefore, the assessment of CSFs for the Polish market can be viewed as an extension of this knowledge with the context of the Polish housing construction industry.

Also worth noting is the study of Ulubeyli et al. (2015), who performed a survey based on the questionnaire conducted among 42 residents (i.e. end-users) and seven top construction project managers. In their study they put forward a detailed process of 'implementing quality functions' involving ultra-luxurious villa projects. The authors explained the perspective of project managers themselves, but also that of end-users, who can be perceived as stakeholders in the housing construction projects (i.e. they are associated with the operation phase). Their results allow for better understanding of the real expectations of high income customers. The survey shows that quality of completed facilities is of great importance for projects' success, and that customers (i.e. real estate buyers) have specific expectations related to quality, which are reflected in their feelings towards specific amenities in building complexes to be delivered. The Ulubeyli et al. (2015) study shows that for wealthy customers, 'safety of the complex', 'architectural design', and 'quality of final products' turn out to be essential. The Ulubeyli et al. (2015) study also argues that if customers' expectations as to certain parameters of the projects to be implemented coincide with better technical standards resulting from the implementation of such projects (for example the 'common areas of use', amenities, i.e. sports facilities, fitness centres, saunas, children's playgrounds and 'quality of final products'), then such projects are more likely to be completed successfully, which will be reflected in a greater customer satisfaction, but also in a greater demand for this type of housing units. In their paper Ulubeyli et al. (2015) discussed 25 expectations and associated findings constituting preliminary guidelines for the construction companies' agenda so that they improve their marketing practices and thereby also their projects' results.

Of particular interest is also the study performed by Hwang et al. (2013) who examined critical factors influencing the timeline for public housing projects in Singapore. They found that 'construction management', 'coordination between different parties' and 'availability of workers on site' are the three most important factors influencing time schedules of housing projects in Singapore. Pan et al. (2012) conducted a survey of the six largest UK construction companies (from the housing sector) and identified the criteria (grouped by cost, time, quality, health and safety, sustainability, processes, public procurement and legal and statutory acceptance) to help housing companies manage technological innovation and thereby also make more conscious corporate decisions. In turn, Panibratov and Larionov (2013) studied development of housing companies in Russia and identified the main problem of their functioning and sustainability. These turned out to be complications in shaping market relations, low investment activity, variously targeted economic interests of construction market participants, weak role of the state in management of the economic system, and in particular, low efficiency of the entire construction industry, insufficient reliability of functioning of many construction organisations, lack of a clear system of the interaction between capital market participants at the federal and regional level, and exceptionally low labour productivity. They revealed the main impediments to the activities of construction organisations, such as high tax levels, financial

insolvency of customers, high costs of materials, construction, articles and lack of financing. Also, Shin et al. (2008) showed how the use of new information technologies could contribute to the development of the housing industry in Korea.

In more general terms, Chan et al. (2004) studied the implementation of construction projects and presented a conceptual framework for critical success factors. They identified five groups of independent variables, namely (1) project-related factors, (2) project procedures, (3) project management activities, (4) human factors, and (5) external environment. They also pointed to the need for further research on Key Performance Indicators (KPIs) and for finding causal links between CSFs and KPIs, indicating those correlations as a useful source of information on successful project implementation.

Reaching for even older studies, we can indicate Odeyinka and Yusif (1997) who examined the perception of the causes of delays in the housing sector on the basis of a general contractors' survey in Nigeria. Also, Sullivan and Harris (1986) conducted surveys and interviews (relying on questionnaires) with major construction customers, contractors and consultants in order to get their views on the results of major contemporary construction projects and the problems faced by contractors while they were working on their projects. Of course, these are only a few examples.

As technology progresses and societies continue to develop, construction projects naturally take on their scale, involving *a huge number of professionals, long life cycles, complex systems that interact with each other and support investment processes* (Jui-Sheng and Jung-Ghun 2012). For this reason, it becomes increasingly important to understand in depth the factors that determine their success or fiasco. What is also worth noting is an increasing complexity of operational construction processes. This is influenced by development of technology, which touches the construction industry (like many other sectors) and the accompanying growing amount of information (i.e. big data), which has to be managed in some sensible way. All this makes the implementation of new construction projects require highly specialised knowledge and skills. Traditional operational processes used in the construction industry until recently, lose their importance and may prove to be of little use in solving existing problems. In response to these challenges there is such a field of knowledge as project management, which supports the implementation of investment projects (Chan et al. 2004; Chen and Partington 2006; Kapliński and Dziadosz 2011; Głodziński 2014; Walker 2015). The rapid changes currently affecting the entire construction industry urgently require engineers and experts to be able to use the right tools (for example BIM technology, materials engineering solutions, VR/AR technologies, 3D printing technology, machine learning, Internet of Things solutions, and so on) so that they can implement the right project management techniques in practice (Driver 2019). The rapid progress in management science leads to the reorganisation of project management experiences into a complete knowledge system (Indelicato 2009). According to Kapliński and Dziadosz (2011), project management facilitates the coordination of operational activities in the life cycle of an investment project (Kapliński and Dziadosz 2011). When it comes to engineering projects, construction processes can be analysed in terms of the five main stages, namely feasibility studies (1), planning (2), design (3), project implementation (4), and operation (5). Each stage can also be viewed as a single project, meaning that each stage creates a unique product or service and carries certain value added.

