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Janusz Nesterak, Bernard Ziębicki

Editorial

Social and economic changes that took place in recent years have significantly impacted the functioning of the public sector in Poland and in the world. Institutions and organisations counted among this sector have faced new and often entirely unknown challenges. These changes are also marked by the so far unusual dynamics. The main challenge is to meet higher and higher social expectations while having to ensure sustainable development at the same time. Greater and greater limitations of resources – caused by the baby bust, economic crises, the pandemic, or the war in Ukraine – result in the necessity to increase the effectiveness of the functioning of this sector. Another challenge that public organisations are facing is the dynamic development of information and communication technologies (ICTs) (Gil-Garcia et al., 2018). Technical solutions absorbed by business, enabling the automatisation and virtualisation of processes, also result in the necessity to transform solutions in the public sphere (Waheduzzaman, 2019). In the face of the presented challenges, the notion of public governance is gaining a new meaning. Under the current conditions, this process should aim not only at ensuring the efficient functioning of the state and its institutions, but also at actively supporting the processes of social and economic changes (Bozeman, 2019).

In this special issue of *Public Governance*, five scientific articles have been published, presenting research results within selected contemporary problems of public management. These articles were prepared and presented within the 14th International Scientific Conference of the College of Management and Quality Sciences, titled "Knowledge – Economy – Society", which took place on 26–27 October, 2022. These works have been chosen out of elaborations submitted to the conference. The problem area of these articles refers both to the functioning of public organisations and to the perspective of the state's public policies. The problem area concerns Poland as well as other countries of Europe.

The first article, written by Agnieszka Skoczylas-Tworek, is devoted to the problem of frauds and embezzlements in organisations, as well as the evaluation of the effectiveness of mechanisms counteracting such phenomena. Frauds and abuses are currently one of the biggest threat to the effective functioning of organisations. The conducted analysis revealed that among anti-fraud controls, the tool of whistleblowing shows the biggest effectiveness, while among the culprits of abuses, employees of organisations constitute the biggest proportion. The research also demonstrated companies' progress in implementing mechanisms countering the abuses, when compered to previous years. This, however, is still not enough to effectively limit the pace of the increase of frauds and abuses. Technological development provides the culprits with much greater possibilities, which means that mechanisms countering frauds will turn out to be insufficient in the long run. It is, therefore, necessary to better adjust the mechanisms of controlling the counteracting of embezzlements to the organisational structure as well as its level of cultural and ethical maturity. This should

be accompanied by legal initiatives at the national and international levels, such as sanctioning the duty of reporting in this scope. Organisations should put much greater emphasis not only on implementing anti-fraud controls, but also on monitoring their effectiveness. Also indispensable is legal support aiming at creating airtight systems of fighting against embezzlements.

The problem area of the effectiveness of the functioning of public organisations concerns also the second article, written by Janusz Nesterak and Damian Majkowski. This elaboration is devoted to the structuring management of the post-merger integration (PMI) phase in the buy-and-build (B&B) model. This issue is presented based on the example of the private network of integrated healthcare entities. In the article, literature review is offered, supplemented with the practical description of the structure of managing the PMI in the B&B model on the German market. The structurisation of managing the PMI phase in the B&B model is unique and requires an individualised approach. The general assumptions of the integration process are formulated and steered based on the mechanism of the loopback from information relayed by linear directors responsible for a given PMI. The observations coming from the practical case study show that the structure of the integration phase in the healthcare sector might be composed of three general stages: (I) the analysis of the market context; (II) formulating a strategy, including business planning and working out long-term financial prognoses; (III) working out guidelines for an analysis of the entity undergoing a takeover and integration. Moreover, an appropriate management of the PMI phase should take place within strictly defined timeframes not longer than 120 days so that the degradation of the value resulting from acquisition can be avoided.

The third article in this collection, written by Sylwia Krzyżek-Liburska, is devoted to the problem area of the international cooperation of Polish universities within framework programmes [Pol. *Programy Ramowe*, PR] of the European Union. The EU's framework programmes constitute the biggest instruments of financing scientific research and technological advancement in the European Union. They are addressed to research institutions as well as small and medium-sized enterprises. Framework programmes are managed directly by the European Commission through the agency of a selected implementing agency. The programmes do not have national or regional allocations, which means that the applicants compete at the level of the whole Union (*Programy Ramowe*, 2022). Currently, the 9th framework programme Horizon Europe, with the budget of over 95 billion EUR, is the biggest and the most ambitious one (*Polityka w zakresie innowacji*, 2022). Participation in research projects within framework programmes offers the opportunity to realise big international research undertakings which significantly influence the increase in the quality of research activity of the entities taking part in the project. Despite these benefits, participation of Polish universities in the H2020 budget is merely 0,83% (*Programy Ramowe*, 2022). This article makes an attempt at identifying the main reasons behind the low level of the participation of Polish universities in the European Commission's research programmes as well as at recommending the activities which can contribute to the improvement of this situation.

Two subsequent articles concern problems of public management in other countries of Europe. The article written by Javier Jorge-Vázquez, Sergio Luis Náñez Alonso, Konrad Kolegowicz, and Jarosław Kaczmarek is devoted to the problem area of technological entrepreneurship and rural development in Spain. Intensive flows of migrants from rural to urban areas within the last century resulted in the emergence of a strong imbalance which caused the concentration of the population in big cities, whereas rural areas are experiencing the advancing process of depopulation and obsolescence. In the European Union, Spain is one of the countries which experience the biggest economic imbalance resulting from demographic challenges. Aware of the enormous scale of this

challenge, national, regional, and local authorities have implemented in the recent years a wide range of policies and programmes of activities aiming at the promotion of the development of rural areas through promoting entrepreneurship as a driving force of economic activities in these territories. Within these strategies, what stands out is the promotion of creating rural start-ups within the Programmes of the Development of Rural Areas of the Structural Funds. One of the Spanish regions which are the most experienced by the outcomes of the ageing and depopulation is the Castilla y León region (CyL). In this context, the purpose of this article is to characterise the phenomena of the depopulation of the rural environment from the perspective of the opportunities provided by rural entrepreneurship based on technology as the force aiding the fixation of population and the economic dynamisation of the territories most experienced by economic and social imbalance resulting from depopulation.

The last of the articles, written by Yuliya Idak, concerns the vision of rebuilding the cities of Ukraine. The author performed an analysis of the European experiences with regard to the contemporary architectural and urban-planning practice in cities of Austria, Germany, and Poland. A considerable part of research begins with selecting attributive categories and generalising different ways of organising the residential environment, which belong to the field of modern European urban planning. This made it possible to distinguish between five basic models, whereby each of them is directed by theories, rules, concepts, and categories which are significant to the essence of a given model, but what connects them all is the paradigm of sustainable development. The *formal* model focuses on the harmonisation of the urban environment; the *classic* one puts emphasis on the consistency with the sector standards; the *social and economic* one concentrates on ensuring that the citizens have various and sufficient chances; the *ecological* one focuses on preserving and recreating the natural environment; and the *conceptual* one is about creating ideas based on innovations. The author conducted a discussion on the possibility of using the identified models when reconstructing cities of Ukraine after the war has ended.

The articles presented in this special issue depict the diversity of problems connected with the functioning of the public sector. The authors are hoping that they will constitute inspiration for further discussions as well as academic and research explorations.

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Agnieszka Skoczylas-Tworek

A Review of Research into the Phenomenon of Fraud and Abuse in the Modern Economy: The Scale of the Problem and the Prospects for Counteracting

Abstract

Objective: The phenomenon of fraud and abuse is currently one of the greatest threats to the effective functioning of organisations. The purpose of this article is to assess the scale of the fraud phenomenon, taking into account the main types of fraud and their perpetrators. The paper also presents the anti-fraud mechanism used by organisations to reduce the risk of fraud and abuse over the past years. Based on the results of the study, conclusions have been formulated.

Research Design & Methods: This article uses a combination of quantitative and qualitative methods to describe the development of the phenomenon of fraud and abuse.

Findings: The analysis undertaken in the article showed that among anti-fraud controls, the whistleblowing tool has the highest effectiveness. In contrast, among the perpetrators of fraud, the highest percentage is taken by the employees of the organisation. The study also showed the progress of companies in implementing anti-fraud mechanisms when compared to previous years. However, it is still not sufficient enough to effectively reduce the rate of growth of committed fraud and abuse.

Implications / Recommendations: The discussion undertaken in the publication around the development of fraud and abuse indicated that the implementation of appropriate control mechanisms is essential to reduce this phenomenon. Technological advances are giving fraudsters much greater opportunities, which means that anti-fraud mechanisms will prove insufficient in the long run. It is, therefore, necessary to better adjust anti-fraud control mechanisms to the organisational structure as well as its level of culture and ethical maturity. This should be accompanied by legal initiatives at the national and international level, such as sanctioning mandatory reporting in this regard by entities.

Contribution / Value Added: The phenomenon of fraud and abuse is a significant problem for the development of organisations. Meanwhile, the controls to reduce it are still insufficient. Organisations should put much more emphasis not only on implementing anti-fraud controls, but also on monitoring their effectiveness. Legal support aimed at creating tighter anti-fraud systems is also necessary.

Keywords: bribery, fraud, anti-fraud mechanism

Article classification: theoretical/review paper

JEL classification: D81, D82, G31, G38

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Introduction

Today, the phenomenon of fraud and abuse is an inherent part of the economy and a threat to its proper functioning. Fraud causes huge losses to businesses and the state budget distorts market competition and lowers staff morale. This phenomenon is facilitated by ubiquitous globalisation, the development of information technology, as well as new possibilities to communicate and establish transactions. This means that organisations' anti-fraud systems cannot keep up with the advances in fraud techniques. Control mechanisms are proving not only insufficient, but also too weak in the face of fraudulent practices. The largest percentage of fraud is that of occupational fraud committed by employees, i.e., by those who are most familiar with the specifics and weaknesses of the institution's operations. The costs of fraud are not easy to quantify, as, in many cases, the fraud goes undetected or unreported. Meanwhile, the phenomenon of fraud and abuse has been on an upward trend over the years, which is confirmed by numerous reports, including international studies (see, e.g., ACFE, 2022; ZPF, 2022; PwC, 2022). In addition, a significant problem involves the passivity of businesses towards fraud risk management and their failure to take monitoring measures that are adequate to the scale of the phenomenon. Apart from establishing controls, these entities do not report the results and effects of their application. Another issue may be that they do not exploit the potential of the anti-fraud systems they implement, or the poor quality of the controls.

This article undertakes a consideration of the causes of the growing scale of fraud and abuse, taking into account the types of fraudsters and their perpetrators. It also describes the types and nature of anti-fraud controls implemented in companies and the scale of their development. Based on the results of the analysis, a discussion has been undertaken and conclusions formulated.

Literature review

The phenomenon of fraud and abuse has existed for centuries. However, it was only in the 21st century when fraud became a severe problem for the economy, and the access to information about it became so widespread that the interest in the subject increased. E. H. Sutherland (1949) made a significant contribution to the fraud and abuse theory (Benson & Simpson, 2009; Simpson, 2019). He described the theory of differential association, which assumed that criminal behaviour is learned (Douglas & Douglas, 2006). Sutherland's research had a significant impact on the development of perceptions of the issue of fraud. As a result, the approach to the perception of fraud changed. Researchers began to concentrate on identifying the reasons for a crime based on the nature of the perpetrator (van Onna et al., 2014). In addition, Sutherland (1949) pointed out that there is a certain relationship between human behaviours, namely that dishonest employees and their unethical behaviours affect the honest ones, and *vice versa* (Bugdol, 2007). Research was also undertaken into the scale of fraud, its types, and the methods and techniques used to reduce it (Wells, 2007; Bales & Fox, 2011; Trompeter et al., 2013; Anand et al., 2015; Sandhu, 2022). Literature on the subject presents case studies of famous frauds (Surdykowska, 2012) or the motives behind the committed frauds (Free, 2015; Homer, 2020; Rustiarini et al., 2019; Scheaf & Wood, 2022), as well as a number of studies on the development of the phenomenon (EY, PwC, Deloitte, ACFE). Unfortunately, despite significant advances in the development of the fraud theory, as well as the presentation of the undertaken research, the phenomenon is constantly

evolving. The reasons for this can be attributed to the progressive development of economies, the accompanying crises, or the increasing pressure of society.

The reasons for the growing scale of fraud include both social, economic, and legal factors, as well as those on the part of companies. The former are shaped by the prevailing national and international socio-economic situation. This has a significant impact on the measures taken against fraud risks in the form of legislation and the development of guidelines or standards. The latter factors depend on the organisation and the culture of organisational behaviour. They have an influence on the estimation of the likelihood and degree of fraud risks based on the specifics of the undertaken activities and the disposition of assets. The subject of this article is precisely about those factors conditioned by companies, as they have the ultimate influence on the design of fraud risk management policies (Erbuga, 2020). The literature emphasises the particular importance of developing an ethical and compliance culture within the organisation (Pfister, 2009; Saluja et al., 2022). These are important in minimising fraud risk. Therefore, an organisation's cultural environment plays a significant role. Its appropriate formation influences a number of actions taken to mitigate the risk of fraud. Actions taken to implement procedures and guidelines shape the anti-fraud system (Norman et al., 2010). These include, in particular: internal control system, reporting mechanism, clear lines of authority, employee fraud education, independent checks/audits, competent personnel in oversight roles, tone at the top, management review. The lack of these mechanisms can significantly undermine an organisation's effectiveness (Dewi, 2017; Jalil, 2018). In addition, it can be the cause of ineffective measures taken against fraud risk mitigation (Sadgali et al., 2019). Meanwhile, most of these mechanisms, if implemented, can be insufficient or too weak to minimise the likelihood and effect of fraud risk. This is confirmed by ongoing research and the increasing scale of fraud.

Research methodology

The purpose of this article is to analyse the development of fraud and abuse. It presents the types of committed fraud, the perpetrators of fraud, and the anti-fraud controls that are used in organisations. The primary research method was an analysis of both quantitative and qualitative character. The article uses data published since 2002 by the American Association of Certified Fraud Examiners (ACFE) as well as data published by the EY Poland in its 2020 report. It contained information on the use of fraud and abuse detection mechanisms in selected financial institutions in Poland in the period of 2019–2020.

The results of the survey were used to assess the degree of the use of anti-fraud controls in organisations. The paper is a continuation of a series of articles on fraud and abuse in companies, the tools used in their mitigation, and the disclosure of information about them.

Results

Economic abuse can be considered from a number of points of view. They can be divided according to the type of fraud committed, the nature of the damage, the degree of detection, or the persons involved (Kutera, 2008). Globally, the most popular classification is based on the subject criterion. This classification was developed by the ACFE organisation. It has developed an occupational fraud and abuse classification system, the so-called "fraud tree" (ACFE, 2022a). It identifies three main categories for the division of fraud: corruption, asset misappropriation, and

financial statement fraud. Corruption frauds include understatement, bribery, illegal gratuities, and economic extortion. A misappropriation of assets includes cash and inventory, and all other assets. Financial fraud, on the other hand, includes net worth, net income, and overstatement or undervaluation (ACFE, 2022a, 2022b). Table 1 shows the scale of fraud according to its types.

Table 1. Percentage of fraud committed by fraud group between 2002 and 2022

Type/group of fraud	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022
Corruption	12.8	30.1	30.8	26.9	32.8	33.4	36.8	35.4	38	43	50
Asset misappropriation	85.7	92.7	91.5	88.7	86.3	86.7	85.4	83.5	89	86	86
Financial statement	5.1	7.9	10.6	10.3	4.8	9.6	9	7.6	10	10	9

Source: ACFE, 2022a.

The data included in the table shows that the largest number of fraud cases are committed in the area of asset misappropriation fraud. The smallest percentage comes from the area of financial statement fraud. While the level of both types of indicated fraud has remained almost unchanged since 2012, the risk of corruption is on an upward trend. Among the potential perpetrators of fraud, the literature identifies the following groups of people: senior and middle management, employees, accountants, customers, other people from outside the organisation, and organised crime groups (Kutera, 2008). The analysed data indicates that anyone can be a fraudster. However, the largest percentage of fraudsters are company employees; they have a much greater and better knowledge of the company's procedures than an external customer. Figure 1 shows the evolution of fraudulent acts committed by potential perpetrators.

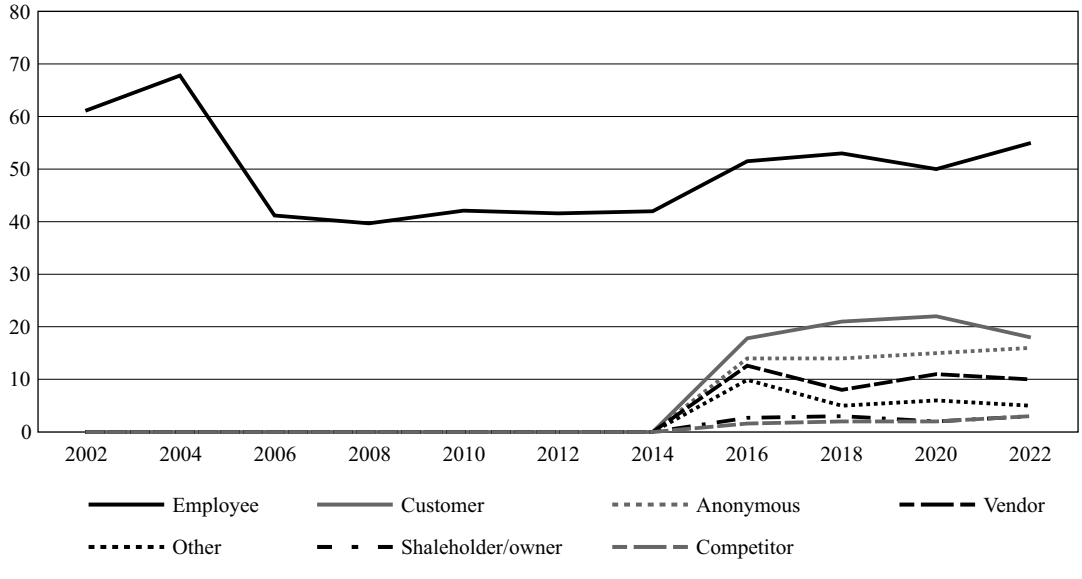

Figure 1. Perpetrators of professional fraud between 2002 and 2022

Source: own elaboration based on ACFE, 2022a.

