

ACHIEVEMENTS TO DATE AND EXISTING RESEARCH GAPS IN PROJECT MANAGEMENT IN THE LIGHT OF LITERATURE STUDIES

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Purpose: The purpose of this article was to identify current development directions and potential research gaps in project management.

Design/methodology/approach: The method of systematic review of articles published in the Elsevier – Science Direct database in the years 2000-2019 was used, where the search phrase was “project management” and the type of articles was “research articles”. In order to answer the research questions posed, an additional method of analysis and criticism of the literature was used.

Findings: The following conclusions were drawn from the analysis of the articles: a) almost a third of them concerned the practical application of PM issues in one clearly defined sector of the economy, with the most common reference being to the building sector and IS/IT, b) most articles were created in English-speaking countries (47%), c) the largest number of articles concerned the area of human resource (HR) management, including many subjects of qualifications and leadership, d) of the ten areas of knowledge specified in PMBoK, “HR” and “scheduling/time” were the most popular, followed by risk-related issues.

Practical implications: The findings of this article would contribute to building a strong and coherent theory and identify best practices in project management.

Originality/value: The most important achievement is the recognition of two areas of knowledge – lean management and game theory – where little research has been done so far, and whose solutions and methods could be successfully implemented inside PM.

Keywords: Project Management; Research trends; Literature review

Category of the paper: Literature review

1. Introduction

Projects have accompanied humanity since the dawn of time, but modern project management emerged as a social practice only after World War II as a set of procedures, models and techniques (Hodgson and Cicmil, 2006), derived from operational research and focused on

the development of planning and scheduling methods (Söderlund, 2004b). The above concept, which from the beginning had both ardent supporters and opponents, despite numerous debates, disputes and the recurring wave of criticism, was accepted as an indispensable element of economic development (Cicmil, and Hodgson, 2006) and quickly covered not only new geographical areas but it has also penetrated almost all industry sectors (Archibald, 2004). Unfortunately, despite mastering so many levels of social life, project management, until the end of the nineties, suffered from a lack of sufficient theoretical foundations (Koskela, and Howell, 2002) that would qualify them as a full-fledged field of science.

However, this state of affairs could not last long – project management has become a key business process for many companies and its economic significance has not ceased growing (Maylor, 2001). It quickly became clear, that the development of specific competences in this area can not only lead to the development of enterprises against the background of a rapidly changing market, but even be a necessary condition for their survival (Jugdev et al., 2001). The world of science has recognised the need to broaden and supplement the theoretical foundations and to integrate them into practical management (Söderlund, 2004).

Projects have ceased to be treated as independent enterprises or closed systems. To understand their variability, factors that guarantee success, causes of failure, impact on the surrounding business environment, it was necessary to put them in the right context – both historical and organisational (Engwall, 2003) and to introduce a formal categorisation of their types (Shenhar, 2001). Two different approaches to project management were clearly outlined (Winter et al., 2006; Pollack, 2007): the first, hard, rooted in system theory, strictly focused on providing analytical models and planning techniques, concentrating on increasing performance and optimising elements “the iron triangle” – cost, time and scope. This approach – although having undoubted qualities of engineering precision, was criticised for too narrow view at the problems faced by practitioners.

As part of the second – soft approach – projects have gained a wider meaning and began to be perceived as complex social systems (Cicmil et al., 2006; Hodgson, and Cicmil, 2008), closely related to all processes in the organisation and providing – in addition to the requirements set – additional business values. Risk management, interactions between stakeholders and the efficient flow of information gained importance. It also became clear, that one of the important success factors of the undertaking is the proper selection of the project team and its skilful management.

There was a need to isolate and describe good practices and, finally, formal certification of emerging knowledge. Certification programmes, due to their high efficiency, soon gained huge popularity (Morris et al., 2006). Already since the sixties, the first attempts to communicate between profession experts and the formation of the first project management societies could be observed. In the eighties, the Project Management Institute (PMI) began its certification programme, and not long after the British Association for Project Management (APM)

(Morris et al., 2006b). Soon, there was a rapid development of such associations around the world (Morris et al., 2011).