Last but not least, the implementation of housing construction projects should be conducted with the use of a process

system (Bryx 2006). Such system indicates individual phases and stages of the investment project in progress. Without a processual approach it is difficult for a project to succeed (Bryx 2006). It is commonly assumed that an investment process is a combination of many different activities and factors that are necessary to carry out a specific construction project (Biliński 2007; Połński 2009; Biliński 2010a, 2010b; Dzierżewicz and Dylewski 2011; Gołaszewski and Stolarczyk 2011; Górski and Skorupka 2011; Zabielski 2014; Baryłka and Baryłka 2015; Obolewicz 2016). The literature contains many studies on processual models of investment projects (Adams and Barndt 1983; Pinto and Slevin 1987; Behrens and Hawranek 1991; Burton and Michael 1999; Trocki et al. 2009). What is worth emphasising, however, and what Bryx (2006) very aptly points out, is that the management of an investment processes is closely linked, and thereby dependent on the macro-environment, i.e. the political, legal, economic and social systems in which the company operates.

Knowledge gap

The scientific objective of this paper is to study the factors influencing successful management of investment processes in the housing construction industry from the perspective of top level managers in the housing sector. Such knowledge would form a basis for better understanding of investment process management in this particular sub-sector of the construction industry.

This paper tries to identify such CSFs, looking through the optics of Polish construction companies' managers operating on the housing construction market. It is worth noting that the literature on the subject lacks a comprehensive study that would take up this topic, looking at it through an empirical prism. Therefore, the purpose of this study is to cover this gap.

This paper contributes to the literature on investment project management in two fundamental ways. Firstly, it provides a thorough review of the literature with regards to housing construction project management. Secondly, it gives an answer to the question as to what an effective housing construction project management may depend on. We include variables that, although theoretically were previously considered by some authors, have never been put into practice before in the form of such a large set of variables. Previous studies address more specific variables which are not necessarily related to housing construction specificities. More specifically, we introduce a set of variables that measure management performance in the above mentioned domains. In this regard, previous studies have covered only few aspects and very selectively. Our survey consists of 12 questions (including 4 metric questions), characterised by 73 variables. We use the Exploratory Factor Analysis (EFA) technique, which allows to reduce the number of variables and addresses the key factors influencing the effectiveness of housing construction project management.

In multivariate statistics, EFA is a statistical method used to uncover the underlying structure of a relatively large set of variables. Its overarching goal is to identify the underlying relationships between measured variables. While many scientists are convinced of the superiority of such methods as CFA (Confirmatory Factor Analysis) or SEM (Structural Equation Modeling), there are some strong points of the EFA method that cannot be overlooked. And so whereas CFA and SEM are deemed to be superior in factor creation, hypothesis testing (they attempt to confirm hypotheses and use path analysis diagrams to represent variables and factors), the EFA method uncovers complex patterns by exploring the dataset itself. It also allows for

assignment to specific groups of questionnaire variables, a specific order of priority, which depends on the eigenvalues-related percentage of explained variation.

Previous studies are largely problem-specific, i.e. they address specific aspects of the problem. This may be due to the fact that conducting thorough questionnaire surveys is not only very difficult, but also very time consuming and expensive. In our study, based on a thorough review of the literature, we selected 73 variables and then conducted the survey in 192 companies. Table 1 wraps up the key project success factors in the literature. We aimed to see how successful construction processes are perceived by industry professionals. In this way, it is possible to understand and explain in a scientific way the issues on which effective management of construction projects depend on (in the case of our survey, it is the housing market, but a similar survey can be conducted with regards to the whole construction industry). Responses in the questionnaires come from top level managers themselves and from industry experts. By identifying a number of factors, we want to reduce the level of perception of some specific issues related to the industry and assign certain importance to them. Hence, one of our aims is to reduce these numerous variables and find in them some hidden structure that will allow us to better understand the issue of successful project management.

Methodology of the study

For the purposes of our analysis we apply a diagnostic survey methodology. Pilch (1995) describes it as *the method of accumulating knowledge about structural and functional attributes and dynamics of social phenomena, opinions and views of selected groups, intensification and directions of development of specific phenomena and all other phenomena not located institutionally - of educational significance - based on a specially selected group representing the general population in which a given phenomenon occurs*.