The data in the figure shows that, amongst the identified perpetrators, employees of the organisation commit the highest proportion of fraud. Employee fraud, also known as professional fraud, refers to the act of an employee to enrich himself/herself or to gain other financial or personal benefits to the detriment of the organisation. Data shows that employee fraud is one of the costliest financial crimes.

Fraud is a long-term process; it is not a one-off activity. For example, research confirms that the duration of professional fraud ranges from 12 to 60 months and even up to 10 years (ACFE, 2022a, 2022b). Thus, this indicates that the preparation for committing a fraudulent act is a very meticulous process that requires a significant commitment on the part of the perpetrator. It includes not only an analysis of the possibilities, but also of the weaknesses of the organisation. Therefore, employees and management members are the biggest potential perpetrators, because they know the organisation best. With this assumption, customers are certainly a smaller threat to the company, but they cannot be ignored. They tend to exploit system or legal loopholes to gain possible benefits. The motives for committing fraud are attributed to psychological and economic factors, but issues such as knowledge of the organisation, its weaknesses, and system gaps increase the success of the fraud.

The preparation of the perpetrator to commit fraud is the point at which the organisation should start to have the right tools in place to prevent the perpetrator from seeing weaknesses in the systems. Monitoring tools should have the most significant role; their function is to raise the awareness of the potential perpetrator through signalling that every operation and transaction is subject to verification and double-checking. Evoking in employees a feeling that internal audit annually evaluates processes with the highest probability of fraud risk, the management oversees and fosters the right ethical attitude by pointing out unethical acts; they know how to admit a mistake, rectify it, and approach their duties with full responsibility for their actions (tone of the top). Only when all these elements are working properly and are consistent, do they constitute an effective barrier for fraud perpetrators. Hence, organisations and their boards of directors have a very important role in shaping the anti-fraud system. It is worth emphasising that the application of appropriate and effective fraud risk mitigation tools is not an impossible matter, but this requires commitment and appropriate knowledge, as well as continuous improvement of these tools.

Taking into account the described development of fraud and its greatest concentration on employee or professional fraud, it is necessary to take applied measures to reduce the likelihood of such events occurring. Research indicates that the mechanisms by which professional fraud is most frequently detected involve: whistleblowers, internal audit, management review, 'by accident' tools, and other sources. The degree to which these are implemented in entities has been assessed based on the research conducted by the ACFE (2022a, 2022b). The results are shown in Figure 2.

The data in the figure shows that tip tools are the most common and effective method of detecting fraud. It is noteworthy that slightly more than 40% of all cases were detected through tips, and almost half of these were disclosed by employees (ACFE, 2022a). Tips are a form of whistleblowing, so they provide information about a potential threat. Tip information can be shared via hotline, anonymously, or overtly. The choice of channel depends on the methods made available by the organisation and the decision of the whistleblowers themselves. Among the identified tools, internal auditing is also highly effective. Tools such as 'management review' and 'by accident' show slightly lower effectiveness. It is worth noting that the other control tools seem to be on an increasing trend; they include external audit, account reconciliation, document examination, surveillance/monitoring, notifications by law enforcement, IT controls, confession.

Therefore, the question must be asked whether the controls analysed over the period of 2002–2022 are slowly beginning to be replaced by other tools, i.e. more modern ones, taking into account socio-economic progress. The basic tools will not lose their relevance, but taking into consideration the progressive development of technology, companies, and fraudsters, the implementation of new mechanisms should give companies greater advantages in reducing fraud.

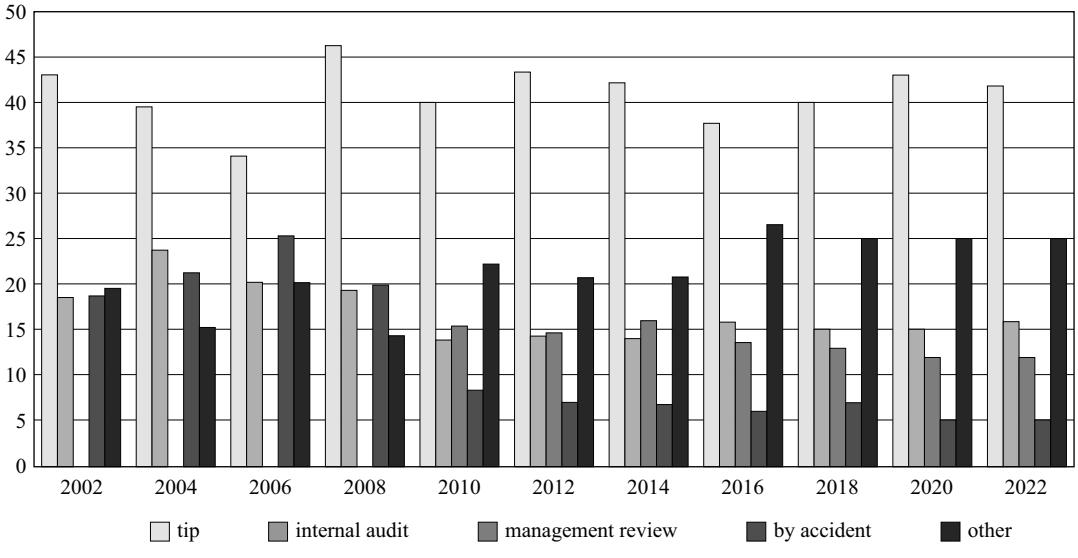

Figure 2. Scale of use of fraud detection tools between 2002 and 2022

Source: own elaboration based on ACFE, 2022a.

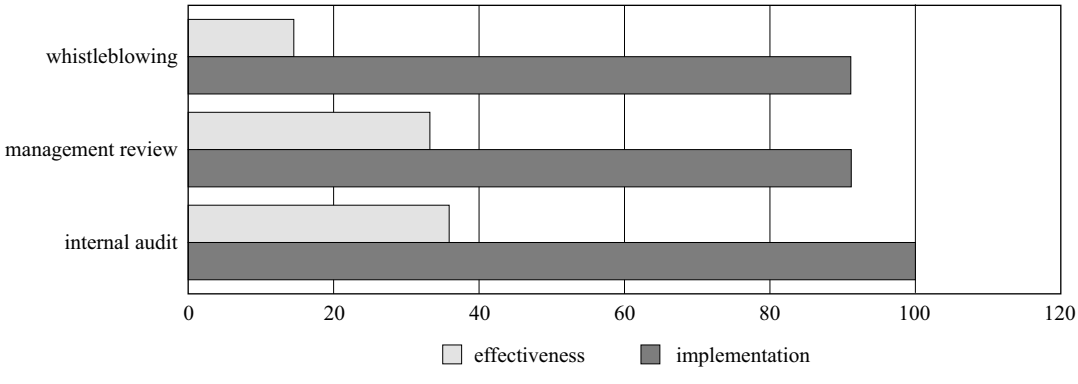

Figure 3. Application of fraud and abuse detection mechanisms in selected financial institutions during the period from 2019 to 2020

Source: own compilation based on EY Poland (2020), Financial Sector Fraud Survey 2020, Association of Financial Enterprises, available at: https://assets.ey.com/content/dam/ey-sites/ey-com/pl_pl/news/2020/10/ey-raportnaduzycia-2020.pdf (ac-cessed: 17.08.2022).

Taking the Polish financial sector as an example, an assessment of the fraud mitigation mechanisms in place was carried out by the EY institution. The study covered the years 2019–

2020 and addressed the use and effectiveness of selected fraud detection mechanisms. The results of the survey are shown in Figure 3 and relate to the already analysed selected tools. Research does not include the 'by accident' tool.

The study showed that financial entities use the internal audit mechanism, management review, and whistleblowing. However, it is worth pointing out that in the case of the banking sector, which is part of the financial sector, such an action is due to legal regulations. Despite the widespread use of these tools, the results of the study reveal that they have low efficiency in detecting fraud.

The use of mechanisms to detect fraud and abuse was also analysed for Polish market players. As in previous analyses, the subject of the study was the use of four main tools, i.e. tip, internal audit, management review, and 'by accident' tools. The tip tool was classified as an implementation of the whistleblowing tool. The 'by accident' detection method was also not referenced, which results from the fact that entities do not include such mechanisms in their reports. The survey covered entities listed on the Warsaw Stock Exchange, included in the WIG20 index, i.e. those that publish financial and non-financial information on their operations, as well as the anti-fraud tools they use. While risk mitigation tools are disclosed, these entities do not show an assessment of the effectiveness of fraud detection mechanisms. Hence, Figure 4 only shows the use of fraud detection mechanisms such as whistleblowing, internal audit, and management review. The assessment covers the period 2017–2021.

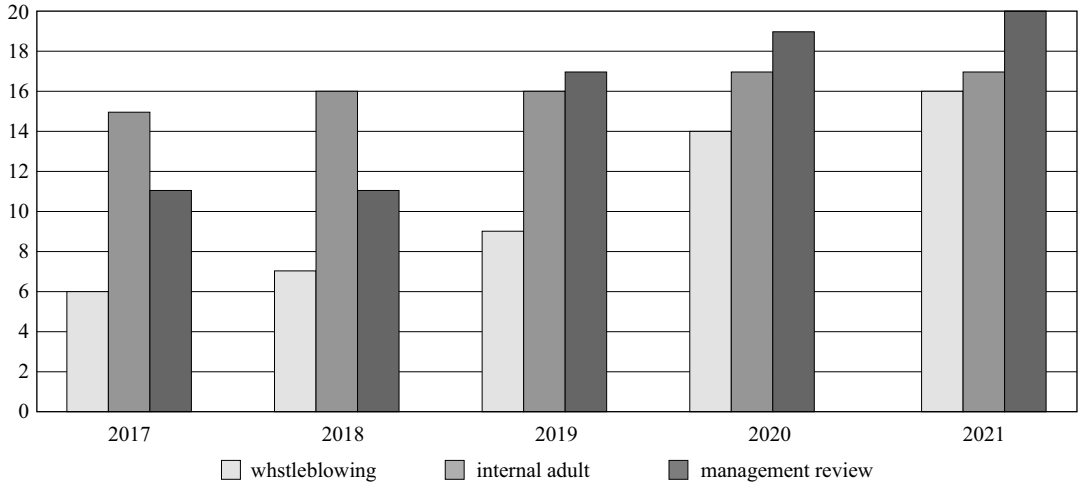

Figure 4. Application of the main fraud detection mechanisms in WIG20 Index entities in the period of 2017–2021

Source: own elaboration based on reports and statements on non-financial information published in 2017–2021 by companies included in the Index WIG20.

Among the surveyed market entities, the internal audit tool is the most popular, followed by whistleblowing and management review. With regard to whistleblowing, it should be noted that procedures for its implementation have been established in most of the entities. Unfortunately, the level of their detail and the use of whistleblowing channels vary. Published information in this regard is incomplete. As in the management review mechanism, entities do not always

indicate the use of this tool for risk mitigation. It is worth mentioning that the level of application of the main tools for the surveyed group of entities is relatively high. However, entities do not publish information on the effectiveness of their application. Only a few companies indicate the number of reported frauds as a result of implementing whistleblowing, which does not provide information on its effectiveness in reducing the risk of fraud.

The results of the presented analyses show that entities are implementing fraud detection mechanisms. However, in most cases, these are selected main tools. There is a lack of certain innovations in this area, which organisations should strive for. Despite the fact that the conducted analyses concern different groups of organisations as well as different periods, an improving trend in the use of anti-frauds mechanisms is noticeable. Due to the lack of sufficient information and research, it is difficult to take a clear position on their effectiveness. The effectiveness of these tools is studied by external national and international institutions. Companies do not report on the effectiveness of the implemented fraud detection tools. Therefore, given the growing scale of fraud, the effectiveness of these mechanisms can be questioned.

Concluding remarks

The threat of fraud is one of the most common management challenges faced by organisations regardless of size, industry, or location. Having proper internal control procedures that include an adequate risk response plan is fundamental in the fight against fraud. However, in addition to implementing mechanisms for mitigating the risk of fraud, it is essential to implement fraud detection tools. Unfortunately, their catalogue is limited. According to research conducted by the ACFE (2022a, 2022b), the tool associated with obtaining whistleblowing tips has the highest effectiveness. It is the employees of the organisation who account for the highest number of fraud perpetrators, as well as whistleblowers. Thus, we have a situation in which an employee is not only a perpetrator of fraudulent acts, but can also be a whistleblower of information regarding the committing of a fraudulent act. Thus, this is the person who has the most knowledge. The question then arises about how he/she will use this knowledge, i.e. whether that will be for personal gain or in the name of protecting the institution and its assets. The dilemmas that occur are of an ethical and moral nature. They also depend on the situation of the enterprise, economic factors, and the motives behind the actions. All these shape the employee's attitude towards the organisation.

Another problem is the provisions of the EU law that go out to whistleblowers and oblige entities to implement procedures for their protection. This is very important, necessary, and can significantly contribute to the detection of abuse. However, it should not be forgotten that as a human being, a person is difficult to diagnose. This means that he/she will report irregularities or fraud to gain appropriate protection and divert attention from his/her own illegal acts. To mitigate this risk, it is necessary to ensure adequate whistleblowing procedures and establish a system for monitoring them. Other tools for detecting wrongdoing applied in the organisation can be used for this purpose. It is always necessary to consider the advantage of eliminating or reducing a fraudulent act over the negative side of using a particular mechanism. In order to increase fraud detection at the organisational level, it is also necessary to tighten internal control systems, which involves extensive monitoring. This is essential, because the controls in place can already be insufficient or too weak to curb fraud. Moreover, this makes sense given the advances in the development of fraudulent methods and techniques. This is confirmed by the results of studies conducted at the national and international levels of research on fraud.

In summary, economic fraud is now a major problem affecting the entire world. The scale of this phenomenon and the extent of the damage experienced by companies affected by fraud are significant. The damage is not only financial, but also concerns non-financial losses. Economic crimes can take many forms. It is, therefore, extremely important to consciously manage the risk of fraud, as well as to adopt appropriate methods for its disclosure. Studies have shown that there is visible progress in the implementation of anti-fraud mechanism when compared to previous years, but it is still not enough to effectively reduce the rate of growth of a committed fraud and abuse. Part of the problem accompanying this phenomenon is the apathy of businesses. It is related to the fact that many organisations are not doing enough to prevent and report fraud, and management does not care sufficiently to set the right tone to promote a culture of honesty and ethical behaviour. In addition, taking into account the changing socio-economic conditions, it should be pointed out that the risk of fraud is growing faster than the development of anti-fraud mechanism is progressing.

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Structuring Management of the Post-Merger Integration Phase in the Buy-and-Build Model: The Case of a Private Network of Integrated Healthcare Entities

Abstract

Objectives: In recent years, researchers have indicated a significant rising trend in the number of serial transactions carried out in the Buy-and-Build model. Simultaneously, managing the Post-Merger Integration (PMI) phase has not yet found much reflection in the investigations of researchers. The chosen subject of the research is related to activity which is focused on exploring the issue of proper management of the PMI phase in M&A projects. The article reviews the literature on the subject, supplementing it with a practical description of structuring the management of the PMI in the B&B model on the German market.

Research Design & Methods: Information included in this article is mainly based on the analysis of the literature on the subject of PMI management, verified on the basis of publicly available data on the consolidation of the healthcare sector on Western European markets, supplemented with knowledge from the implementation of the PMI project on the German market. The conducted research was not verified on the basis of the realities of the Polish market and is not based on Polish literature of the subject.

Findings: Structuring management of the PMI phase in the B&B model is unique and requires an individualised approach. Generic assumptions for the integration process are formulated and steering based on feedback mechanism from information provided by line managers responsible for a particular PMI. Observations coming from the practical case study show that there could be four generic stages in structuring the integration phase in the healthcare industry: (i) market context analysis; (ii) formulating the strategy including business planning and developing long-term financial projections; and (iii) developing the guidelines for the analysis of the entity subjected to acquisition and integration. Furthermore, proper management of the PMI phase should close within a strictly defined timeframe that is not longer than 120 days in order to avoid the degradation of the value resulting from acquisition.

Implications / Recommendations: The perspective of private investors in the healthcare sector should be recognised by public managers. Investors from the private sector in Western countries, identifying the ineffectiveness of the public healthcare system, make attempts to recreate the architecture of the public healthcare system based on general and specialist clinics by acquiring private clinics and including them in a mutually-connected network. The upside from the investor's perspective that allows for generating a high rate of return on acquisition results from the effective management of the PMI phase due to, *inter alia*, building an IT infrastructure enabling the digitisation of patient's contact with medical institutions and building a product offer for companies providing access to private healthcare as an employee benefit.

Contribution / Value Added: The main contribution of this paper is a practical description of structuring the management of the PMI in the B&B model on the foreign market of Western Europe based on the example of a serial acquisition of healthcare entities by a private equity investor. Furthermore, following recommendations by public managers operating in the healthcare sector – in particular those relating the need of digitalised contact between the patients, doctors, and clinics – could limit the negative impact for society, resulting from the extended time of access to medical care.

Keywords: Post-Merger Integration, PMI, Buy-and-Build, B&B, Private Equity, Private Healthcare

Article classification: research article

JEL classification: G24, G34, G32, I11

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Introduction

According to a report provided by the international legal advisor company Allen & Overy (2022), the global value of M&A transactions reached a record level of over $5.8 trillion in 2021, which is an increase of 64% compared to 2020 and by 48% more than in 2018, i.e. the previous record year (p. 1).

Furthermore, the Boston Consulting Group (Brigl et al., 2016) indicated a significant rising trend in the number of serial transactions carried out in the buy-and-build model, pointing out that B&B deals outperform standalone private equity deals generating an average IRR of 31.6% from entry to exit compared with IRR of 23.1% for standalone deals (p. 3).