Projects are currently making a significant contribution to the global economy. They are used in every industry – both private and public enterprises, government institutions and non-profit organisations. They are important instruments used to shape the company's strategy (Gareis, and Huemann, 2007).

Interest in research in project management has increased over the past twenty years (Turner et al., 2013), which is reflected in the number of articles published. This increase is caused by many factors – ranging from growing competition in global markets, shortening product life cycles, increasing globalisation, through the increasing access to information and training, and ending with the rapid development of supporting software (Gareis, and Huemann, 2007).

Unfortunately, many authors still view project management as a weak and immature concept. They notice its insufficiently developed theoretical foundations. They postulate to expand the scope of research and then to organise knowledge properly. Perhaps – as some believe – due to the one-time and unique nature of the projects, as well as their multidimensionality and context dependence, one coherent theory will never arise (Hall, 2012; Smyth, and Morris, 2007).

Bearing in mind the above circumstances, this article attempts to identify current trends in project management development – indicating both fashionable and neglected trends, searching for gaps in the existing area of knowledge, and thus formulating new research problems that need to be developed and supplemented.

2. Research to date

Many authors have recognised the need to broaden and deepen the theoretical foundations of project management.

Morris et al. (Morris et al., 2000) listed the main research trends in the search for issues in which future staff dealing with the PM area should be educated. Their goal was to review the current knowledge of the British Association for Project Management Body of Knowledge (APMBoK) and to propose key changes in its next release. They noticed, that the existing BoK structure was created without sufficient empirical data that could justify its current shape. They noticed discrepancies in the perception of the scope and boundaries of project management between various groups of practitioners and the ongoing debate in this field.

A similar divergence of views was noted by Themistocleous and Wearne (Themistocleous, and Wearne, 2000), who, in their work, analysed articles published in the years 1984-1998 in IJPM (International Journal of Project Management) and PMJ (Project Management Journal)

in order to isolate the leading research directions concept. They noticed that specific topics with different intensity are described in both journals.

Artto and Wikstrom (Artto, and Wikstrom, 2005) identified eleven thematic blocks classifying projects from the organisation's point of view. They showed that there is a need to expand the theoretical foundations of project management in the areas of: organisation theory, innovation theory and sociological and psychometric theories.

Bredillet (Bredillet, 2006) made a significant contribution to understanding project management and its dynamics, which used the EBSCO Business Source Premier Database to conduct keyword analysis to identify important development directions for PM. His research showed incessant interest in cost management, information management and optimisation techniques, and in the strategic aspect – project categorisation issues, integration with supply chain management and knowledge management.

Crawford et al. (Crawford et al., 2006), using a similar method, examined 1051 articles published in the years 1994-2003 in *IJPM* and *PMJ* and compared the obtained results with the earlier works of other authors. They noticed, similar to Themistocleous and Wearne before (Themistocleous and Wearne, 2000), the difference in approach to different topics between both journals. They found a reduction of interest in interpersonal and quality issues, as well as an increase in the importance of project evaluation and improvement. They also noticed an increase in the strategic importance of the project.

Similarly, later, Kwak and Anbari (Kwak, and Anbari, 2009) identified the strategic importance of the project as a leading direction when it comes to developing project management. They analysed this concept in terms of its relationship with related fields through a review of 537 articles that appeared in the years 1950-2007 in 18 business journals, excluding those that were mainly devoted to the subject of PM. The articles were grouped into eight categories. The authors have shown a strong increase in PM research in all areas since the 1980s.

The increase in the number of quantitative studies was noticed by Biedenbach and Müller (Biedenbach, and Müller, 2011), who used a priori classification method and systematically reviewed the materials collected as part of the IRNOP (International Research Network on Organizing by Projects) conference in the years 1994, 2000 and 2007, in order to identify philosophical currents and research trends within PM.

In their extensive work, Pollack and Adler (Pollack, and Adler, 2015) analysed 94,472 publications from the Scopus and ISI Web of Science databases, which appeared in the years 1962-2012, in search of dominant research topics related to project management. They used a number of methods, such as field analysis, co-occurrence frequency and rate of change of words with respect to article abstracts and keywords. They noticed, among others, the growing importance of issues related to strategic planning, knowledge management and the role of PM in the organisation, e.g. Crawford et. al (2006); Kwak and Anbari (2009).