Questionnaire survey

The questionnaire contains a metric and a list of relevant questions. More accurately, it breaks down into 12 questions (including 4 metric questions), characterised by 73 variables. The questions and variables behind them have been selected following a review of the literature. Table 1 shows a summary of relevant variables, described in the literature, which have been included in the questionnaire.

The responses concern respondents' opinions on key factors influencing the implementation of housing construction-investment projects on the Polish housing construction market. Attempts were also made to determine the essential characteristics of companies engaged in investment processes and the use of investment project management methodologies. There were also questions with regards to specific companies' characteristics such as location, size, age of the organisation and the number of investment projects completed in the last 5 years.

The study involved comparisons taking into account 73 variables recorded on the Likert scale (1 ÷ 7). The categories of answers in the questionnaire were as follows: (1) I definitely agree, (2) I agree, (3) I rather agree, (4) it is difficult to say, (5) I rather disagree, (6) I do not agree, (7) I strongly disagree. Respondents were asked to mark their answers in one of the categories. Only one anonymous and impersonal survey was conducted in each company and none of the questionnaires was rejected due to erroneous completion by respondents.

Table 1. Key project success factors in the literature.

	Competence of the project manager, project planning over time, control and liability systems, communication, monitoring and feedback, continuous involvement in the project
Sayles and Chandler (1971)	
Martin (1976)	Definition of objectives, selection of the organisation's project philosophy, general management support, organisation and delegation of authority, project team selection, provision of sufficient resources, provision of information and control mechanisms, mandatory planning and reviews
Cleland and King (1983)	Project description, operating concept, support of the senior management, financial support, logistical requirements, support of the construction backup facilities, market research, project time schedules, executive development and staff training, manpower and organisation, communication and information channels, project review
Baker et al. (1983)	Precise objectives, project team's involvement in achievement of the objective, local Project Manager, sufficient project funding, sufficient capacity of the project team, exact project cost estimates, minimal difficulties encountered during the initial phase of the project, project planning and control techniques, task orientation, lack of bureaucracy
Locke (1984)	Dissemination of information on project implementation, delegation of authority on projects, appointment of a competent project manager, establishment of procedures and information flows, establishment of project control mechanisms, organisation of project progress assessment meetings
Pinto (1986)	Project mission, support for senior management, project plans, time schedules, cooperation with the client, personnel, technical tasks, customer acceptance, monitoring and feedback, communication, fault detection and correction
Standish Group (1998)	End-user involvement, support for senior management, precise business objectives, experienced project manager, small milestones, stable basic requirements, competent personnel, proper planning, project ownership
Spalek (2004)	Appointment of a project manager, competencies of the project manager, high authority of the project manager, clearly defined project objective, establishment of the project team, support of the company's management for the project
Standish Group (2009)	End-user involvement, support for senior management, precise business objectives, emotional maturity, optimal scope, adaptive processes, expert support, high quality resources, implementation, tools and infrastructure
Pan et al. (2012)	Costs, time schedules, quality, health and safety, sustainability, processes, public procurement and legal, statutory acceptance
Hwang et al. (2013)	Construction management, coordination between different parties, availability of workers on site
Panibratov and Larionov (2013)	Complications in shaping market relations, low investment activity, variously targeted economic interests of construction market participants, role of the state in management of the economic system, efficiency of entire construction industry, reliability of functioning of many construction organisations, clear system of the interaction between capital market participants at the state and regional levels, labour productivity
Ulubeyli et al. (2015)	Quality of completed facilities, capability to meet customers' expectations related to quality, safety of the complex, architectural design, quality of final products
Jaafar et al. (2016)	Planning, business strategy, marketing, project management, financial management, networking, management capabilities, use of intangible assets
Kavishe et al. (2019)	PPP importance, sustainability assessment from the feasibility phase, durability of construction works
Muhammad and Johar (2019)	PPP importance, context specificity of various administrative conditions, legal-administrative and environmental issues, equitable risk allocation, stable political system, reputable developer, action against errant developer, consistent monitoring

Exploratory factor analysis (EFA)

The obtained results of the questionnaire survey were verified with the use of a statistical approach called Exploratory Factor Analysis (EFA). EFA is employed to investigate the internal relationships between a large number of individual variables and to describe them with a smaller number of hidden factors. The examined factors are initially unknown, but they are determined by analysing the values of random variables. Therefore, the aim of the EFA method is to reduce the number of variables used in the questionnaire study so as to find a new set of factors, less numerous than the original set of variables, yet still expressing the relationships between observable variables (Szttemberg 2008).