Despite sufficient returns generated by B&B deals, this transaction model has not yet found much reflection in the interest of scientific researchers, unlike other well-researched private equity transactions, such as leveraged buyout (Axelson et al., 2013, p. 2225). Another research, one conducted by Hoffmann (2008) on German buyout market, based on 21 buy-and-build transactions, indicates that, on average, the B&B model created a significant value, especially by capturing synergy between the different companies involved. It can be assumed that the majority (ca. 75%) of the analysed B&B transactions at least fulfilled the minimum expected IRR of approximately 25% (Hoffmann, 2008, p. 184).

The main contribution of this paper is a practical description of structuring the management of the PMI in the buy-and-build model on the foreign market of Western Europe, based on the example of a serial acquisition of healthcare entities by a private equity investor. The case study presented in the article does not provide a universal determinant of well-managed integrations, but, rather, provides guidance as to which areas of PMI are worth addressing and how a door-to-door process of serial integration could be organised.

Literature review

Characteristics of the buy-and-build model

Buy and Build (B&B) is a Mergers and Acquisitions (M&A) strategy in which a private equity (PE) fund acquires a portfolio company as a platform for the so-called add-on acquisitions (Hammer et al., 2017, p. 2).

According to Smit (2001), these 'add-on' acquisitions are done to consolidate the targeted industry (and capturing the advantages of economics of scale) and to eliminate the small firm premium. The strategy involves buying 'platform' assets and building the scale and scope through subsequent M&As as a primary source of business growth. The economic rationale of the B&B model rests on economies of scale and efficiency improvements between the platform and add-on companies (Smit, 2001, pp. 79–82).

Moreover, Cumming and Johan (2010) indicate that add-ons come with additional monitoring and integration costs, distract focus from organic growth, and cause the portfolio firm to grow in size and complexity (p. 229).

On the other hand, some researchers indicated that due to the high level of complexity of transactions in the B&B model, there is a risk of increased costs related to post-acquisition issues. Costs incurred due to information asymmetries and coordination are very important during the B&B, because they refer to the intended return and investment horizon (Hammer et al., 2017).

According to the Boston Consulting Group, there is one simple reason for implementing the B&B model: it outperforms standalone PE deals. B&B transactions are not only a way to generate superior performance, but they also provide an opportunity for operational improvements and the furthering of a credible narrative about future growth and margin expansion owing to value generated from traditional synergy levers such as the economy of scale effects as well as from improved sales forcing effectiveness and pricing (Brigl et al., 2016, p. 5).

Ghosh (2001) disagreed with the above thesis; in his studies of the post-exit operating performance of a buy-and-build firm, he finds no evidence of improvements in post-acquisition operating performance.

The team under the supervision of MacArthur from the Bain Company observed that the B&B model has never been as popular as it is today. The researchers concluded that the reason is simple, namely that buy-and-build can offer a clear path to value at a time when deal multiples are at record levels and GPs are under heavy pressure to find strategies that do not rely on traditional tailwinds, such as falling interest rates and stable GDP growth (MacArthur et al., 2019, p. 37). Furthermore, they pointed out that the most effective B&B models target sectors with predictable secular growth and a low risk of disruption as well as fragmented industries with sufficient acquisition targets of the right size (MacArthur et al., 2019, p. 41).

Fragmented industry such as the target market was also indicated by Hoffman (2008), who pointed out that the B&B model typically happened in at least relatively fragmented markets characterised by a combined market share of below 50% for the top 5 companies (p. 185).

Hoffman's another conclusion contributing to the literature on the subject is that the quality of the management team was clearly the most important success factor in buy-and-build strategies. Moreover, the sophistication of the financial controlling/reporting system which represents a prerequisite for effective monitoring of the managers by the private equity firms was also identified by Hoffman as a partly relevant success factor (Hoffmann, 2008, p. 185).

The issue of the PMI of entities implementing serial acquisitions interested Kengelbach et al. (2012) from the Boston Consulting Group and Sperling at the Leipzig Graduate School of Management. The researchers were inspired by the following theses: 1) that multiple acquirers have a considerable potential to learn, but usually fail to exploit it (Hayward, 2002, p. 21); 2) that experience effects may range from positive to negative, because subsequent deals are usually rather heterogeneous, thus making inferencing often inappropriate (Haleblian & Finkelstein, 1999, p. 30). The researchers verified above theses using a global sample of 20,975 of the M&A transaction and came to the conclusion that serial acquirers' short-term transaction performance is equal to that of single acquirers. The conclusions drawn from research by the Boston Consulting Group and Sperling at the Leipzig Graduate School of Management are not unequivocal, although they indicate that serial acquirers have relative competitive advantages owing to the positive learning curve in (i) public target acquisitions and (ii) small to middle-sized deals; it is, therefore, worth to subsequently investigate M&A learning and PMI problems in the remainder of the study (Kengelbach et al., 2012, p. 16).

Companies with superior operational performance are more likely to be part of a buy-and-build model as a platform. Results are more ambiguous with regard to follow-ons, although there is some evidence to suggest that companies with lower operational performance have a higher probability to be acquired as a follow-on (Abrahams, 2018, p. 3).

The empirical results of a study into a deal sample comprising 964 buy-and-build deals and 1,401 traditional LBOs that have taken place in the UK between 2008 and 2016 suggest that

buy-and-build models are more likely to appear in industries that are more fragmented and have a higher amount of exit and follow-on opportunities compared to industries that have not seen any buy-and-build activity (Abrahams, 2018, p. 3).

Furthermore, Bansraj and Smit (2017) determined that the B&B model works the best in specific predefined conditions divided into three main pillars: (i) financing, (ii) industry, and (iii) company conditions (p. 3).

Smit (2001) argues that buy-and-build is an acquisition-driven strategy with the purpose to consolidate a certain industry. The first step in the buy-and-build model is to acquire a target company that fits into the role of a platform. The platform company is a well-established industry player with a sustainable competitive advantage over other industry players through noticeable capabilities and unique resources (Smit, 2001, pp. 82–89).

Borell and Heger (2013) empirically address the sources of value creation of the buy-and-build model and state that private equity combine platform companies with follow-on companies with the purpose of allocating resources more efficiently (p. 5).

Nikoskelainen and Wright (2007) put forward an indirectly contradictory thesis that the B&B model would positively influence the performance of buyouts (p. 512).

An analysis conducted by BCG Consultants of buy-and-build deals executed in the period from 1998 to 2012 found that the approach is the most successful when the portfolio company: is small or medium sized; has a PE sponsor with operational and buy-and-build experience; offers an operationally-efficient and scalable platforms; is in a low-growth, low-profitability, highly-fragmented industry; does only one or two add-on acquisitions; targets add-ons in its core industry; and uses acquisition to expand internationally (Brigl et al., 2016).

The business case for building a vertically-integrated healthcare entity in the buy-and-build model

The literature identifies a wide variety of organisational structures and approaches to integrating the healthcare business across private providers. The main conclusion from the Healthcare Intelligence Report, which briefly describes several vertically-integrated healthcare businesses, is that health systems must find a way to evolve beyond their fragmented legacy care delivery models. This will involve partnering with untraditional allies to create regional hubs which bring value to consumers and build patient loyalty using M&As (Hanys, 2019).

Schuhmacher's analysis has shown that the buy-and-build model, which is key to private equity firms in the healthcare sector, is possible and by standard anticipated in facilities' agreements documenting leveraged buyouts (2021, p. 114).

The advantages of building a network of medical facilities in the buy-and -build model are confirmed by business practice, identifying several advantages of building an integrated network of healthcare entities benefiting from the economy of scale and, therefore, generating a number of synergy effects, e.g. increasing medical and visual standard; building a large purchasing group that gives a better negotiating position in the supply of materials; or implementing wider digitisation, which is profitable only after building an appropriate business scale (medical application enabling contact on the patient–facility–doctor line, better utilisation of medical specialist, integration of marketing and sales activities, the possibility of creating a dedicated shared service centres, cooperation with companies from the insurance sector and businesses that provide private care for their employees as part of cafeteria programmes, etc.)

Therefore, in Central Europe, for example on the Polish market, several networks of vertically-integrated healthcare entities were built in the buy-and-build model, such as CenterMed, Enel-Med, Lux-Med, Medicover, or Polmed, operating in a similar business model to that of their counterparts in Western Europe and the USA.

Generic management scheme for the integration phase in the buy-and-build model

A considerable challenge related to building a management model for serial acquisition involves structuration of the post-merge integration phase in a way that: (i) allows standardisation; (ii) correlates with the process of preselection of particular healthcare entities subject to acquisition; (iii) is coherent with an overall strategy of building vertically-integrated healthcare capital group; and (iv) allows the maximisation of the generic added value associated with the add-on acquisition while simultaneously leaving adequate space for own initiative implemented by operational managers responsible for particular integrations.

The projected structure of the integration process is highly influenced by information appearing during the implementation of individual integrations (output signals). Therefore, information coming from a particular integration manager has a fundamental impact on the structuring of the integration phase management methodology.

The feedback mechanism occurs in many processes that require self-regulation, including in automation, computer science, biology, but also, which is confirmed by the described case study, in the discipline of management sciences. Feedback is the influence, direct or indirect, of changes at the outputs of a given system on the state of its inputs. The idea behind the feedback action is to adjust the successive responses of the system based on information about the effects of its own actions (Kowal, 2018, p. 7). The error signal, which is the difference between the input signal and the feedback signal (which may be a function of the output signal), is fed to the control system so as to minimise the error and bring the output signal to a given value (Figure 1). From the above definitions it can be concluded that in the feedback mechanism, the effect of a given action is, *de facto*, the beginning for another action (Gitlow, 2009, p. 14).

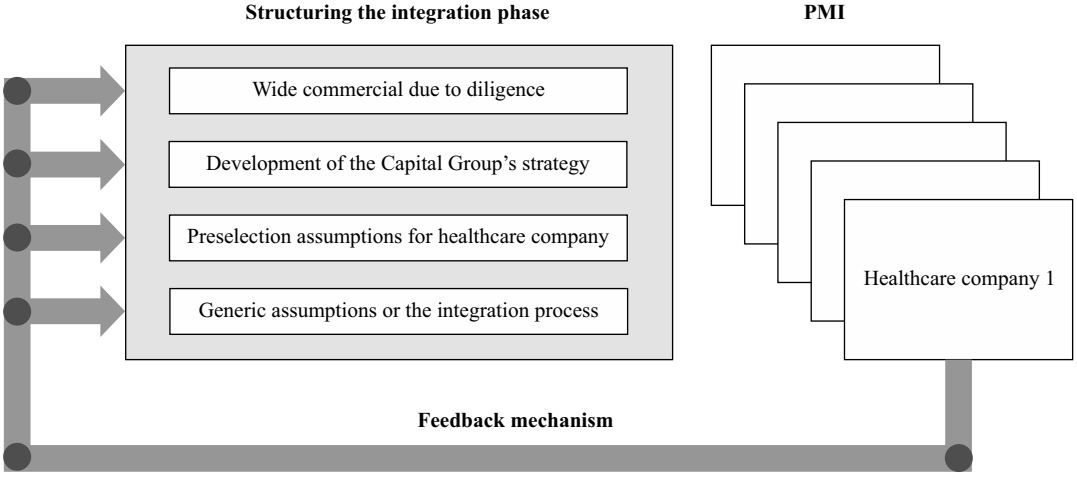

Figure 1. Generic management scheme for the integration phase in the buy-and-build model

Source: own elaboration.

The feedback mechanism in integration management comes down to addressing the relevant questions to line managers responsible for a particular PMI in order to obtain relevant information about how generic assumptions for PMI are reflected in practice. It is especially important to find out how key personnel of a healthcare entity responds to changes, what the key customers' findings or any possible disruptions in supply chains are, etc. The conclusion based on the collected data from at least several medical facilities within at least 8 months after the Day-0 starting integration may point to corrective actions not only for the generic assumptions for the integration process, but also for the preselection assumptions or even the Capital Group's strategy.

Research method

The chosen subject of the research is related to the researchers' activity focused on exploring the issue of proper management of the PMI phase in M&A projects. Namely, the authors of this article noticed a gap in the literature on the subject concerning techniques and tools that, if applied, could support PMI managers in carrying it out correctly, thus reducing the risk of failure.

The dataset included in this article is mainly based on the analysis of the literature on the subject of PMI management, verified on the basis of publicly available data on the consolidation of the healthcare sector on Western European markets, supported by knowledge from the implementation of the PMI project on the German market. The conducted research was not verified through the prism of the reality of the Polish market. The researchers did not use Polish-language literature.

Observations drawn from the implementation described in this article's case study confirm the proposed hypothesis that every particular post-merger integration reflects its unique specificity even in PMI projects that relate to a very similar asset class, such as healthcare entities. The differences in the described case study result mainly from the human factor, including different levels of resistance to stress of key personnel, related to participation in the M&A project as well as attachment to the previously existing customer service model, which changes after the integration.

Structuring the integration phase – preparatory stage

Structuring the management of the post-integration phase in a case study from the healthcare sector had a cascading character and was divided into four interrelated stages (described in Figure 2 below). All of the generic stages were considered from the perspective of PMI as a key activity in building an integrated Capital Group in the healthcare sector.

(1) Market context analysis for the strategy of building an integrated capital group in the healthcare sector: an in-depth analysis of the formal, legal, regulatory, and business environment, enabling the construction of a strategy for an equity investor, whose aim is to build a vertically-integrated network of healthcare entities based on a serial acquisitions and the integration of the existing healthcare companies, as well as, after that, raising their standard (both medical and visual, e.g. interior design), and then generating a number of synergy effects coming from: (i) building a large purchasing group that gives a better negotiating position in the supply of materials; (ii) introducing a wider digitisation, which is profitable only after building an appropriate business scale (medical application enabling contact on the patient–facility–doctor line); (iii) a better optimisation of medical workers' calendars owing to the exchange of patients; (iv) the integration of marketing and sales activities;

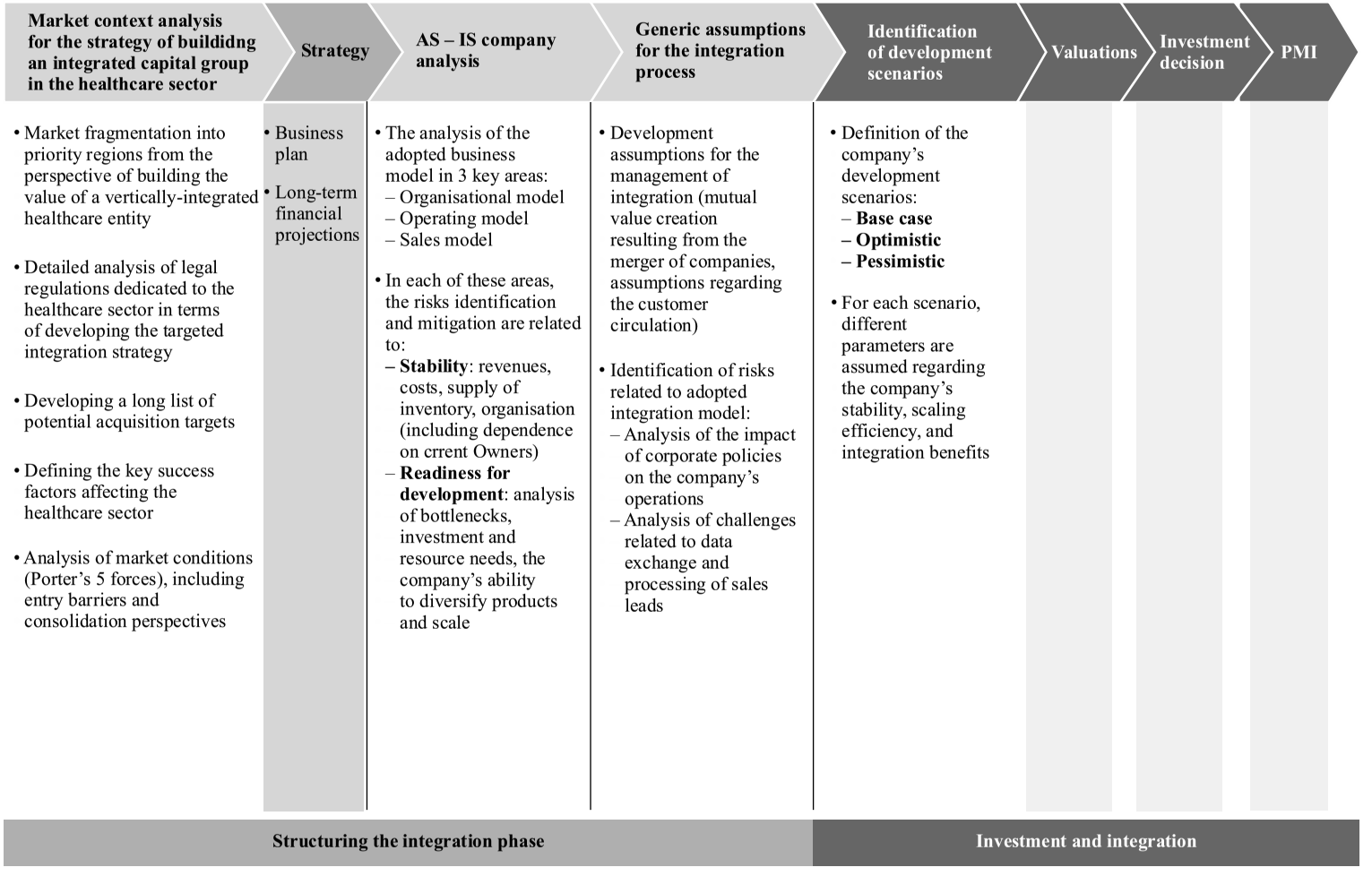

Figure 2. Diagram presenting stages of structuring the integration phase

Source: own elaboration.