Svejvig and Andersen (Svejvig, and Andersen, 2015) conducted a systematic review of 74 publications related to the RPM (Rethinking Project Management) trend and showed its emergence over the years since the early 1980s.

Uchitpe et al. (Uchitpe et al., 2016) analysed the keywords of the articles published in the IJPM (International Journal of Project Management) over the years 2009-2013 to forecast the directions of research development within PM in the coming years. One of their observations was a great interest in the subject of organisational culture and its impact on the success of the project.

Padalkar and Gopinath (Padalkar, and Gopinath, 2016) had a similar goal. They systematically reviewed articles mainly from IJPM, PMJ and IJMPB (International Journal of Managing Projects in Business) and then divided them into four separate thematic areas: deterministic, non-deterministic, seeking explanation and general issues. They noticed little interest in communication in the project, as well as issues related to quality management, integration and scope, although – as the authors themselves emphasised – these factors often appeared in many publications as the reasons for the failure of the project.

There is an undoubted need for further analysis of the project management area. Identification of development directions and research gaps that have not been sufficiently treated so far can contribute to building a strong and coherent theory, as well as identifying best practices within this subdiscipline of management sciences.

3. Research method

The purpose of this article is to identify research gaps and further research directions in project management, based on a literature review covering the genesis and development of this management subdiscipline. To do this, the following questions were asked:

- How has the PM area developed over the past twenty years?
- Which directions have lost their importance, and which are currently dominant?
- In which sectors of the economy is research currently being conducted?
- Which countries contribute to project management the most?
- What research gaps in project management currently need to be filled in economic theory and practice?

The method of systematic review of articles published in the Elsevier – Science Direct database in the years 2000-2019 was used in the work. The search was based on the phrase “project management”, type of articles “research articles”, resulting in 16,662 publications, of which 480 articles were selected for further analysis using “relevance” sorting.

The articles have been grouped based on:

- year of publication,
- country of origin,
- sector of economy/industry,
- area of knowledge.

The priori classification of knowledge areas was made on the basis of: Crawford et al., 2006; Pollack, and Adler, 2015; Padalkar, and Gopinath, 2016; Project Management Institute, 2013; and was presented in Table 1.

Table 1.

A priori areas of knowledge

No.	Area of knowledge	Description
1	Integration	Based on PMBoK (Project Management Institute, 2013).
2	Scope	
3	Schedule/Time	
4	Costs	
5	Quality	
6	HR	
7	Communication	
8	Risk	
9	Procurement	
10	Stakeholders	
11	Organisation	The role PM plays in shaping the organisation, increasing its efficiency and market competitiveness; The impact of the organisational environment on the project – its course and conditions for success (organisational culture, mission, vision, values, attitudes, technological advancement of the company, the presence of IT systems etc.) Organisational maturity in the field of PM (maturity models, maturity assessment etc.) Project support offices in the organisation.
12	Tools/Techniques	Tools, techniques, methods, good practices, standards. The role of standardisation and certification in the PM area.
13	Portfolio/Programme	Multiple project management. Project portfolio management. Project programme management.
14	Performance	Issues of efficiency and effectiveness of the project process, mainly in relation to implementation processes, as well as monitoring and controlling.
15	Success factors	Factors affecting the success/failure of a project, mainly relevant in the area of initiation and planning processes.
16	Strategy	Project strategy as an important factor of success. Concurrency of the project's goal with the organisational strategy.
17	RPM	“Rethinking Project Management”.
18	Theory building	Publications aimed at discovering research directions within PM.
19	Education	Issues related to education within PM (fields of study, certification programmes etc.)
20	Knowledge management	All issues of acquiring, collecting and managing knowledge in the context of both the project and the organisation.

In order to answer the research questions posed, an additional method of analysis and criticism of the literature was used.