The literature, including that on the construction industry, does not lack surveys, the results of which would be analysed with the use of this method. For example, Sui Pheng and Yuquan (2002) thanks to the exploratory factor analysis, extrapolated the intercultural dimensions resulting from cultural differences between Singapore and China in the context of construction projects. Peansupap and Walker (2005) employed the EFA method to explore and identify factors affecting adoption and implementation of information and communication technology (ICT) in large ICT-experienced Australian construction organisations. Chan (2012) surveyed managers of large contractors in Hong Kong and then with the use of the EFA highlighted the principal factors affecting construction project overheads. These are, of course, only a few examples, of which there are many more.

Selection and characteristics of the study sample

Empirical studies (pilot and actual ones) were carried out on a specific sample, called the non-probabilistic selection.¹ When selecting respondents to the survey, they were expected to have a greater knowledge of the issues related to the analysed phenomenon. In order to ensure as much representativeness and adequacy of the targeted sample as possible, reliable surveys were conducted among 192 representatives of the management staff coming from the housing construction companies operating in Poland. The survey was conducted between October 2012 and September 2013. It was performed according to a specific schedule, which divided the research activities into the following stages. First stage consisted of the elaboration of methodological assumptions, based on numerous interviews with people from the industry. Second stage involved the development and implementation of the questionnaire. It also comprised the formulation and selection of appropriate questionnaire questions so that they were adjusted to the respondents' level of knowledge. The third stage concerned the elaboration and verification of collected survey material, consisting of both quantitative and qualitative data analysis.

Direct interviews with the managerial staff and participatory observations were conducted as part of the qualitative study. More specifically, the interviews were performed with the owners and representatives of the highest management of companies from the housing construction sector, responsible for making strategic decisions concerning investments and development

policies, and having an appropriate level of practical knowledge in the area of investment project management.

The research sample consisted of respondents from micro, small, medium and large companies from all over Poland. Over 26% (51 respondents) were respondents from Mazowieckie Voivodeship, over 5–6% were respondents from Kujawsko-Pomorskie, Świętokrzyskie, Dolnośląskie, Podkarpackie, Podlaskie, Pomorskie, Śląskie or Warmińsko-Mazurskie regions. The least numerous represented was Zachodniopomorskie region (2.6%). The structure of the survey presented below shows certain level diversity in terms of the number of people employed in the surveyed companies. As shown in Table 2, the most numerous were small companies (with 11 to 50 employees), constituting 35.42% of the surveyed sample and medium companies (with 51 to 250 employees), constituting 31.77% of the surveyed sample, respectively.

Table 3 shows the structure of the research sample in terms of the number of completed investment projects in the last 5 years by residential buildings, UFA (usable floor area), UFAS (usable floor area of services), TFA (total floor area) and parking spaces.

Results

The results of the questionnaire survey were verified with the use of the EFA method. Typically, this statistical approach is employed to study internal relationships between a large number of distinguished variables so as to describe them with a reduced number of hidden factors (Coakes and Steed 2009). These factors are initially unknown, and they are identified through analysis of the values of random variables. The analysis of the questionnaire responses aims at determining which variables form such a hidden data structure and can be described with a relatively simple mathematical model. In our study, all statistical calculations were performed with the use of SPSS package. The mathematical basis of the EFA is a determination of the eigenvalues of correlation matrix that is established on the basis of the questionnaires' results. For determination of eigenvalues we apply the principal components analysis (PCA), the results of which are then verified by means of the principal axes factor (PAF) method. Furthermore, we verify the results, with the use of the centroid method of factor extraction. The distinction between these two methods is subtle and boils down to small differences in the values of individual factor loadings. To optimise the loadings we use the varimax and quartimax rotation. However, there is a certain criteria for testing data so as to ascertain that exploratory factor analysis is an appropriate statistical method. As indicated by Pallant (2001), correlation coefficients for individual variables must have at least one factor which is higher than 0.30 (Peansupap and Walker 2005). In our analysis, all variables have correlation coefficients greater than 0.30. In addition, the measure of sample adequacy, which is reflected in the Kaiser-Meyer-Olkin (KMO) value is 0.568, and the Bartlett's test for sphericity proves to be significant. Therefore, for our data set the use of factor analysis is considered to be appropriate. The Bartlett's and KMO's test values are summarised in Table 4. Table 5 shows all eigenvalues obtained with the use of the PCA method. As you can see the first factor is dominant and explains almost 26% of the variance; the second one explains 10% while the third and fourth ones represent a mere 6% and 5%, respectively. Eigenvalues smaller than 1 are not taken into account. We use both PCA and PAF methods and quartimax rotation for factor extraction to perform appropriate calculations. The results show 18 factors with eigenvalues above 1, which account for 81.32% of

Table 2. Structure of the survey sample by voivodeship and company age.