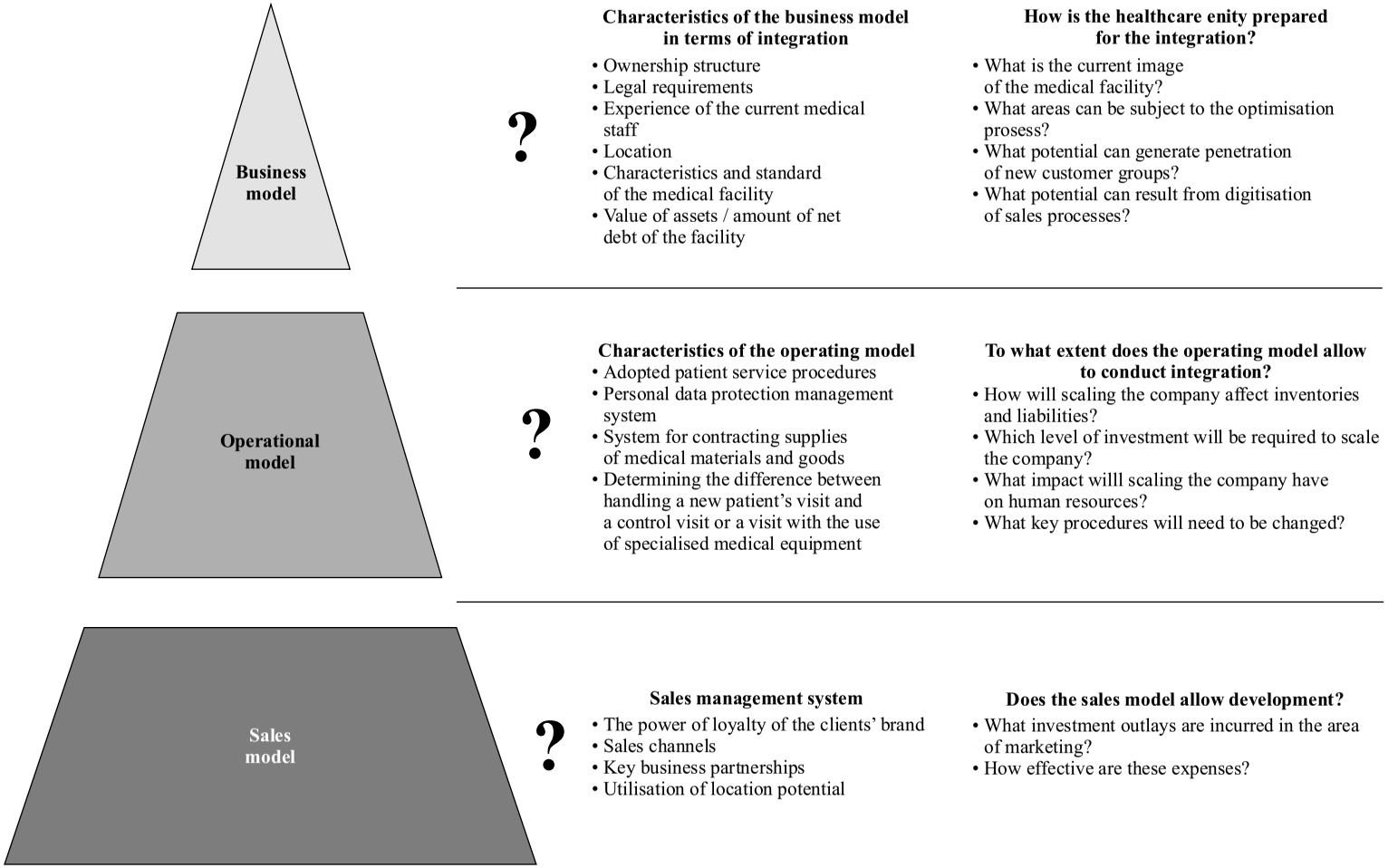

Figure 3. Scheme of guidelines for the analysis of the company that is the subject of the acquisition and integration (analysis of the AS-IS company)

Source*:* own elaboration.

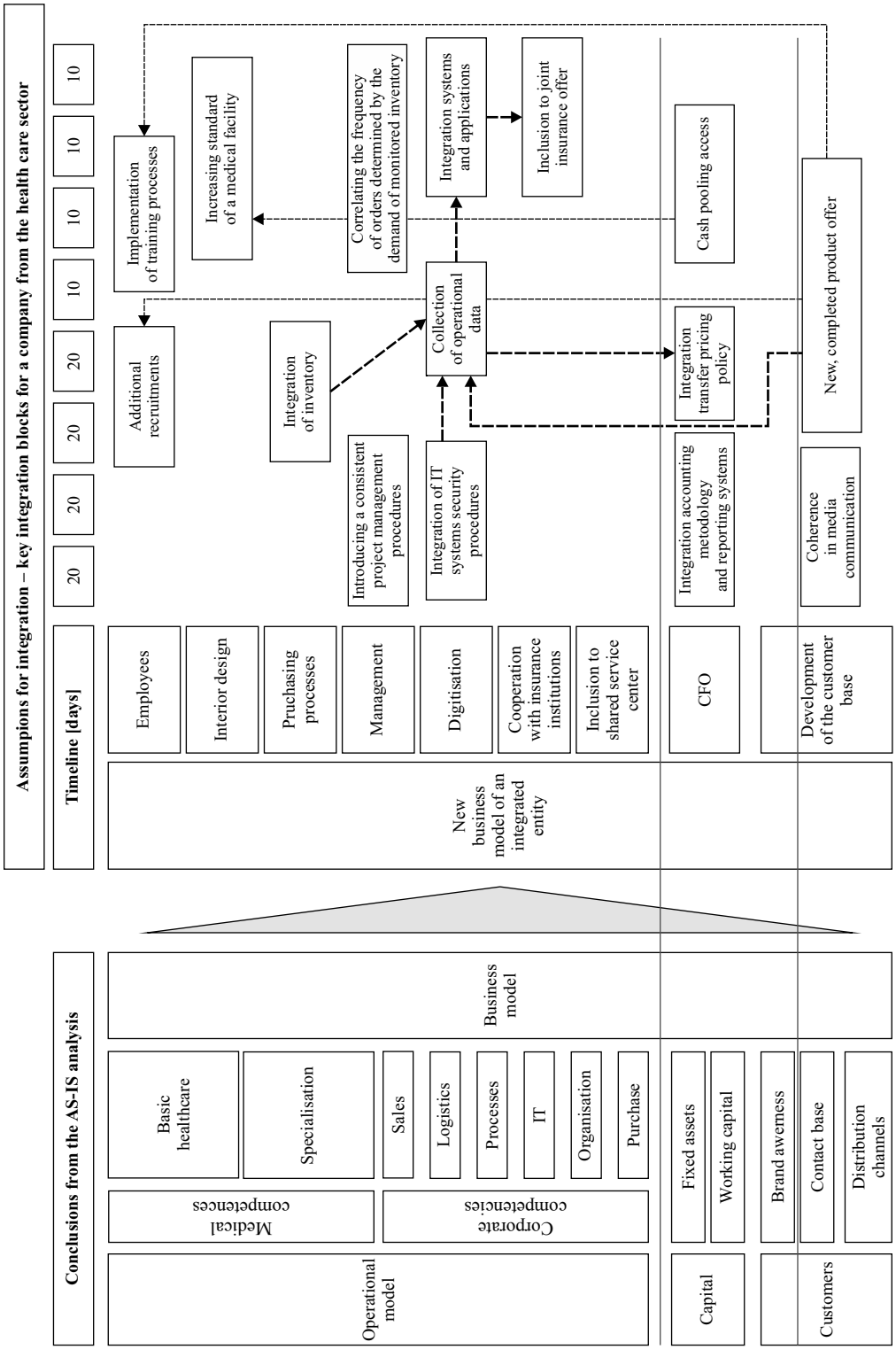

Figure 4. Scheme of key integration blocks

Source: own elaboration.

(v) the creation of a dedicated shared service centre; and (vii) cooperating with companies from the insurance sector and businesses that provide private care for their employees as part of cafeteria programmes.

(2) Development of an integrated strategy of the Capital Group: here, a business plan is developed containing key assumptions concerning, *inter alia*, (i) investment budget; (ii) management structure, including a business development department (a team actively looking for new acquisition targets), a team dealing with the transaction phase, and a team responsible for integration; (iii) identifying and agreeing the terms of key business partnerships; and (iv) defining the number of investment goals assigned to particular years; and many others. The second important document developed during those stages is a long-term financial projection with reflected income and cost assumptions resulting from the previously developed business plan.

(3) Development guidelines for an analysis of the entity subjected to acquisition and integration, otherwise known as AS-IS company analysis (described in Figure 3): the scope of the analyses determined by the specificity of the healthcare industry as the organisational model of healthcare entities is usually a hybrid of internal forces and external partnerships, thus combining business flexibility with control over the quality of the provided services, described exactly on the basis of market analyses carried out as part of the previous stage and focused on three main areas: sales management, operations, and managing the organisation of partners and employees. In each of these areas, the aim of the analysis is to address key questions which are strategically important from the integration perspective.

(4) Development of generic assumptions for the integration process (described in Figure 4): the last stage of structuring of the integration phase, reflecting, *de facto*, the key conclusions from the other three stages. It is also the most important stage from the perspective of building the Capital Group and achieving the assumed business goals. In addition, as part of the process of structuring the integration phase, it is also the stage that should be influenced most strongly by information from line managers responsible for the operational conduct of individual integrations combining medical facilities into the Capital Group.

Concluding remarks and discussion

Developing business by a serial acquisitions of other businesses and implementing vertical integration known as buy-and-build is a growth model observed in practice for companies from the healthcare sector. Structuring management of the post-integration phase in the buy-and-build transaction model is unique and requires an individualised approach. PMI integration is a set of activities aimed at achieving the assumed synergies between the merging companies. It is important to properly plan the integration process before finalising the transaction, as well as create extensive plans for the first 120 days after the transaction closing with a detailed breakdown of decision-making and competence centres, including the determination of resources and planned effects.

Observations coming from the practical case study show that there could be four generic stages in structuring the integration phase in the healthcare industry, namely: (i) market context analysis for the strategy of building an integrated capital group in the healthcare sector; (ii) formulating the strategy including business planning and developing long-term financial projections; and (iii) developing guidelines for the analysis of the entity subjected to acquisition and integration. Based on the previous three stages, the generic assumptions for the integration process are formulated and

steering based on feedback mechanism from information provided by line managers responsible for a particular PMI.

The described case study is the beginning of further research in the field of post-merger integration management.

Research limitations

Conducting research on the key factors of structuring management of the PMI phase is severely limited due to the specific approach of various entities to the faced challenges as well as varying business goals, the generation of which may lead to erroneous conclusions.

Additionally, due to the competitive environment in which most companies operate, they do not make information on managing the PMI phase publicly available.

Generalising the approach to PMI management may lead to statements of conclusions whose practical application may not bring the desired effect related to improving the management of the PMI phase.

Policy recommendations

Identifying the ineffectiveness of the public health care system, investors from the private sector in Western countries make attempts to recreate the architecture of the public healthcare system based on general and specialist clinics by acquiring private clinics and including them in a mutually-connected network.

The upside from the investor's perspective that allows for generating a high rate of return on acquisition results from the effective management of the PMI phase due to, *inter alia*, building an IT infrastructure enabling the digitisation of patients' contact with medical institutions as well as building a product offer for Corporations providing access to private healthcare medical benefits as an employee benefit.

The insights of the private sector should be noticed by decision-makers from the public health sector, which, through proper management, owing to having a large network of treatment facilities, would be able to significantly improve its efficiency.

In particular, an important factor in the development of the public health service is the digitisation (e.g. by creating an interactive application) of contact between the patients, doctors, and clinic. It will make it possible to reduce social losses resulting from the extended time of access to medical care.

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Polish Higher-Education Institutions in International Cooperation: Evidence from the European Union Framework Programmes

Abstract

Objective: Polish higher-education institutions (HEIs) compete for European funds with excellent European universities that have comprehensive support systems for applying for research grants. This paper's aim is to analyse the patterns of participation of Polish higher-education institutions in the 7th and 8th EU framework programmes, and their relationship with the characteristics of universities and national and geographical effects.

Research Design & Methods: This article uses the CORDIS database for analysing data concerning projects financed under FP7 and the Horizon 2020 Programme.

Findings: The literature emphasises the weak starting position of Polish entities in competing for international grants. The low results of Polish institutions in EU FPs might be due to many factors, including system and structural, institutional, and mental barriers.

Implications / Recommendations: There is the necessity for a detailed examination of the determinants of the success of research proposals and the development of a system that will support strategic decisions on applying for grants at Polish universities in order to increase the absorption of EU funds.

Contribution / Value Added: New legislation in Poland has forced universities to change their expectations towards academic staff in order to achieve the highest possible categorisation of disciplines and universities. Polish scientists are under pressure to publish their research in reputable journals. Therefore, it might be possible to observe a direct emphasis on application for research grants and timely settlement of projects in case of obtaining grants.

Keywords: research funding, EU Framework Programmes, Horizon 2020, research policy, higher-education institutions

Article classification: research paper

JEL classification: I23, O39

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Introduction

Poland has been a member of the European Union (EU) since May 2004. Owing to this, it has the opportunity to participate in EU funds, which play an important role in the support of innovation and economic development (Drela & Szymański, 2013). EU funds contribute, in particular, to the empowerment of Polish science and education. The opportunities of European funds are long-range, because they help to establish a close cooperation between science and business. This makes universities and enterprises the precursors of change, allowing them to compete with the global industry.

The European Union framework programmes (FPs) are the largest instruments for financing scientific research and technological development in the European Union. They are addressed to research institutions and small and medium-sized enterprises. The EU FPs are managed directly by the European Commission (EC) through a selected executive agency. FPs do not have national or regional allocations, which means that applicants compete at the level of the entire EU (*Programy Ramowe*, 2022).

The history of the framework programmes dates back to 1984, when the first four-year Framework Programme was announced. Over the next 30 years, successive framework programmes have provided financial support for the implementation of EU research and innovation policies. Their focus has changed: from programmes supporting cross-border cooperation in research and technology to programmes supporting a truly European coordination of actions and policies. Currently, the largest and most ambitious is the 9th framework programme, namely the Horizon Europe, with a budget of over 95 billion EUR (*Polityka w Zakresie Innowacji*, 2022). The framework programmes, and their budgets in billions of euros, are presented in Table 1.

Table 1. The European Union Framework Programmes

ID	Framework Programme	Period	Budget (billions of €)
FP1	First	1984–1987	3.8
FP2	Second	1987–1991	5.4
FP3	Third	1990–1994	6.6
FP4	Fourth	1994–1998	13.2
FP5	Fifth	1998–2002	15.0
FP6	Sixth	2002–2006	16.3
FP7	Seventh	2007–2013	50.5 over seven years + 2.7 for Euratom over five years
FP8	Horizon 2020 (H2020)	2014–2020	77.0
FP9	Horizon Europe	2021–2027	95.5

Source: https://en.wikipedia.org/wiki/Framework_Programmes_for_Research_and_Technological_Development.

Entities from all over the world can participate in EU framework programmes, e.g. universities, large enterprises, small and medium-sized enterprises, public institutions, hospitals, foundations, and international organisations. Still, there are different requirements for financing the participation of European Union member states, FPs associated countries, and third countries (other countries). The rules for their participation are always specified in the call documents.

The benefits of participation in the EU FPs include, e.g. (NCBiR, 2019; 2022):

- increasing the international recognition of institutions involved in cooperation within projects;
- exchanging good practices, research methods, and procedures;
- creating international research teams, conducting simultaneous research in many different countries, verifying theories in different cultural contexts;
- building international networks of contacts;
- access to knowledge networks;
- benchmarking against those best in Europe;
- an exchange of knowledge and personnel, increasing the mobility of research staff;
- the internationalisation of research and a wider dissemination of results;
- the possibility of enriching the research workshop with approaches derived from different cultural or technological contexts;
- gaining experience in managing international projects;
- increasing the productivity of researchers (e.g. the number of publications);
- improving the quality of the results of scientists' work (e.g. the number of citations);
- increasing the probability of identifying blunders;
- access to unique material, equipment, and intangible resources (knowledge, experience);
- pro-evaluation activities – each international project increases a score for Polish universities in evaluating the quality of the scientific activity.

Despite so many advantages of the EU FPs, the share of Polish higher education institutions in the H2020 budget is only 0,83% (Poland in Horizon 2020, 2021). With all this in mind, this article's aim is to analyse the patterns of participation of Polish higher-education institutions in the 7th and 8th EU framework programmes, and their relationship with the characteristics of universities and national and geographical effects.

Research background

The topic of international research cooperation in the European framework programmes has been tackled by numerous authors. Most studies suggest that the critical factor for obtaining grants is the reputation of the university and belonging to the EU15 (the group of the so-called 'Old European Union' countries: Austria, Belgium, Denmark, Finland, France, Greece, the Netherlands, Spain, Ireland, Luxembourg, Portugal, Germany, Sweden, Italy, the UK) (Ajdarpašić & Qorraj, 2019; Lepori et al., 2015; Nokkala et al., 2011). Nokkala et al. (2011) suggested next factors, such as research productivity, the size of the university, and the specificity of the country. Additionally, high GDP per capita in the country was found to have a positive impact on participation and coordination of projects from the EU FPs. The topic of the importance of an institution's productivity in acquiring EU funds has been investigated by Geuna (1998). An econometric model was developed to investigate the relevance of various factors, both the likelihood of joining a EU-funded project and the number of times that a university has participated in these projects. The results show that the likelihood of participation in a EU-funded research and development project depends primarily on the university's research and development productivity. Factors that explain the number of times that a university has participated in a project include research productivity, unit size, as well as differences between countries and fields of study (Geuna, 1998).

There is also research analysing networks of scientific institutions and their impact on the success of collaborative grant applications (Balland et al., 2019; Wanzenböck et al., 2020).

Having a strong, influential network position in a collaborative European Union research is found to affect participation in the EU FPs, greatly suggesting "closed clubs", to the detriment of less influential institutions (Enger, 2018). Universities with more resources (finance, staff) will have stronger networks compared to those with fewer resources. For example, universities with influential positions in the network will usually be involved in coordinating projects. A large pool of resources will positively strengthen the impact of the network's position on the likelihood of participation in joint FPs projects. The resources (scientific reputation, productivity) are a comparative advantage in the influence of the university's network position on the EU's participation in FPs (Enger, 2018). Moreover, previous coordination experience contributes to the successful acquisition of projects. This is all owing to the learning outcomes that facilitate the development of a coherent application (Enger & Gulbrandsen, 2020). Further empirical research suggests that both the research capacity and the scientific excellence of an organisation increase the likelihood of receiving funding (Bol et al., 2018; Wanzenböck et al., 2020).

Some studies focus on the so-called Matthew effect in science, i.e. the hypothesis that outstanding scientists and/or outstanding research institutions have an advantage in competing for funding (Smith et al., 2019; van den Besselaar & Sandström, 2015). However, Bol et al. (2018) have shown that previous funding in itself is not an advantage in obtaining funds at a later stage.

Henriques et al. (2009) support the view that the institution's reputation is the critical factor in participation in EU funds. The authors characterised the participation of universities in the FP6, with particular emphasis on the profile of participation of the best research universities. Europe's top research universities account for the lion's share of participation in higher education in FP6 and act as lead coordinators and key partners. According to Lew (2009), one of the primary criteria for world-class universities is the ability to attract and retain excellent and experienced academics, and, as a result, research projects and programmes. Finally, the low success rate for partners from Central and Eastern Europe should be taken into account; the more consortium partners are from this part of Europe, the less likely it is to be awarded a grant (Paier & Scherngell, 2011; Wanzenböck et al., 2020).

Lepori et al. (2015) conducted research on the participation regularity of the countries of Southeast Europe in the EU FPs. The results suggest that: 1) there is a high concentration of EU participation in FPs in a small group of universities with a high reputation; 2) the participation of non-doctoral universities in the EU framework programmes is very limited, even though they account for a significant proportion of all universities in Europe; 3) the number of participants tends to increase in proportion to the size of the organisation and is strongly influenced by international reputation; and 4) there is limited evidence of significant national impacts on participation in the EU Framework Programme, as well as the impact of distance from Brussels. Table 2 lists all the institution-related factors that influence their participation in the European framework programmes.

Research methods

Data taken from the CORDIS database was analysed. CORDIS is an information base on European research and development activities (CORDIS, 2021). The analysed data concerned projects financed under FP7 and the Horizon 2020 Programme. Data was downloaded on August 30, 2022.

Table 2. The institution-related factors that influence participation in the European Framework Programmes

1	the reputation of the institution (Ajdarpašić & Qorraj, 2019; Lepori et al., 2015; Nokkala et al., 2011)
2	the institution's experience in project coordination (Enger, 2018; Wanzenböck et al., 2020)
3	prior participation (Enger, 2018; Wanzenböck et al., 2020)
4	research productivity of institution (Ajdarpašić & Qorraj, 2019; Geuna, 1998)
5	geographic location (Ajdarpašić & Qorraj, 2019; Balland et al., 2019; Lepori et al., 2015; Wanzenböck et al., 2020)
6	institution size (Lepori et al., 2015)
7	GDP per capita (Nokkala et al., 2011)
8	existing cooperation between institutions (Hoekman et al., 2013)
9	date of the institutions' establishment (Ajdarpašić & Qorraj, 2019)
10	type of institution (Ginther et al., 2012)
11	Matthew effect (Boyack et al., 2018; Nokkala et al., 2011)

Source: own elaboration.

Results

Table 3 presents the results of Polish higher-education institutions in FP7 and H2020. Poland's results are not satisfactory. Moreover, the results of Polish higher-education institutions in the Horizon 2020 programme are worse than in the 7th Framework Programme. In FP7, Polish HEIs participated in 4.56% of projects in which worldwide HEIs participated. Polish HEIs coordinated 0.77% of these projects. In H2020, however, these results deteriorated to 3.96% and 0.51%, respectively.

Table 3. The participation of Polish higher-education institutions in FP7 and H2020

Number of	7th Framework Programme	Horizon 2020
projects in which higher-education entities participated	19,341	22,141
projects in which Polish entities of higher education participated	763	724
institutions	90	88
participations in projects	883	878
coordination	149	115

Source: own elaboration.

Figure 1 shows the results of Polish higher-education institutions with the highest involvement in FP7 and H2020-funded projects (both coordination and partnership). The top results included the University of Warsaw, the Jagiellonian University, the Warsaw University of Technology, and the AGH University of Science and Technology.

Figure 2 shows the countries with which Polish higher-education institutions collaborated the most often under projects financed under the 7FP and H2020. The list takes into account foreign higher-education institutions from the European Union member states. The United Kingdom was included as a member state, because Brexit occurred at the end of the implementation of the Horizon 2020 programme. It was the institutions from the United Kingdom that most often

partnered with Polish institutions in projects with both FP7 and H2020. Altogether, Poland has participated over 700 times in projects financed by both FP7 and H2020. Subsequently, the country cooperated with Germany, Italy, the Netherlands, France, and Sweden. In the case of financed projects, Poland most often participates in consortia with countries from Western and Northern Europe, while it works less frequently with countries from Eastern and South-Eastern Europe, such as Romania or Croatia.

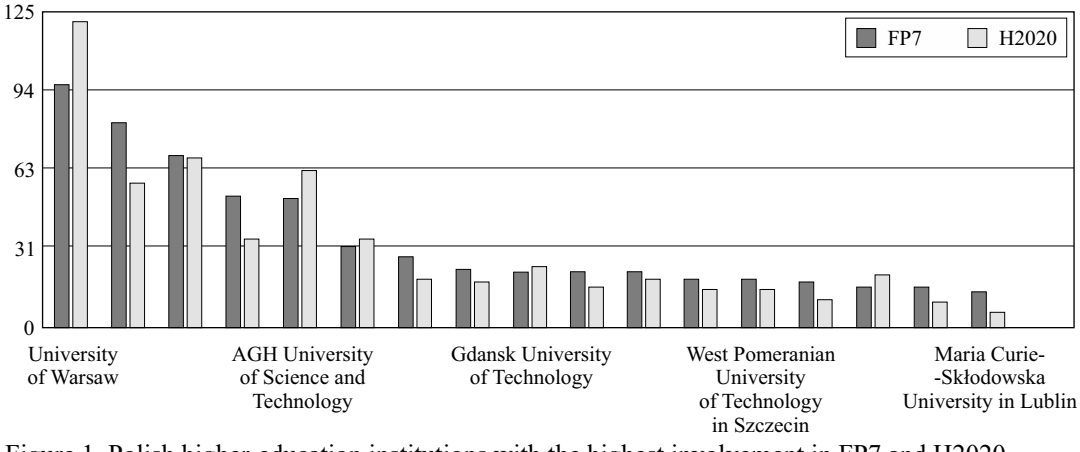

Figure 1. Polish higher-education institutions with the highest involvement in FP7 and H2020

Source: own elaboration.

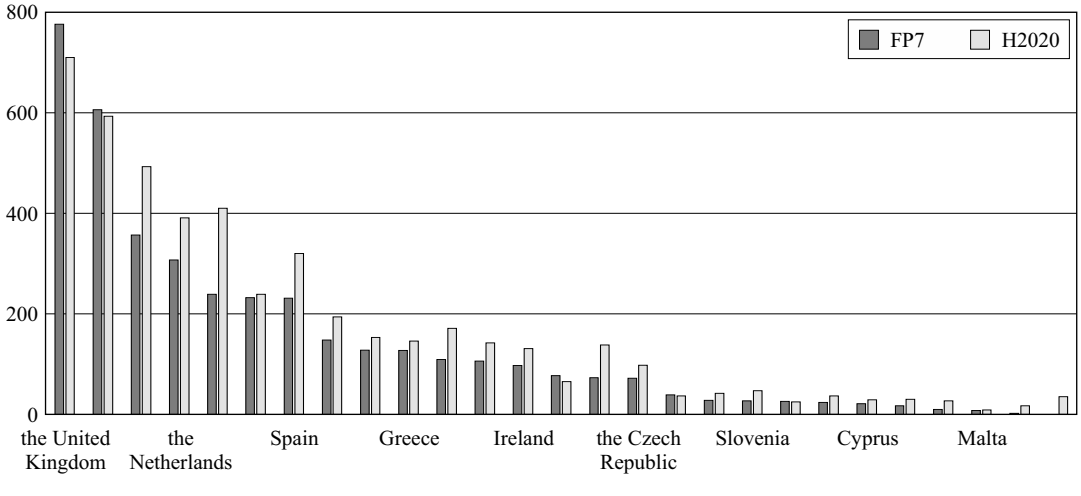

Figure 2. EU countries collaborating with Polish higher-education institutions under the 7FP and H2020

Source: own elaboration.

Figure 3 shows overseas higher-education institutions, which were the most frequently part of project consortiums with Polish institutions. Polish HEIs collaborated mainly with renowned entities from the United Kingdom, such as the University of Oxford, the University of Cambridge,

and the Imperial College London, as well as with the Belgian Katholieke Universiteit Leuven and the German Delft University of Technology.

Figure 4 shows the cooperation of Polish HEIs with associated countries. It cooperated the most often with Switzerland, Israel, and Norway. The tendency to cooperate with countries with high GDP per capita appears also in this case.

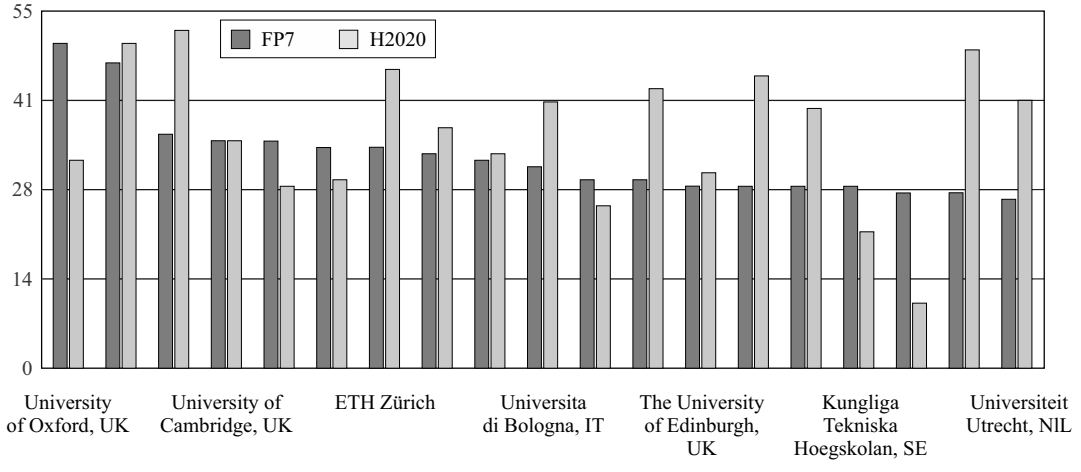

Figure 3. Overseas HEIs collaborating with Polish institutions under the 7FP and H2020

Source: own elaboration.

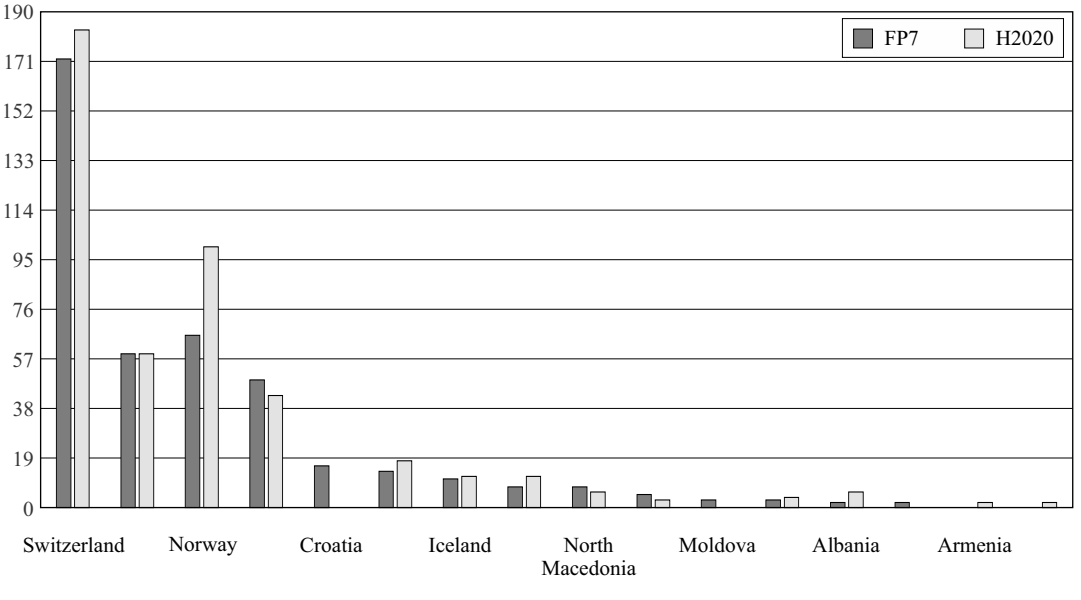

Figure 4. Associated countries collaborating with Polish higher-education institutions under the 7FP and H2020

Source: own elaboration.

Figures 5 and 6 concern the cooperation of Polish HEIs with the so-called third countries. Horizon 2020 shows greater cooperation with third countries than it is the case with FP7. In this programme, cooperation with the USA, China, Canada, Australia, and Singapore has increased significantly. Cooperation with Russia, Japan, South Africa, and Taiwan remained at a similar level as in FP7.

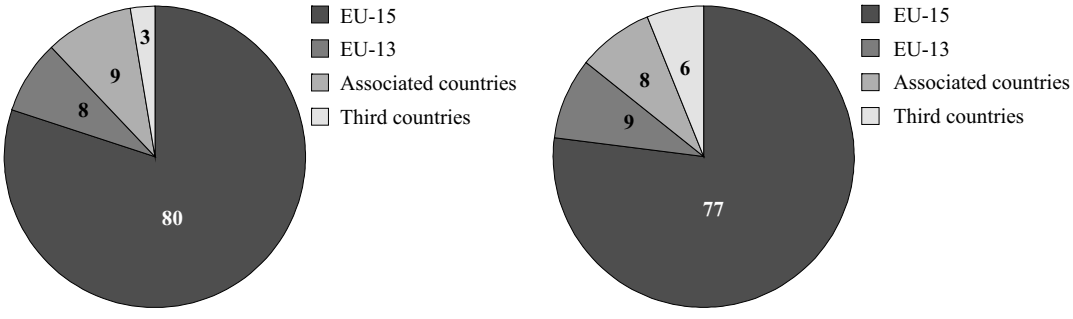

Figure 5. Comparison of the cooperation of Polish HEIs with different types of countries in FP7 and H2020 (%)

Source: own elaboration.

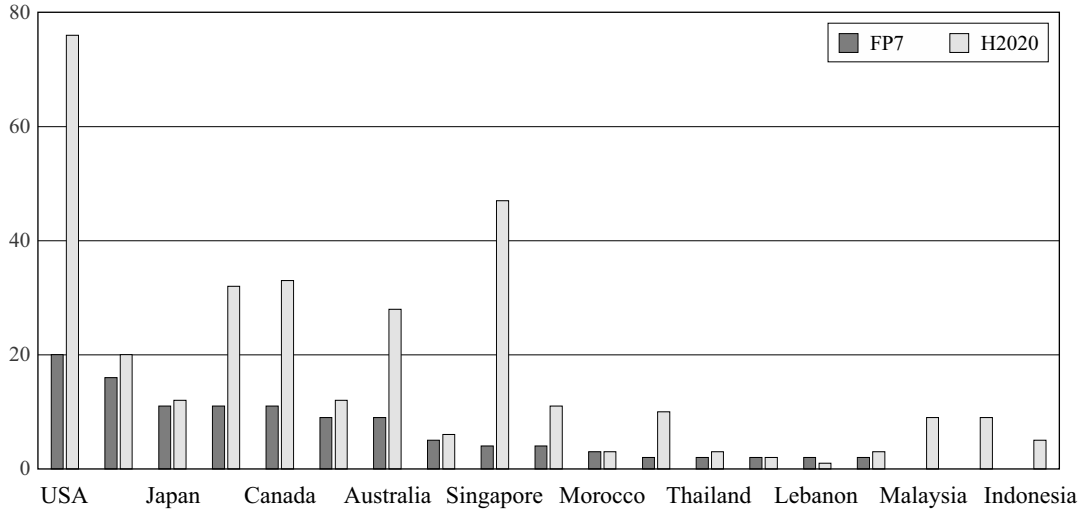

Figure 6. Third countries collaborating with Polish higher-education institutions under the 7FP and H2020

Source: own elaboration.

Discussion

Despite so many advantages of the EU FPs, the share of Polish HEIs in the H2020 budget is disappointing. The above conclusions from the literature emphasise the weak starting position of Polish entities in competing for international grants. Poland is a country with poor research

and innovation performance, and the level of research excellence is lower than the EU average (Horizon Europe – Work Programme 2021–2022). It ranks last regarding the level of research funding from EU programmes per scientist. Polish entities do not recover contributions to the joint EU budget for research and are net contributors to the EU budget in this area. The challenge for Polish science is the insufficient activity of universities and academics in obtaining grants. Polish higher-education institutions compete for European funds against excellent European universities that have comprehensive support systems for applying for research grants. Research on the determinants of the success of international research applications is important for increasing the acquisition of EU funds by Polish universities. Authorities should pay special attention to the process of applying for international grants, and provide applicants with specialist support in finding partners and preparing grant applications (Szczepaniak, 2019).

The low results of Polish institutions in the EU FPs might be due to many factors, including system and structural, institutional, and mental barriers. Table 3 presents the most common barriers that Polish HEIs face when participating in international research grants. Polish universities still lack clear strategic goals, incentive systems, and professional administrative and expert support at the institutional level (NCBiR, 2022).