VOIVODESHIP	Company age [in years]						Total
	1–10	11–20	21–30	31–40	41–50	Over 51	
dolnośląskie	7	4					11
kujawsko-pomorskie	5	3	4	1			13
lubelskie	3		3	1			7
lubuskie	5	2				1	8
łódzkie		6			1	1	8
małopolskie	3	1	3	1	1		9
mazowieckie	2	22	15	3	5	4	51
opolskie	3	2	1	1			7
podkarpackie	2	6		1	1		10
podlaskie	2	4	2		1	2	11
pomorskie	3	3	2		1	2	11
śląskie	3	2	3	2			10
świętokrzyskie	3	2	4		1	2	12
warmińsko-mazurskie		5	4			1	10
wielkopolskie		6	2			1	9
zachodniopomorskie	1	2	2				5
Total	42	70	45	10	11	14	192

the cumulative variance. Moreover, an additional analysis of the number of factors is conducted, taking into account the Cattell's criterion, also known as the Scree test. It indicates one dominant factor and a large number of factors of lesser relevance. All in all, instead of 10–12 important factors, it seemed reasonable to limit the number of factors to only 4–5, even at the expense of a weaker representation of the phenomenon under study. The model with four factors describes less than 50% of the explained variance. To better understand and explain these factors, we used the quartimax rotation. As a result, 35 variables were grouped into 4 factors. In order to examine the reliability of variables in one factor, we perform the Cronbach's Alpha analysis (Pallant 2001). It is a measure of internal consistency, that is, how closely related a set of items are as a group. In other words, it examines the similarity between responses to individual questions in the questionnaire. Cronbach's alpha is considered to be a measure of scale reliability. In the case of our analysis Factors 1–4 fell within 0.60 or higher range indicating that they are reliable. Also, the KMO (0.781) turns out to be higher than the required minimum of 0.5. To sum up, the EFA method showed the existence of a hidden structure which can be expressed by the following factors:

- the first factor is a dominant one and is characterised by the following variables: selection of an experienced project manager (var. 10), thorough risk evaluation of project initiation (var. 13), time schedule and detailed specification of the various stages of project implementation and any predictable events between its stages (var. 14), professional business plan with projections of costs, profits and financial cash flows (var. 15), flexible, well-developed implementation plan (var. 16), good register of documents (var. 17), knowledge and competences of employees (var. 18), the scope and structure of activities (var. 19), stability of the economic system (var. 20), stability of the social system (var. 22), stability of the legal system (var. 23), good cooperation with stakeholders (var. 25), length of service (var. 27), professional experience gained on major national construction sites (var. 31), personal traits such as creativity, curiosity, openness to novelties (var. 32), access to talents such as quick association of facts, quick memorisation of many information from their first reading, innovative mind, ability to solve unexpectedly occurring problems, ability to avoid panic in crisis situations (var. 33), experience and knowledge of the markets on which investments work is to be performed (var. 41), availability of efficient transport

Table 3. Structure of the survey sample by the number of completed investment projects, UFA, UFAS, TFA and parking spaces.

	Number or space	Number of companies
Residential buildings constructed in the last 5 years	1–20	60
	21–40	12
	41–60	11
	61–80	0
	Over 81	6
UFA in the last five years	1–50,000	41
	50,001–100,000	9
	100,001–200,000	9
	200,001–300,000	7
	300,001–400,000	3
	400,001–500,000	5
	500,001–600,000	1
	600,001–700,000	N/A
	Over 70,000	1
UFAS in the last 5 years	1–10,000	34
	10,001–50,000	11
	50,001–100,000	2
	100,001–200,000	N/A
	200,001–300,000	2
	300,001–400,000	N/A
	400,001–500,000	1
TFA in the last five years	Over 500,001	N/A
	1–50,000	30
	50,001–100,000	5
	100,001–200,000	5
	200,001–300,000	5
	300,001–400,000	2
	400,001–500,000	2
	500,001–700,000	1
	700,001–900,000	6
	Over 900,000	2
Parking spaces	1–1000	38
	1001–5000	24
	5001–10,000	9
	10,001–20,000	4
	20,001–30,000	N/A
	30,001–40,000	1

infrastructure (var. 45), positive annual GDP growth (var. 48), stable exchange rates (var. 49), long-term stability of laws and regulations (var. 50), political stability in the country (var. 51), balance between an increase in consumption and production growth (var. 52), legal system tailored to the needs of conducting business activity (var. 54), behavioural standards adopted in the society (var. 69);

- the second factor is described by such variables as well-developed democracy (var. 59), adequate and sustainable pension system (var. 62), active pro-family policy of the state (var. 63), and active pro-social policy of the state (var. 64);
- the third factor comprises the following variables: business activity relying on advanced technologies (var. 37), business activity associated with academic centres in the field of construction/Polytechnics, Engineering Schools, and so on/(var. 38), business activity associated with academic centres in the field of management, economics in construction (var. 39);
- the fourth factor is characterised by the following variables: activity associated with the provision of construction services (var. 34), activity related to construction production (var. 35), business activity linked to the financial sector (var. 36).