Conclusion

New legislation in Poland has forced universities to change their expectations towards academic staff in order to achieve the highest possible categorisation of disciplines and universities. Polish scientists are under pressure to publish their research in reputable journals. Therefore, it might be possible to observe the direct emphasis on application for research grants and timely settlement of projects in case of obtaining grants. The results of Polish higher-education institutions in applying for European grants under the 7th Framework Program and the Horizon 2020 programme are unsatisfactory. For example, solely the University of Oxford obtained 527.48 million EUR in funding from the H2020 programme, while all Polish universities together received only 207.43 million EUR (Poland in Horizon 2020, 2021).

The low results of Polish institutions in the EU FPs when compared to expectations in terms of the number of inhabitants or the number of scientists is due to many factors, including system and structural barriers.

The author of this study sees the necessity for a detailed examination of the determinants of the success of research proposals and the development of a system that will support strategic decisions on applying for grants at Polish universities in order to increase the absorption of EU funds. Further research should also focus on analysing rejected applications in terms of the composition of the project consortium.

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Technological Entrepreneurship and Rural Development: A Binomial to Combat Depopulation in Spain

Abstract

Objective: This study aims to characterise the phenomenon of depopulation in the rural environment from the point of view of the opportunities offered by technology-based rural entrepreneurship as a lever that promotes population fixation and the economic dynamisation of the most depressed territories subject to the economic and social imbalances generated by depopulation.

Research Design & Methods: The research approach is based on the application of case studies as an empirical research technique. In particular, the strategy for the promotion of rural start-ups in CyL – the largest European region and one of the Spanish regions most affected by the negative consequences of depopulation – is analysed.

Findings: Empirical evidence has shown that economic conditions have impacted the extent and duration of migration flows from rural areas to a more industrialised urban environment. Thus, in recent decades, the spatial distribution of the population has taken shape characterised by strong concentrations in large cities as opposed to the dispersion and low density of the population in large areas of the territory.

Implications / Recommendations: The promotion of rural entrepreneurship through the development of specific actions to encourage the creation of start-up companies could be a solution to the demographic challenge.

Contribution / Value Added: The creation of a regional entrepreneurial ecosystem has been possible owing to the financing, growth, scaling, and business internationalisation programmes promoted by the regional government.

Keywords: technological entrepreneurship; rural development; depopulation; startups

Article classification: research article

JEL classification: M13, P25, R58, O38, J11

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Introduction

Concern about the negative economic and social consequences associated with the strong demographic imbalances existing in a large part of Europe is currently a common concern in most European countries. The intense migratory flows from rural to urban areas over the last century have led to the emergence of strong imbalances that have, in turn, resulted in the concentration of the population in large cities, while rural areas are suffering a progressive process of depopulation and ageing. These migratory processes have become an important source of inter-territorial inequality. The adverse effects of such processes are nowadays at the centre of political, social, and academic debate. The fixation of the population in the most deprived areas is nowadays one of the common elements that can be observed in the political agendas of most European governments. At the same time, the phenomenon of depopulation is a multifaceted reality that has been the subject of a particular interest to the scientific community. Beyond the economic implications, many studies have investigated the consequences of depopulation in fields as diverse as, among others, the environment (Falcucci et al., 2007; Martínez-Abraín et al., 2020) sociology (Paniagua, 2011), or cultural heritage conservation (Gómez-Limón et al., 2007; Salas, 2019).

On the other hand, the available evidence has clearly determined that economic factors strongly condition the phenomenon of depopulation (Dax & Fischer, 2018; Li et al., 2019). The most economically-depressed areas suffer more intensely from the migratory flows of their population towards more prosperous territories in search of new opportunities (Pinilla & Sáez, 2017). In this context, the development of new economic activities, local entrepreneurship, and innovation are all essential conditions for boosting rural development and contributing to population retention.

In recent years, a trend aiming to boost rural entrepreneurship (Müller & Korsgaard, 2018) and counteract the dynamics of depopulation and economic sluggishness in rural areas has visibly emerged. The promotion of initiatives and programmes that encourage the creation of rural start-ups is a good example. The rural environment offers ample potential for the development of innovative ideas in sectors as diverse as agriculture and agribusiness, agricultural biotechnology, and tourism. The socio-demographic characteristics of rural areas also open up opportunities for the development of start-ups offering, *inter alia*, telemedicine services, dependency care, and collective transport solutions. These initiatives can be boosted by programmes for the promotion of rural entrepreneurship launched by different local and regional administrations.

Within the European Union (EU), Spain is one of the countries most affected by the economic imbalances posed by the demographic challenge. Aware of the magnitude of the challenge, national, regional, and local authorities have in recent years deployed a wide range of policies and action programmes aimed at promoting rural development through the promotion of entrepreneurship as a driving force for economic activity in these territories. Within these strategies, the promotion of the creation of rural start-ups within the Rural Development Programmes of the Structural Funds stands out.

One of the Spanish regions that suffer the most from the consequences of ageing and depopulation is the Region of Castilla y León (CyL). This study aims to characterise the phenomenon of depopulation in the rural environment from the point of view of the opportunities offered by technology-based rural entrepreneurship as a lever that promotes population fixation and the economic dynamisation of the most depressed territories subject to the economic and social imbalances generated by depopulation. To achieve this objective, the research approach is based on the application of case studies as an empirical research technique. In particular, the strategy

for the promotion of rural start-ups in CyL, the largest European region and, as mentioned before, one of the Spanish regions which have been the most affected by the negative consequences of depopulation, is analysed as a good practice.

The demographic challenge in rural areas – depopulation and ageing

The phenomenon of depopulation in the European rural environment has its origin in the demographic movements occurring on a large scale within the framework of the urbanisation processes initiated in the mid-20th century in Western Europe (Pereira & Navarro, 2015; Baudin & Stelter, 2019). In Spain, these migratory flows from rural areas to more developed urban centres, subject to strong industrialisation processes and the development of the service sector, began in the 1960s and 1970s. This trend was soon interrupted by the counter-urbanisation processes that emerged at the end of the 1980s and continued until the 1990s (Camarero, 1993). These phenomena led to the decongestion of large urban centres in favour of nearby population centres. Despite this, the problem of depopulation of rural areas in Spain continues to be more pressing than ever, even more so if one considers that nearly 80% of the population is concentrated in only 9% of municipalities with a population of more than 10,000 inhabitants (INE, 2020).

The region of CyL is one of the European regions most affected by the phenomenon of depopulation due to the existence of specific socio-economic characteristics that make it particularly vulnerable to the adverse effects of population loss. Thus, the existence of a greater agricultural tradition in the region is coupled with the smaller initial size of its population centres (García, 2000), characterised by a strong population dispersion and low demographic density, with the smallest municipalities being precisely those which have suffered most severely from the problem of de-population. Municipalities in the region with a population of fewer than 2,000 inhabitants lost, on average, more than 58% of their population in the last five decades (Gómez-Limón et al., 2007).

On the other hand, the demographic change experienced by the region is pressured by the concurrence of several determining factors such as the ageing of the population, the fall in fertility rates, and the aforementioned migratory flows from rural areas to large urban centres.

The available empirical evidence shows that the evolution of the population in CyL has regressive features. It would suffice to analyse the vegetative growth of the population over the last two decades to confirm this (see Table 1).

Thus, while from 1998 to 2018 the Spanish population grew by 17.2%, Castile and León lost 3% of its inhabitants, a percentage that practically doubles when considering the period of 2008–2018. This circumstance is aggravated in the north-western provinces of the region, with population losses of over 8% between 1998 and 2018. Particularly noteworthy is the case of the Province of Zamora, where the population contracted by nearly 15% during this period.

Another factor conditioning depopulation is the degree of rurality of the territory. As can be seen in Table 2, the percentage of the rural population (residing in municipalities with a population of fewer than 2,000 inhabitants) amounts to 25.2% in Castile and León. This figure almost doubles when considering the Province of Zamora. It also shows that more than 90% of the region's municipalities are rural, reflecting the fact that the municipalities that are not considered rural are limited to the provincial capitals and large county seats.

The economic and social imbalances generated by the phenomenon of depopulation and, in particular, the adverse consequences produced by demographic tensions in rural areas, are one of the main concerns in Europe. The Treaty on the Functioning of the EU, known as the Treaty

Table 1. Population evolution of CyL and Spain

Territory	1998	2008	2018	% variation 1998–2008	% variation 2008–2018	% variation 1998–2018
Ávila	167,132	171,815	158,498	2.8	–7.8	–5.3
Bugros	346,355	373,672	357,070	7.9	–4.4	3.1
León	506,365	500,200	463,746	–1.2	–7.3	–8.4
Palencia	179,623	173,454	162,035	–3.4	–6.6	–9.8
Salamanca	349,550	353,404	331,473	1.1	–6.2	–5.2
Segovia	146,755	163,899	153,342	11.7	–6.4	4.5
Soria	91,593	94,646	88,600	3.3	–6.4	–3.3
Valladolid	492,029	529,019	519,851	7.5	–1.7	5.7
Zamora	205,201	197,221	174,549	–3.9	–11.5	–14.9
Castilla y León	2,848,603	2,557,330	2,409,164	2.9	–5.8	–3.0
Spain	39,852,651	46,157,822	46,722,980	15.8	1.2	17.2

Source: the authors' own elaboration based on INE data (various years).

Table 2. Degree of rurality in CyL and Spain

	Total polulation	% rural population	Total manipulation	% rural manipulation	Total population density	Rural population density
Ávila	158,498	34.9	248	95.2	19.7	8.1
Bugros	357,070	24.1	371	97.3	25.5	6.8
León	463,746	23.1	211	85.3	29.8	8.3
Palencia	162,035	26.7	191	94.2	20.1	6.3
Salamanca	331,473	28.7	362	95.9	26.8	8.1
Segovia	153,342	35.7	209	94.7	22.4	9.7
Soria	88,600	28.0	183	95.6	8.6	2.9
Valladolid	519,851	11.2	225	88,9	64.1	9.0
Zamora	174,549	47.5	248	98.4	16.5	8.3
Castilla y León	2,409,164	25.2	2,248	94.4	25.7	7.4
Spain	46,722,980	5.8	8,124	72.3	92.6	9.8

Source: the authors' own elaboration based on INE data.

of Lisbon, takes up this concern and expresses it in Articles 174 and 175 by stating that it is essential to "promote the harmonious development of the Union as a whole", with particular attention to rural areas and regions with severe demographic handicaps or low population density. In this context, the work of European institutions to address the demographic challenge and territorial imbalances has been unceasing, albeit with partly questionable results. This is the case for the 1995 Report from the Commission to the Council and the European Parliament on the demographic situation in the EU, through the European Commission's Green Paper on

Confronting demographic change: A new solidarity between the generations (published in 2005), to the Resolution adopted by the European Parliament in 2017, titled *The deployment of cohesion policy instruments by regions to address demographic change* (European Commission, 1995).

In Spain, concern about the negative consequences associated with the depopulation of the territory has been on the agenda of the main public institutions for several years. In this respect, various actions have been carried out to tackle the demographic challenge. These include the creation of the Commissioner for the Demographic Challenge in 2017 and the development of the National Strategy for the Demographic Challenge, approved in 2019, which aims to provide answers to three demographic issues, namely depopulation, ageing, and the effects of the floating population. To this end, three priority lines of action are established: a) to guarantee the functionality of territories affected by depopulation and low density; b) to improve competitiveness and facilitate the development of new economic activities as well as the promotion of entrepreneurship; and c) to favour the settlement and fixation of the population in rural areas.

The region of CyL has also developed over the last few years a wide-ranging programme of actions in order to respond to the challenge posed by the demographic change. These include the 2016 creation of the Demographic Policy Council of the Junta de CyL (JCyL), as well as the Working Group on depopulation and ageing, in which CyL participates together with other European regions. Also relevant is the approval of the Agenda for the Population of CyL 2010–2020, which was revised in 2017.

Research methodology

The primary research approach adopted here is based on applying case studies as an empirical research technique. In particular, a research strategy to understand the dynamics present in unique contexts is used to collect qualitative and quantitative evidence to describe, verify, or generate theory (Eisenhardt, 1989). In addition, a literature and documentary review of the state of the art was carried out.

In the present study, following the principle of relevance and appropriateness to the formulated research objective, a non-probabilistic and non-random sampling by convenience was adopted to select the territorial unit of analysis. In particular, the geographical area under study is the Spanish region of Castilla y León, which comprises nine provinces (Ávila, Burgos, Palencia, León, Salamanca, Segovia, Soria, Valladolid, and Zamora) and is home to around 2.4 million inhabitants. The criteria applied for the selection of the territorial unit of the study were the following: a) the negative population growth trend; b) a high degree of rurality; c) the ageing demographic structure; d) low population density; and e) a strong dispersion of the population in small, sparsely-populated municipalities. Out of all the analysed Spanish regions, Castilla y León was the territory that best met all these criteria and was, therefore, selected as a representative case study to identify public strategies to promote technological entrepreneurship in rural areas subject to solid demographic tensions in Spain.

Once we had determined the territorial unit of study, the following steps were carried out:

1. Defining the mechanisms for obtaining and accessing organisations and key informants. In particular, persons responsible for industry and employment in the Autonomous Community of Castilla y León were identified, and unstructured personal interviews were used as the main channel for accessing relevant information and documentary review.
2. Transcribing the data through the transcription of the interviews.

3. Analysing the results: the information obtained in the interviews was coded, processed, analysed, and contrasted with the evidence obtained from official statistical sources.
4. Drawing general conclusions.

In the collection of information related to the constructs, multiple sources of were also used, the description of which appears in Table 3.

Table 3. Selection of variables and primary sources of information and data collection instruments

Dimension	The analysed variables	Sources of information
Socio-demographic characterisation of the region	– total population – the percent of the rural population – the number of municipalities – population density – the ageing index	National Statistics Institute (INE, various years)
Strategies to promote entrepreneurship and innovation	– the number of platforms for launching innovative ideas – the number of business accelerators – the number of financial platforms – applications for start–up funding – the cumulative volume of funding – the volume of induced investment – the number of jobs created – the percentage of start–up projects by the productive sector	Startup Reception Plan (JCyL, various years) Strategy for Entrepreneurship, Innovation and the Self-Employed in CyL 2016–2020
Tax incentives to support the creation of startups	– tax exemptions for investment in the development of start–ups – land price subsidies in industrial estates or technology parks – subsidised renting of workspaces and incubators for entrepreneurship – tax deductions on the acquisition of shares in start–ups in income tax – the reduction of the corporate tax rate – a reduction in the corporate tax base	The Law to Support Entrepreneurs (Law 14/2013, of September 27, 2013) introduced in the Personal Income Tax Law (Law 35/2006, of November 28, 2006 Law 27/2014, of November 27, On Corporate Income Tax, 2014 Legislative Decree 1/2013, of September 12, 2013, by which the Consolidated Text of the Legal Provisions of the Community of CyL in Matters of Own and Assigned Taxes is approved, 2013

Source: the authors' own elaboration.

Technological entrepreneurship in rural areas – a lever for transformation

As stated in the 2019 National Strategy for the Demographic Challenge, "the fixation of the population in the territory requires turning it into a space of opportunities, which takes advantage of local resources through the generation of economic activity, the promotion of entrepreneurship and the use of the talent associated with the environment" (Náñez, 2020a).

In this context, technological entrepreneurship is postulated as a transforming and dynamising lever for the rural environment, and as an engine for economic growth, generation of quality employment, and population fixation. The available evidence shows that 'technological companies' are characterised by achieving the greatest productivity gains in the shortest time. Despite this, the technological entrepreneurial initiatives that can be developed in rural areas are strongly conditioned by the existence of insufficient infrastructures and connection networks. The existence of a digital divide in rural areas (Jorge-Vázquez, 2021, 2022), associated with a lower degree

of technological training and adoption by the population, can also be an obstacle to the development of entrepreneurial initiatives in the technology sector. To overcome these difficulties, it must be the priority to guarantee full territorial connectivity by the commitments set out in the European Digital Agenda 2020.

The role of start-ups in promoting rural entrepreneurship. Case study: CyL (Spain)

CyL is an example of a European region that in recent years has been able to adopt specific innovative actions aimed at favouring and strengthening the regional entrepreneurial ecosystem. These measures have focused on improving business competitiveness based on four main lines of action: financing, growth, scaling, and internationalisation. The promotion of start-ups has also been facilitated by the creation of a regional network of accelerators and incubators, together with the implementation of specific programmes aiming to boost local entrepreneurship in rural areas.

Strategy for the promotion of emerging entrepreneurship and innovation in CyL

Strategies aimed at encouraging entrepreneurial activity and the proliferation of start-ups by public administrations are present in all processes and policies for territorial development and the productive fabric of any public administration. More specifically, in the case of CyL, within the *Plan de acogida a startup*, five types of initiatives can be distinguished in the process of creating or developing start-ups with the purpose of turning them into competitive companies:

– launching pad for innovative ideas – this section would be aimed at entrepreneurial ideas in the early stages;
– business accelerator measures – aimed at transforming a high-potential project into a business opportunity within the shortest possible time;
– financial platform – financial measures aimed at the start-up and development of innovative entrepreneurial projects through various instruments such as grants, microcredits, subsidies, etc.;
– land – this section includes all the subsidies for entrepreneurs who set up in the Technology Parks located in CyL;
– tax incentives – this last aid package would be aimed at encouraging contributions from investors interested in supporting the development of start-ups.

All these measures aimed at Startups are included in the Strategy for Entrepreneurship, Innovation, and the Self-Employed of CyL 2016–2020 (JCyL, 2021).

Since the creation of this financial platform in 2016, and according to the latest data published in the first quarter of 2021, 19,376 applications have been submitted and more than 88% have been financed with an amount of more than 2,585 million EUR and an induced investment of more than 4,577 million EUR. In cumulative terms, the number of applications increased by 1850% in the period of 2016–2021. In terms of employment, this translates into the maintenance or creation of 192,485 jobs. By productive sectors, the services sector accounts for 23.2% of the submitted projects; it is followed in order of importance by the commerce sector (21.7%), the agri-food sector (15.5%), and the tourism sector (11.4%).

Within this programme, a series of grants or subsidies can also be found to promote investment activities, R&D&I and the internationalisation of companies. There is also the possibility of financing with venture capital, with a minority and temporary participation in the share capital of the companies. One of the advantages of this resource is that it does not require guarantees, as

banks do not participate in it. The ICE has shares in Sodical (*Sociedad de Capital Riesgo de CyL*), which invests in companies for an amount ranging from 20,000 EUR to 2,000,000 EUR and for periods of between four and seven years. This company also manages seed capital projects. In this case, the amount ranges from 20,000 EUR to 90,000 EUR, and the term is between three and five years. JCyL has also a series of capitalisation programmes, including the following: mining land, innovative growth plan, entrepreneurship with an innovative component, and the consolidation of innovative companies.

JCyL also participates in projects of the European Commission and the EIB group. One of these is the SME initiative, which aims to provide financing to small and medium-sized enterprises in several European countries. The ICE has signed agreements with different agents that support entrepreneurship, and it has an entrepreneur's office that offers various services. JCyL supports the internationalisation process of companies with advice on trade promotion and other issues.

In fact, the ICE has offices in different countries around the world to support companies at the point of destination. In the field of innovation, training and capacity-building activities for company employees and managers stand out, as human capital is one of the essential factors for promoting R&D&I. Among the training programmes, the *Gestidi Executive* programme stands out, which seeks to update the knowledge of technicians and managers in this field. The main training areas include digitalisation, product, or process innovations and 4.0 technologies. The public sector can also promote innovation through the Public Procurement of Innovation (PPI), which is an instrument that consists in purchasing business solutions based on innovation.

Fiscal policy to support rural entrepreneurship

Supporting start-ups in their initial stages is fundamental and to this end, it is important to have the support of the public sector. This support is implemented through public policies. Within these policies, JCyL stands out in two areas:

1) Allowances for entrepreneurs setting up in the Technology Parks of CyL:

This is a series of public incentives implemented by the 'no income' side, by which JCyL selects an industrial land in different industrial parks or centres where start-ups can start their activity with a bonus on the price of the land. There is also an offer of spaces for rent in the region by the Junta, which offers discounts to entrepreneurs. In some cases, these are buildings for common uses, while others involve co-working spaces (see Figure 1).

As can be seen, the territorial distribution of the industrial estates where JCyL introduces a bonus for the establishment of startups is well-distributed. Only the province of Soria in the border area with Aragón, the eastern part of the region (Zamora-Salamanca), and the north of Palencia show gaps in terms of industrial estates with a bonus from the region of JCyL. In addition to this subsidy, there is also an example of good practice in the subsidised rental of co-working areas for entrepreneurs and common use, as shown in Figure 2.

In this case, there is not such a wide territorial distribution of these places where start-ups, instead of buying, can rent space. Most of them are concentrated in the capital of the region (Valladolid) and its surroundings.

2) Tax incentives to encourage contributions from investors interested in supporting the development of start-ups:

Undoubtedly, the entrepreneurial ecosystem is booming, so investing in start-ups can become a powerful engine to stimulate the local economy. Precisely with the aim of stimulating investors

to allocate part of their assets to start-up business projects, the State has provided a series of tax benefits (Náñez, 2020b).

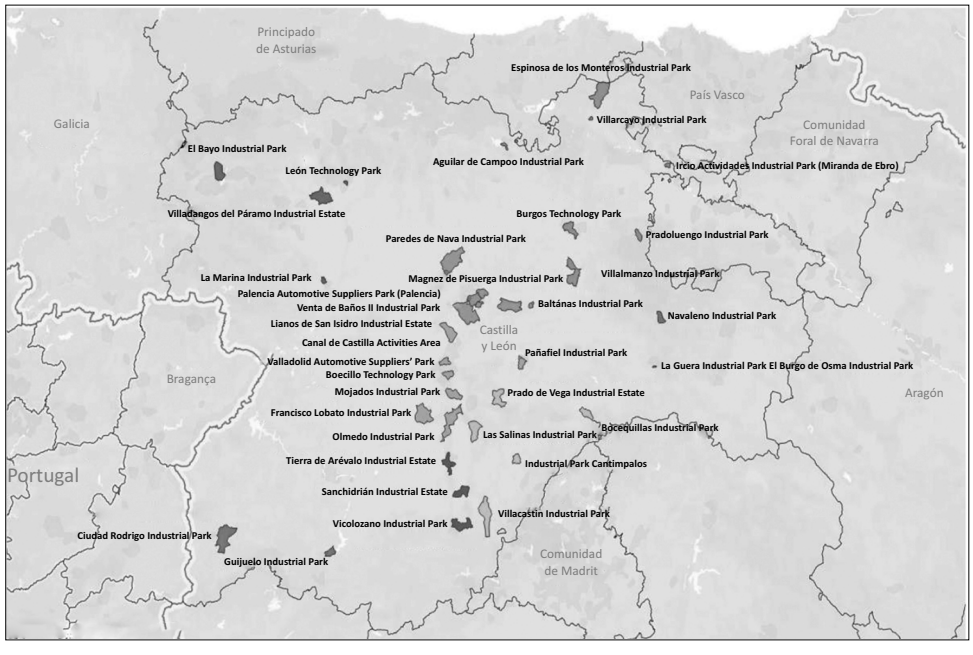

Figure 1. Industrial Park with Start-up establishment bonus by province

Source: the authors' own elaboration using the Tableau Desktop Edition and data extracted from JCyL.

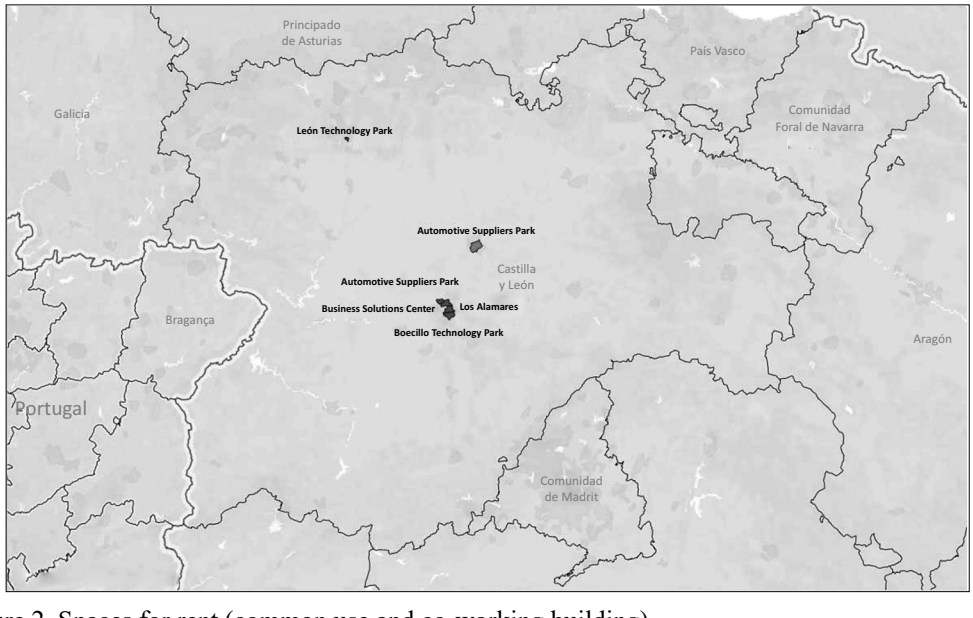

Figure 2. Spaces for rent (common use and co-working building)

Source: the authors' own elaboration using the Tableau Desktop Edition and data extracted from JCyL

The Law to Support Entrepreneurs (Law 14/2013, of September 27, 2013) introduced in the Personal Income Tax Law (Law 35/2006, of November 28, 2006) allows for a deduction of 20% of the amounts destined to the acquisition of shares in startups. However, the applicable deduction was limited to 50,000 EUR per year (i.e., up to the maximum deduction limit of 10,000 EUR). In addition, at the state level, start-ups can apply a reduced corporate income tax rate of 15% in the first year in which their taxable income is positive, as well as in the following year. Additionally, those start-ups that receive their income from the exploitation of certain intangible assets may take advantage of a reduction in the corporate income tax base of up to 60% (effective tax rate of 10%) by applying the tax regime known as the "patent box" (Law 27/2014, of November 27, On Corporate Income Tax, 2014). All these measures aimed at supporting Startups are included in the Strategy for Entrepreneurship, Innovation, and Self-Employment of CyL (2016–2020), and the tax incentive in favour of entrepreneurs is included in the 8th article (Legislative Decree 1/2013, of September 12, 2013, by which the Consolidated Text of the Legal Provisions of the Community of CyL in Matters of Own and Assigned Taxes is approved, 2013).

Specifically, the incentive is included in the Personal Income Tax and affects those who invest in a start-up located in CyL. Taxpayers will be able to deduct 20% of the amounts invested during the year in the acquisition of shares or participations as a consequence of agreements for the incorporation of companies or capital increase in public limited companies, limited liability companies, or labour companies when the company allocates the financing received to investment projects carried out in the territory of CyL. Acquisitions of shares or participations for a minimum amount of 0.5% and a maximum of 45% of the capital of the company, which are maintained in the assets of the acquirer for at least three years, will give the right to apply this deduction. The maximum amount of the deduction will be 10,000 EUR. However, it is necessary to comply with additional requirements related to the maintenance of the workforce.

As can be seen, despite maintaining a deduction percentage similar to that of the other Spanish regions under scrutiny, CyL has a higher deduction limit, which is beneficial.

To promote the development of viable business projects in CyL, the regional government has designed a financial platform for public-private collaboration whose main objective is to finance the business competitiveness strategy and, in particular, to promote innovation and inclusive, rural, technology-based, social entrepreneurship. This instrument, managed by the ICE, aims to boost the economy of the most disadvantaged rural areas of the region, which are subject to strong demographic pressures such as depopulation and ageing. The business projects eligible for this programme can be new or can be the result of an expansion or modernisation, as long as they meet three requirements: a) the project must be developed in CyL; b) it must be technically-, economically-, and financially-viable; and c) it must be intended to finance investments or working capital.

Conclusion

The strong economic and social imbalances linked to depopulation are nowadays a common factor of concern in a large part of Europe. The need to repopulate the most depressed areas and provide them with new opportunities and instruments to boost their economic activity is unquestionable. Spain has been one of the countries that have suffered most severely from the consequences of the great rural exodus that took place in the middle of the 20th century and, in particular, in the Spanish region of CyL due to its socio-economic characteristics.

Empirical evidence has shown that economic conditions have impacted the extent and duration of migration flows from rural areas to a more industrialised urban environment. Thus, in recent decades, a spatial distribution of the population has taken shape, characterised by strong concentrations in large cities as opposed to the dispersion and low density of the population in large areas of the territory.

Finally, the promotion of rural entrepreneurship through the development of specific actions to encourage the creation of start-up companies could be a solution to the demographic challenge. The region of CyL is a good example of a territory that has been affected by the adverse effects of depopulation but, in recent years, has been able to lead a strategy of business revitalisation in its rural environment. The creation of a regional entrepreneurial ecosystem has been possible owing to the financing, growth, scaling, and business internationalisation programmes promoted by the regional government. The creation of a network of incubators has also boosted the creation of rural start-ups that are helping to generate employment and fix the population in a very accelerated manner.

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Yuliya Idak

A Vision for Recovery Models of Ukrainian Cities

Abstract

Objectives: The direction of the research is determined by the necessity to generalise and systematise knowledge about the ways of forming and organising the material and spatial environment of human activity at the territorial level, adapted to the needs of modernity. It needs to meet the tasks of sustainable development. The result of the work will be the selection of basic models that will deepen the understanding of the nature of the modern functioning of the living environment as well as will be able to serve as an ideological basis for the reconstruction of war-ravaged settlements of Ukraine.

Research Design & Methods: In order to explore the methods for the recovery of Ukrainian cities, I have studied the European experience of modern architectural and urban planning practice in the cities of Austria (Vienna, Graz, 2022), Germany (Munich, Bielefeld, 2022), and Poland (Kraków, Wrocław, 2022). The main part of the research begins with the selection of attributive categories and the generalisation of various ways of organising the residential environment, which are in the vision of modern European city planning and are expressed through specific concepts and categories. Next, it was about the models that fix the connections and relationships essential to the specified conditions.

Findings: The formation of residential units in Austria, Germany, and Poland made it possible to identify five basic models. Each of them is guided by theories, principles, concepts, and categories relevant to the essence of the model, but they are united by the paradigm of sustainable development. The contents of the proposed models open as follows: *the formal model* is focused on the harmonisation of the urban environment; *the classical model* is about the compliance with industry standards; *the socio-economic model* is involves ensuring equal and sufficient opportunities for citizens; *the ecological model* values the preservation and restoration of the natural environment; and *the conceptual model* is about producing ideas based on innovations.

Implications / Recommendations: Such models do not necessarily have to be tied to specific places, but they are capable of initiating the introduction of new ideas and technologies into the organisation of the material and spatial environment of human life.

Contribution / Value Added: This work is largely related to the filling of a theoretical lacuna that exists in the theory of urban planning, and is provoked by the development of special forms of the social, material, and spatial organisation of the residential environment within a certain territory and under certain conditions.

Keywords: cities, recovery, sustainable growth, theoretical models

Article classification: theoretical article

JEL classification: O180, O440

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Introduction

The end of the war in Ukraine is inevitable, and the post-war reconstruction of the destroyed cities will be very necessary. Today, numerous online platforms are appearing, funds are being created, programmes are being developed, and declarations are being adopted regarding the restoration of infrastructure and the further development of settlements after the consequences of Russia's military aggression. Against the background of recent events, such measures demonstrate the unprecedented unity of the Ukrainian society and the international community, and provide an opportunity to abandon Soviet narratives represented in architecture and urban planning.

The principles regarding the post-war reconstruction of Ukrainian cities, which are defined in official documents as basic (Shmyhal, 2022; *Ukaz prezydenta Ukraïny Pro Stratehiiu staloho rozvytku; Stratehiia staloho rozvytku Ukraïny do 2030 roku* (*proekt*), are rooted in the implementation of European living standards. Some of them have a political and socio-economic nature, but there are also those which are related to various spheres of society, such as architecture, ecology, urban planning, and many others. The proper functioning of each of them contributes to the selection of certain criteria and the establishment of clear methods, which ensures the reliable development of the city. In a complex, both the evaluation characteristics and the rationally-composed methods are able to create a logical model and form a solid foundation for the implementation of the tasks of the post-war reconstruction and development of populated areas. The scale of the destruction and the need to restore the spaces in accordance with the European standards and the practices of life organisation will ensure their significance in both the short- and the long-term.

As of June 2022, more than 350,000 objects of vital infrastructure and 45 million square meters of housing stock have been destroyed in Ukraine. Some of these objects can be restored, while others are completely destroyed (Makuha, 2022; Solovchuk, 2022).

For urban planning, which takes a direct part in the creation of the material and spatial environment of human life, the development of foundations for the formation and organisation of settlements in the conditions of post-war reconstruction is particularly relevant and is measured by a long-term perspective. This necessity is also strengthened by the fact that every year, the requirements for the quality of the Europe-oriented urban spaces are constantly increasing. Therefore, the direction of the research is determined by the necessity to generalise and systematise knowledge about the ways of forming and organising the material and spatial environment of human activity at the territorial level, adapted to the needs of modernity. It also needs to meet the tasks of sustainable development.

Material and methods

This article will be about the selection of basic models that will deepen the understanding of the nature of the modern functioning of the living environment and will be able to serve as an ideological basis for the reconstruction of war-ravaged settlements of Ukraine.

This work is largely related to the filling of a theoretical lacuna that exists in the field of city planning, and is provoked by the development of special forms of social, material, and spatial organisation of the residential environment within a certain territory and under certain conditions. The main part of the research begins with the selection of attributive categories and the generalisation of various ways of organising the residential environment, which are in the vision of modern

European urban planning and are expressed through specific concepts and categories. Next, it will be about the models that fix the connections and relationships essential to the specified conditions.

The problematic situation of the study is due to the lack of works devoted to various aspects of the formation and specifics of the organisation of settlement units at the territorial level and in the context of sustainable development. Therefore, the theoretical basis of the research was made up of the works of international scientists and various levels of institutions regarding the sustainable development of the city (Buchholz & Weigel, 2021; N′oltinh, 2020; Weigel, 2021) as well as the specifics and peculiarities of their organisation at the functional, planning, morphological, and compositional levels (Curdes, 2010, 2015; Frey, 2005; Jabareen, 2006; Litfin, 2012; Pleshkanovs′ka, 2008; Pleshkanovska, 2019; Pleshkanovskaya, 2020; Singh et al., 2019; Timokhin, 2019, 2020). Most of them focus on the characteristics of formal structures in the context of social stability and security within certain settlement units, the quality of the living environment, the rational use of natural resources and sustainability, and, especially, social cohesion. In this context and for understanding the nature of the residential environment, taking into account the modern realities of life, the works related to the formation and specifics of the functioning of closed communities are particularly significant (Durington, 2011; Grant & Mittelsteadt, 2004). The expert circle mostly connects these issues with social topics. At the same time, due to the nature of material expression (Idak, 2020), they function like a territorial object with clear signs and properties, and become the subject of focused attention in the field of urban planning.

The methodological basis of the study invoved the approaches used for the theoretical understanding of problematic situations in the process of deepening knowledge about the formation and development of the material and spatial environment of human life and the generalisation of practical experience. The method of theoretical analysis – which ensured the selection of the research topic, definition of the essence of key concepts and categories for the study, the systematisation and generalisation of facts about the specifics of the functioning and peculiarities of the development of the material and spatial environment of the life of society at the territorial level – also proved its effectiveness. The logical and epistemological approach is included as well. Its application was based on the necessity to justify the reason for the search for scientific foundations, important for solving urban planning problems in accordance with new ideas and standards, and finding conclusions stating that the problem of developing effective mechanisms for implementing the concept also occurs in the field of city planners; as well as functional and planning analysis of the modern residential structure and morphological description.