All in all, the four revealed factors account for almost 50% of the variability of the variables captured by this structure. It is worth noting that the first factor explains 25.7% of the variance and is the dominant one in the adopted structure, the second

Table 4. Values of the Bartlett and KMO test indices for 73 variables.

	Chi-square	18,458.990
	Degrees of freedom	2628
Bartlett's test of sphericity	Significance	0.000
KMO		0.568

one – about 10% of the variance, the third one slightly more than 6%, and fourth – almost 5%. The next stage involves assigning names to the factors identified with the use of EFA. It is supposed to reflect all variables described by a given factor and the strength of the factor-variable relation. There are four factors identified in the study, which break down further into constituent variables (see Figure 1):

1. Company's activity in the market environment (intellectual capital of the company, flexible plan and time schedule for project implementation, macro-environment of the company).
2. Pro-social policy of the state (active pro-family and housing policy, active housing policy of the state/article 75 of the Constitution of the Republic of Poland/).
3. Advanced technologies (access to academic centres, business activity based on highly developed technologies).
4. Area of market relations (provision of construction services, access to financing).

In a nutshell, the dominant factor in efficient and effective management of the investment processes on the very competitive Polish housing construction market is the factor 'company's activity in the market environment', represented by the following subgroup of factors: intellectual capital of the company, flexible project plan and time schedule for project implementation, and macro-environment of the company. Moreover, the analysis showed the existence of several other factors of lesser rank, i.e. pro-social policy of the state, access to advanced technologies and the area of market relations. Each of these factors has been characterised by means of specific variables, taking into account the nature of the studied phenomenon. A summary of the most important factors classified by groups is shown in Table 6.

Discussion

The empirical research proved that the selected four factors, i.e. *activity of companies in the market environment* (1), *pro-social policy of the state* (2), *advanced technologies* (3) or the *area of market relations* (4) seem to be pivotal from the perspective of companies operating on the Polish housing construction sector. Notably, the dominant factor deserves special attention, since the EFA performed in our study showed its key role. This factor concerns the creation of companies' intellectual potential for flexible planning, development, and implementation of investment projects in a dynamically changing macro-environment conditions. Behind this factor there are the following variables (representing a great portion of the variability of the studied phenomenon), namely the selection of an experienced project manager, project launch risk evaluation, proper time schedule elaboration and detailed specification of project implementation stages, elaboration of a professional business plan, projections of costs, profits and financial cash flows, well-developed and flexible implementation plan, good register of documents, knowledge and competences of employees, proper scope and structure of activities, stability of the economic, social and legal systems, good cooperation with stakeholders, length of service, professional experience gained on major national construction sites, employees' personal traits: creativity, curiosity, openness to novelties, quick association of facts, quick memorisation of many

Table 5. Eigenvalues of the correlation matrix with the use of PCA method.

Eigenvalues				Eigenvalues			
Factor	Eigen value	% of the explained variance	Cumulative % of the explained variance	Factor	Eigen value	% of the explained variance	Cumulative % of the explained variance
1	18.765	25.706	25.706	38	0.278	0.381	96.176
2	7.264	9.950	35.656	39	0.270	0.370	96.546
3	4.521	6.193	41.850	40	0.233	0.319	96.865
4	3.636	4.980	46.830	41	0.219	0.300	97.165
5	3.299	4.519	51.349	42	0.205	0.281	97.446
6	2.872	3.934	55.283	43	0.197	0.270	97.716
7	2.573	3.525	58.808	44	0.178	0.244	97.960
8	2.264	3.101	61.909	45	0.165	0.226	98.186
9	2.028	2.778	64.687	46	0.155	0.212	98.398
10	1.805	2.472	67.160	47	0.144	0.198	98.596
11	1.588	2.175	69.335	48	0.120	0.164	98.760
12	1.545	2.116	71.451	49	0.104	0.142	98.902
13	1.401	1.919	73.370	50	0.095	0.130	99.031
14	1.280	1.754	75.124	51	0.090	0.123	99.155
15	1.224	1.676	76.800	52	0.085	0.116	99.271
16	1.184	1.621	78.421	53	0.072	0.098	99.369
17	1.094	1.498	79.919	54	0.063	0.086	99.455
18	1.024	1.403	81.323	55	0.059	0.081	99.535
19	0.873	1.196	82.519	56	0.049	0.067	99.602
20	0.847	1.161	83.680	57	0.046	0.062	99.664
21	0.815	1.116	84.796	58	0.041	0.056	99.720
22	0.768	1.052	85.848	59	0.031	0.043	99.763
23	0.693	0.949	86.797	60	0.030	0.041	99.804
24	0.671	0.920	87.717	61	0.024	0.033	99.837
25	0.640	0.876	88.593	62	0.022	0.030	99.867
26	0.610	0.835	89.429	63	0.018	0.025	99.892
27	0.570	0.781	90.209	64	0.016	0.021	99.913
28	0.545	0.747	90.956	65	0.015	0.020	99.934
29	0.494	0.676	91.633	66	0.011	0.014	99.948
30	0.479	0.656	92.289	67	0.010	0.013	99.962
31	0.442	0.605	92.894	68	0.008	0.011	99.973
32	0.411	0.564	93.458	69	0.007	0.009	99.982
33	0.384	0.527	93.984	70	0.004	0.006	99.987
34	0.361	0.494	94.479	71	0.004	0.005	99.993
35	0.345	0.473	94.952	72	0.003	0.004	99.997
36	0.314	0.430	95.382	73	0.002	0.003	100.000
37	0.301	0.412	95.794				