Practices and models of forming the material-spatial environment of human life

Since the beginning of the 21st century, attention has been paid to the triad of the categories of ‘knowledge’, ‘experience’, and ‘idea’, which have become particularly significant in architecture, town planning, and urban planning, and now it is the basis of the modern system of theoretical and practical thinking. From this position, the need for scientific generalisation and analysis of modern concepts and theoretical and methodological foundations became important. It is also necessary for the formation of the material and spatial environment of human activity in accordance with the conditions of rational thinking and with the necessary assimilation of innovative ideas.

The European experience of the modern architectural and urban planning practice demonstrates sustainability in compliance with the principles of sustainable development at the level of forming and organising public spaces, residential environments, recreational centres, and

other components important to the full functioning of the material and spatial environment of human life. In Ukraine, with the understanding of the necessity to implement a new model of city development (N′oltinh, 2020), trends have become evident. It makes it possible to consider European techniques as basic (Vienna, Graz, 2022). A comparative analysis of examples of such solutions in the cities of Austria (Vienna, Graz, 2022), Germany (Munich, Bielefeld, 2022), and Poland (Kraków, Wrocław, 2022) enabled the identification of the main groups of approaches based on compliance with high social and environmental requirements:

– the formal approach;
– the classical (normative) approach;
– the social and demographic approach;
– the ecological approach;
– the conceptual approach.

In theory, all conditions necessary for the comfortable functioning of the living environment are determined and explained by knowledge from various fields of science and obtained from experience acquired in various spheres of human activity. Thus, *the formal approach* is based on the methods and means defined in the architectural and urban planning composition. *The classical approach* is based on the features of the development and organisation of the functional and planning structure of the urban territory. *The social and demographic approach* is based on specific characteristics associated with the joint activities of various individuals and their interaction on a specific site. *The ecological approach* focuses on the measures aimed at preserving and restoring the natural environment, while *the conceptual approach* arouse from the need to introduce the latest innovative technologies. At this stage of the development of urban planning practice in Ukraine, the conceptual approach is particularly relevant, as there is a huge gap between real scientific and technological achievements and established tools. Its implementation actualises the urgent need to update both the educational and methodological support of the educational process (Kapushchak et al., 2021), as well as the development of recommendation materials for quality work on project solutions.

For the effective implementation of each of the approaches in practice, it is effective to develop certain models in the form of a general scheme of description through the selection of key characteristics for forming and organising the residential environment. In such a situation, they can be a toolkit for solving specific problems based on real experience.

The formal model of the functioning of the material-spatial environment of human life. It is a unique tool of representing urban structures with an emphasis on getting impressions from their appearance. The nature of such a model is determined by the form and rejection of those provisions that determine the necessary filling of the object. Concepts and categories formulated within the framework of composition and morphology are the basis of its understanding. Due to the impossibility of quantitatively reproducing the rules of its organisation, it has a qualitative character. The emphasis on form as an important characteristic of urban structures is present in works that do not lose their relevance and are fundamental for the theoretical understanding of the specifics of the functioning of the material-spatial environment even today. This is the case with the American urban planner and theoretician Kevin Lynch (1960). Although, he emphasised the content embedded in every image of the city, he also paid great attention to the form. In his opinion, the form enhances the meaning of the city, but in no way suppresses it. In his theoretical work (Lynch, 1960), the author focused on identifying the components of the image of the city by comparing it with objective forms: paths, edges, districts, and landmarks.

Researchers in the study of urban morphology talk about form as some characteristic that is devoid of essence and often does not reflect aspects that are important nowadays (Idak, 2020, 2021). Thus, according to Vitor Oliveira (2013), the shape and structure of the city, although dependent on social and economic aspects, reflects them in an indirect way.

The effectiveness of the formal model is ensured by the principles underlying the composition. In urban planning, they act as a way of organising urban structures in order to achieve general spatial unity and harmony, and combine means to ensure the interconnection of constituent parts determined by the artistic design and function of the object.

The traditional problem of modern urban planning is the expression of the compositional centre, which can be equally appreciated both in the panorama and in its direct comparison with a person. Various ways of organising multi-element structures (Figures 1a, 1b) can help solve this problem.

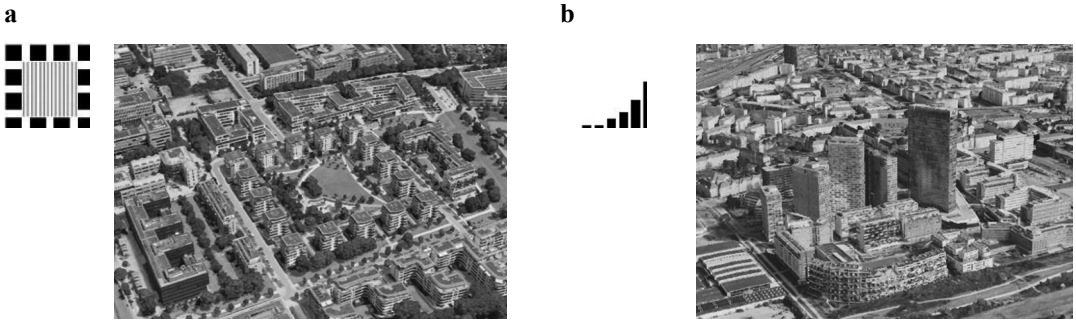

Figure 1. Examples of the formal organisation of multi-element structures: **a** – subordination of form, Munich (Germany); **b** – subordination to the compositional centre, Wienerberg City, Vienna (Austria)
Source: Google Earth 7.3 2022 (see: https://www.google.com/earth/versions/).

The classic model of the functioning of the material-spatial environment of human life. The classic or normative model is a subject system of theoretically-studied and actually approved norms and rules regarding the functional and planning-related organisation of urban structures. A feature of this model is the emphasis on strict compliance with legal acts that regulate the planning and development of the territory. The value of the model lies in the rationality of decisions and the absence of subjectivism.

The principles are basic in the process of implementing such a model. They are the fundamental norms of a methodological nature that regulate the activity of an architect-urban planner. Taking into account the specifics of urban planning in Ukraine, we assume that the principle of zoning and the principle of development should be considered as the main ones. The appropriateness of the allocation of the principle is related to the necessity for the effective distribution of urban structures limited in size and the rational arrangement of the components of the urban infrastructure.

The need to update the functional and planning capabilities of the territory presupposes compliance with the principle of development. As a category, it is one of the main concepts of modernity, as it reflects the transition from one qualitative state to another, and much higher one. The design of large-sized objects requires the determination of rational prognostic aspects regarding the compaction or change of their functional content. Of course, functional changes of such objects will entail changes in other components, such as the planning structure. Because

of this, it is important to predict the direction of development of the designed object. Moreover, if it is possible, one should model it so that in the future such changes do not reduce the level of comfort and safety in the created residential environment. It is also necessary to understand that any changes must be made in accordance with the requirements and needs of the new time.

At the same time, the implementation of such a model as a basic one can cause considerable discussion among Ukrainian scientists and planners. This is due to the need to make certain changes to the legal framework and approaches based on it (Pleshkanovska, 2019).

The classical approach is organically combined and complemented by other methodological approaches, especially those that correlate with urbanism and form the basis of the concept of sustainable development.

The social and economic model of the functioning of the material-spatial environment of human life. The social and economic model is a schematic image of a residential unit, the structure of which is determined by socio-economic and socio-political categories. The mechanism and functioning of such formations depend on the social groups to which it is directed and the economic policy within which they are implemented. There are also cultural differences and a historical background. Because of this, each state, each cultural region has its own socio-economic model. Each model has certain trends and features that can be identified. In one case, they are determined historically and related to the tradition of organising settlements for internally-displaced persons, workers, disabled soldiers, and other social groups. This practice is especially widespread in Germany, and its origins lie in the post-war crisis and the introduction of the newest socio-political model at that time – the social market economy. The new forms of settlement became widespread because of the terrible living conditions in the pre-war buildings (German: *Siedlungen*). Most of them exist today in an unchanged form, with visually noticeable methods of organising the living environment that were relevant at the time: row buildings with compact houses and gardens that surrounded them. There were also blocked houses and perimeter buildings with closed courtyards, and various types of socialisation centres. In other respects, the socio-economic policy is oriented towards the maximum provision of affordable and comfortable housing.

The residential formations '*Domagk*' (Figure 2a) and '*Seestadt*' (Figure 2b) came under special scrutiny. For our research, the choice of these formations was determined by the common idea of providing maximum social benefits at the level of forming the material and spatial environment of human activity in accordance with the concept of sustainable development.

a **b**

Figure 2. Social and economic approach to the organisation of the living environment: **a** – '*Domagk*', Munich (Germany); **b** – '*Seestadt*', Vienna (Austria)

Source: photos by Yuliya Idak, 2022.

The differences in the formal and content-wise nature of '*Domagk*' and '*Seestadt*' can be traced in their organisation. They express certain tendencies. The formal side of these residential formations is described by the morphological characteristics of their material structure[1] and is expressed by the general appearance of the territory, size, and density. If '*Seestadt*' is regularly planned with a high density of built-up territory and relatively large dimensions (1.2 × 1.6 km), then '*Domagk*' is significantly smaller (0.1 × 0.09 km), irregularly planned and with optimal number of buildings in relation to the area of the territory. There are also significant differences in content that are revealed in the urban planning concept. Namely, the economic component dominates in '*Seestadt*', which is manifested in the maximum density of buildings and functions (*Die Seestadt Wiens*: Official site). In '*Domagk*', on the other hand, the social component became dominant (WAGNIS, 2016), which is expressed in the provision of maximum cohesion in a limited territory. Residential buildings were built here in 2012 on the site of one of Europe's largest art colonies. The overriding idea in the organisation of such an institution was the preservation of the artistic component and the creation of opportunities for the implementation of author's ideas at the level of organisation of the subject-spatial environment.

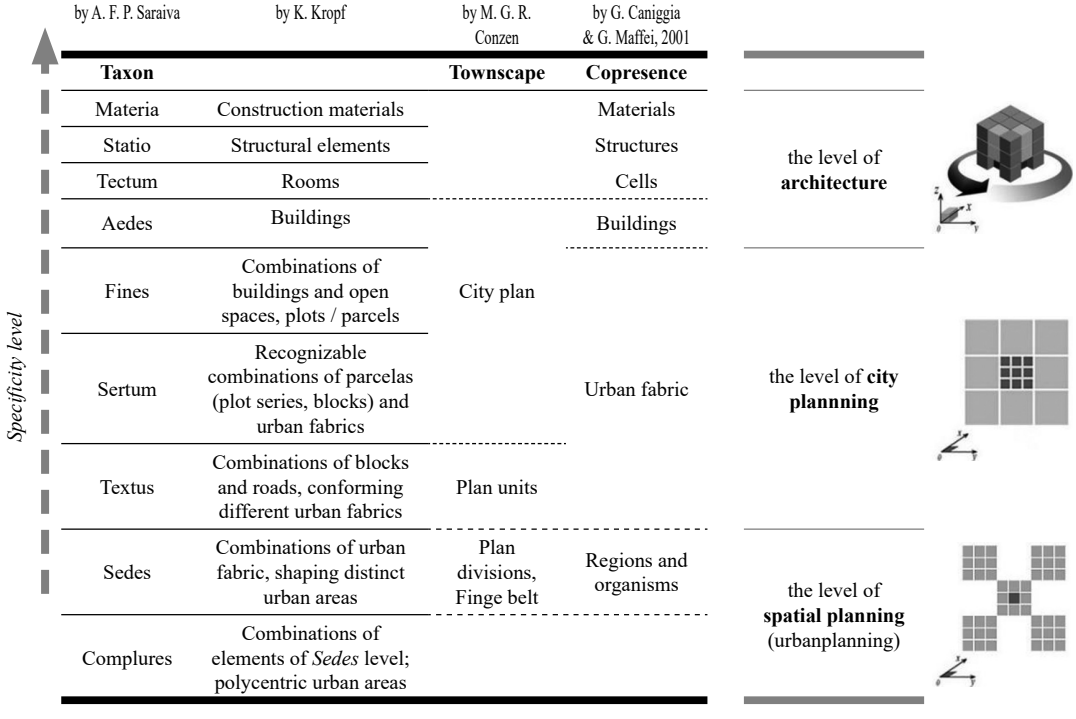

Figure 3. Hierarchy of architectural and urban planning objects and their structural elements (by A. F. P. Saraiva, K. Kropf, M. G. R. Conzen, G. Canigga, & G. Maffei)

Source: Processed by Yuliya Idak, 2020; based on Saraiva (n.d.).

[1] The material structure of the city is the city's substantial level, which is expressed as a set of interconnected structural elements, is opposed to the planning frame, and is considered as its filling at three conventionally-accepted hierarchical levels: macro-, meso-, and micro- (Idak, 2022).

The application of the social approach requires a thoughtful study of the characteristic features of social relations, which express a set of multifaceted relationships that arise between subjects of social interaction and characterise society or community as a whole.

Social interaction does not occur intuitively, but is in a certain way interdependent with other actions and related to different individuals. Here, the model of three levels of interaction in the residential environment finds its place, which is consistent with those that were the basis of research done by European urbanists (Caniggia & Maffei, 2001; Conzen, 1960; Kropf, 2017) (Figure 3):

– *the micro level* – it is a person's private space that functions only with his/her participation; place – living room;
– *the mezo level* – it is the private space of a certain social group towards which an individual feels a sense of belonging and identifies it as his/her own. This is where social control takes place, guided by a certain set of rules and standards. This limits certain actions of the individual, but directs him/her to master clear cultural norms and choose a social role; place – residential building, residential quarter;
– *the macro level* – it is public space owned by the community or freely accessible and used by various social groups; place – district of the city, settlement.

Figure 4. The ecological approach to the organisation of multifunctional complexes of the city, Werksfirtel in Munich (Germany)

Source: photo by Yuliya Idak, 2022.

This approach to understanding a socially-oriented residential environment is especially relevant to Ukraine at a time of active displacement of people who are forced to leave their places of residence. For their successful socialisation, it is necessary to create conditions for free choice and access to various social groups, including the already existing ones.

The ecological model of the functioning of the material-spatial environment of human life. The relevance of the ecological model is dictated by measures aimed at preserving and restoring the natural environment and the policy of sustainable development. Today, to design an eco-settlement is not just to create a populated place, devoid of traffic and built up with houses with high ecological standards. Here, it is important to introduce an effective mechanism for the efficient and economical use of natural resources and the growth of the quality of the environment.

Another effective way of implementing an ecological model is the way to live a greener life away from the contemporary society dominated by individualistic and consumer-based living (Sevier et al., 2008).

The Werksfürtel in Munich (Germany) is a great example when the ecological approach is the basis of the project concept. Werksfürtel is a newly-built area in the northern part of the city on the site of a former factory and is intended for life, work, recreation, and culture, as a way of expressing creativity, forming an individual identity, and strengthening a sense of self in the society (*Werkviertel* – Official site). The priority task in the creation of the district was the ecological approach, which was reflected in the maximum preservation of the existing buildings, the greening of the roofs (the creation of grass and flower meadows and the cultivation of berry crops), the organisation of urban farms (a farm was created on one of the roofs, where sheep, rabbits, and chickens live), the optimal density of buildings and functions, the use of renewable energy sources, and the formation of living fences (which, according to the authors' idea, will have a certain purpose: a habitat for insects, birds, and small wild animals, as well as a way to dispose of the remains of woody plants).

The conceptual model of the functioning of the material-spatial environment of human life. The conceptual approach is a set of ways of creating something, in which the idea is of decisive importance and the created object itself is only a dummy that imitates a certain unit to which attention is directed. Since in the process of designing urban planners often deal with popularising certain innovative solutions, attracting the attention of potential consumers and future investors is of particular importance. Therefore, the conceptual project, as a product within the framework of the implementation of such an approach, functions as something unique, influencing the consciousness and the future of making the necessary decisions at various levels of society.

An example of the implementation of such a development model can be universities, research centres, and high-tech industries, which are more and more often becoming the core of the contemporary city spatial organisation (Pleshkanovskaya, 2020).

As various activities appear, there is a necessity to popularise ideas that are developed without the use of means and methods typical of traditional design. Such an approach is especially relevant at public events, where innovative ideas are demonstrated in various ways, as well as issues related to the urban way of life and its further development are raised. For example, a well-known event of this sort is the Venice Festival of Architecture [It. *Biennale di Venezia*], the main theme of which is demonstrating in an arbitrary form architectural and urban planning solutions for solving problems of a social, humanitarian, and technical nature. This actualises the problem of developing a conceptual approach and effective mechanisms for creating a unique product, moving away from stereotypical thinking about the formation of a material and spatial environment, as well as the introduction of innovative technologies into its structure.

Conclusion

Adherence to the principles of the universally-accepted concept of sustainable development remains a strategic task for the development and restoration of the living environment of populated areas of Ukraine. At the same time, there is a problem in its universality and the extremely wide range of categories it operates with. This complicates the possibility of a successful application of the basic provisions dictated by the concept at the level of urban planning.

International practice demonstrates a clear and coordinated movement in the direction of these provisions' implementation. There are numerous examples of urban-planning solutions that, in a certain way, reflect the norms dictated by the concept. In such a situation, it is considered effective to develop a clear scheme for describing the features of the formation of the material

and spatial environment of human activity in the form of a model with an emphasis on one of the components. At the same time, the unity of the concept will be ensured by the need for clear interaction of other components.

The formation of residential units in Austria, Germany, and Poland made it possible to identify five basic models. Each of them is guided by theories, principles, concepts, and categories relevant to the essence of the particular model, but they are united by the paradigm of sustainable development. The content of the proposed models opens as follows: the formal model is focused on the harmonisation of the urban environment; the *classical* model values compliance with industry standards; the *socio-economic* model puts emphasis on ensuring equal and sufficient opportunities for citizens; the *ecological* models is about the preservation and restoration of the natural environment; and the *conceptual* models focuses on the production of ideas based on innovations.

Such models do not necessarily have to be tied to specific places, but they are capable of initiating the introduction of new ideas and technologies into the organisation of the material and spatial environment of human life.

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