information, innovative mind, ability to solve unexpectedly occurring problems, ability to avoid panic in crisis situations, experience and knowledge of the markets, availability of efficient transport infrastructure, long-term stability of laws and regulations, political stability in the country, balance between an increase in consumption and production growth, legal system tailored to the needs of conducting business activities, behavioural standards adopted in the society.

Our study and the key CSFs that determine the success of housing projects on the Polish market are basically the same as the ones that had already been presented by many scientists who had studied the construction industry, including Sanvido et al. (1992), Metri (2005), Toor and Ogunlana (2009), Banihashemi et al. (2017) just to mention a few. Most of these scientists pointed to factors related to specialists working on the preparation and implementation of projects (for example site manager, project manager, and so on), factors related to project procedures, project management with all related activities and all factors related to the external environment. This was also indicated by most of our respondents who took part in the questionnaire survey.

Also, similarly to the Muhammad and Johar's (2019) study for the Nigerian and Malaysian markets, variables such as *risk allocation* and *stable political system* were identified as critical factors. Of course, different markets are involved here, but it is impossible not to notice certain similarities in the CSFs, which

had the greatest impact on the success of housing projects in the above mentioned countries. Although our survey did not cover questions related to projects implemented under the PPP model (we pointed earlier to the papers by Kavishe et al. (2019) and Muhammad and Johar (2019) who had raised this issue as an important one), most construction managers in Poland also indicate them (i.e. PPPH) as important and point to their pivotal role in the growing housing construction market in Poland (Sobieraj 2020).

Many of the CSFs addressed by our questionnaire respondents indicate the importance of the soft management approach for the Polish housing construction market, i.e. the one in which aspects such as flexibility, competence, delegation, knowledge building, communication management, motivation, commitment to work, quality of work and leadership play an important role. Moreover, the practical conclusion we come to is that many of the variables that can be described by this dominant factor are indicative that project managers in the Polish housing market should opt for a project management methodology such as PRINCE2 rather than PMBoK. In the Polish literature this topic was explored by Górski et al. (2010) and more recently by Sobieraj (2020), who compared both methodologies in the context of investment project management. Generally, PMBoK is a reference guide that shows how to manage a project, but it also addresses the activities of the project manager (PMI 2008).

Table 6. The result of factor analysis (Extraction method - Principal Component Analysis and Rotation Method: Varimax with Kaiser Normalisation).

Variable	F1	F2	F3	F4
Selection of an experienced project manager	0.592			
Thorough risk evaluation of project initiation	0.575			
Time schedule and detailed specification of the various stages of project implementation and any predictable events between its stages	0.687			
Professional business plan with projections of costs, profits and financial cash flows	0.604			
Flexible, well-developed implementation plan	0.688			
Good register of documents	0.634			
Knowledge and competences of employees	0.803			
The scope and structure of activities	0.664			
Stability of the economic system	0.548			
Stability of the social system	0.574			
Stability of the legal system	0.783			
Good cooperation with stakeholders	0.543			
Length of service	0.580			
Professional experience gained on major national construction sites	0.698			
Personal traits such as creativity, curiosity, openness to novelties	0.777			
Access to talents such as quick association of facts, quick memorisation of many information from their first reading, innovative mind, ability to solve unexpectedly occurring problems, ability to avoid panic in crisis situations	0.754			
Experience and knowledge of the markets on which investments work is to be performed	0.838			
Availability of efficient transport infrastructure	0.548			
Positive annual GDP growth	0.807			
Stable exchange rates	0.772			
Long-term stability of laws and regulations	0.848			
Political stability in the country	0.711			
Balance between an increase in consumption and production growth	0.563			
Legal system tailored to the needs of conducting business activity	0.815			
Behavioural standards adopted in the society	0.662			
Well-developed democracy		0.572		
Adequate and sustainable pension system		0.716		
Active pro-family policy of the state		0.786		
Active pro-social policy of the state		0.814		
Business activity relying on advanced technologies			0.615	
Business activity associated with academic centres in the field of construction/Polytechnics, Engineering Schools, and so on			0.882	
Business activity associated with academic centres in the field of management, economics in construction			0.776	
Activity associated with the provision of construction services				0.784
Activity related to construction production				0.793
Business activity linked to the financial sector				0.568

Therefore, it is not targeted at the company's management. PRINCE2, on the other hand, is addressed to all stakeholders (i.e. the company's management as well as customers and suppliers in the value chain). PMBoK is more useful when it comes to the suggested managers' behaviours, while the PRINCE2 methodology is more appropriate when creating project descriptions and documentation. In PMBoK the emphasis is mainly on what the project manager does, and in PRINCE2 there is a whole chapter providing detailed descriptions of the responsibilities for a total of 9 different project management team roles. Since our questionnaire respondents pointed out the need to accurately assess the risks associated with starting a project, to develop a schedule and detailed specification of individual stages of the project and any foreseeable events between its stages, a professional business plan with a forecast of costs, profits and financial flows, a good register of documents, as well as a strict scope and structure of activities and good cooperation with stakeholders, it is impossible not to notice that these are key issues that are referred to in the PRINCE2 methodology. This conclusion can also be treated as a recommendation for management practitioners in the housing construction sector. Last but not least, PRINCE2 takes into account the expectations of customers, who are particularly important on the housing construction market, since it is their needs that must be accounted for by development companies, as emphasised in the survey by Ulubeyli et al. (2015) who put forward a detailed process of implementing *quality functions* involving ultra-luxurious villa projects.

Also, the results of our study show that the following factors proved to be important: 'pro-social policy of the state' which manifests itself in the form of pro-family activities, 'access to advanced technologies', because it provides a competitive advantage over rivals in the industry. The study also indicates that access to advanced technologies can be developed and implemented through cooperation with research and development centres. Therefore, our next recommendation for construction practitioners is to invest in new technologies and build deep ties with academic centers. Therefore, business activities need to be associated with academic centres in the field of construction such as Polytechnics, Engineering Schools, and so on.

The last but not least is the factor 'area of market relations' which involves provision of construction services and access to financing for companies' activities.

Conclusions

To wrap up, the study has an empirical dimension, consisting in identification of the factors supporting successful investment project management. As a result of the above we can draw the following conclusions:

- Most of the CSFs emphasised by our respondents (i.e. housing management practitioners) in the questionnaire survey are those already mentioned in previous surveys and related

to specialists working on the preparation and implementation of projects (for example site manager, project manager, and so on), factors related to project procedures (risks, schedules, and so on), project management along with all related activities (for example issue log, lessons log, knowledge management, communication, flexibility, and so on) and all factors related to the external environment.

- Efficient and effective management of investment projects is mainly the result of undertaking various, multi-directional and comprehensive activities in the area of creating intellectual capital and preparing flexible plans and project implementation schedules. Integration of these elements makes companies' market activities stand out from their competitors and bring intended market effects.
- Moreover, the management of investment processes is strongly dependent on the macro-environment and the political, legal, economic and social systems in which construction companies operate.
- We make two recommendations, namely that PRINCE2 methodology should be superior to PMBoK (due to, i.e., the role of management, scheduling, risk management issues and final customers' expectations, but also suppliers and other stakeholders, without whom even the best projects lack of reasonable business case and are doomed to failure), and that development companies operating in the housing construction market should focus on developing technologies and build strong relationships with academic centres such as Polytechnics and Engineering Schools, as they are able to provide the right tools and human resources to build an advantage over competitors in the industry.
- Finally, our study has shown that the pro-social policy of the state and possibility of creating and implementing advanced technologies and the area of market relations are also of great importance.

Future studies

Since the values of the variables that we rely on are in a Likert-scale which implies their qualitative character, we suggest that, as a future line of research, it is possible to analyse the impact of similar factors on the project performance in Poland, however, building the measurement for project performance and testing the hypothesis with regression method or Structural Equation Modelling (SEM). Such a study would be then more of a quantitative nature.

Note

1. Targeted selection - a non-probabilistic method of selecting a sample of respondents for the survey, sometimes referred to as an expert sample. For the targeted sample, the researcher selects individuals in a subjective way so that they are the most useful or representative.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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