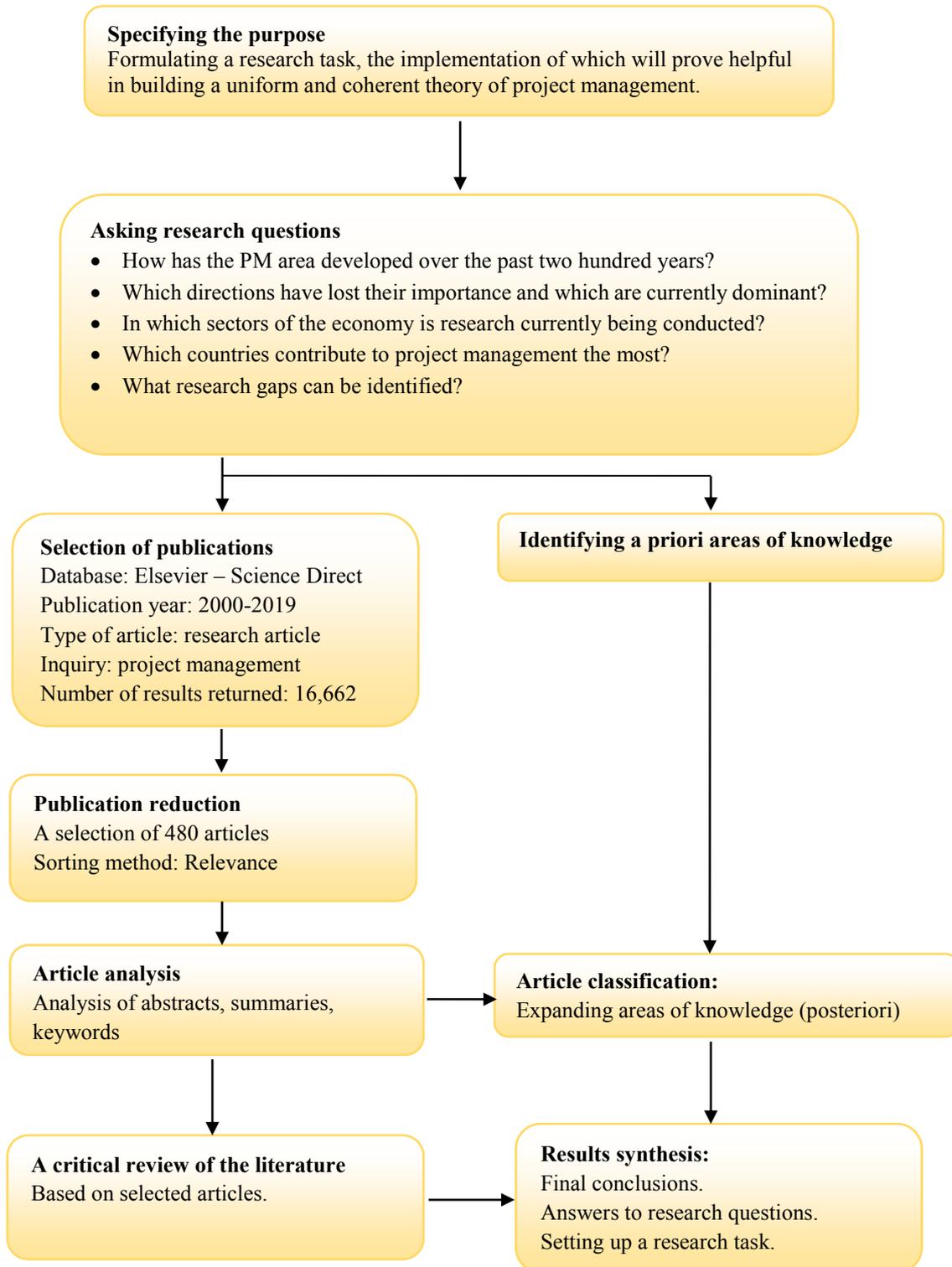


Figure 1. Research method. Source: own study.

4. Results

The study included 480 articles on project management published in the Elsevier – Science Direct database in the years 2000-2019.

The number of articles published annually from the period 2000-2011 oscillates between 6 and 20. Most articles come from the period 2012-2017 and are in the range of 36 to 62 per year. There are 24 articles from 2018 and 14 from 2019. The summary of the number of publications in individual years is shown in Figure 2.

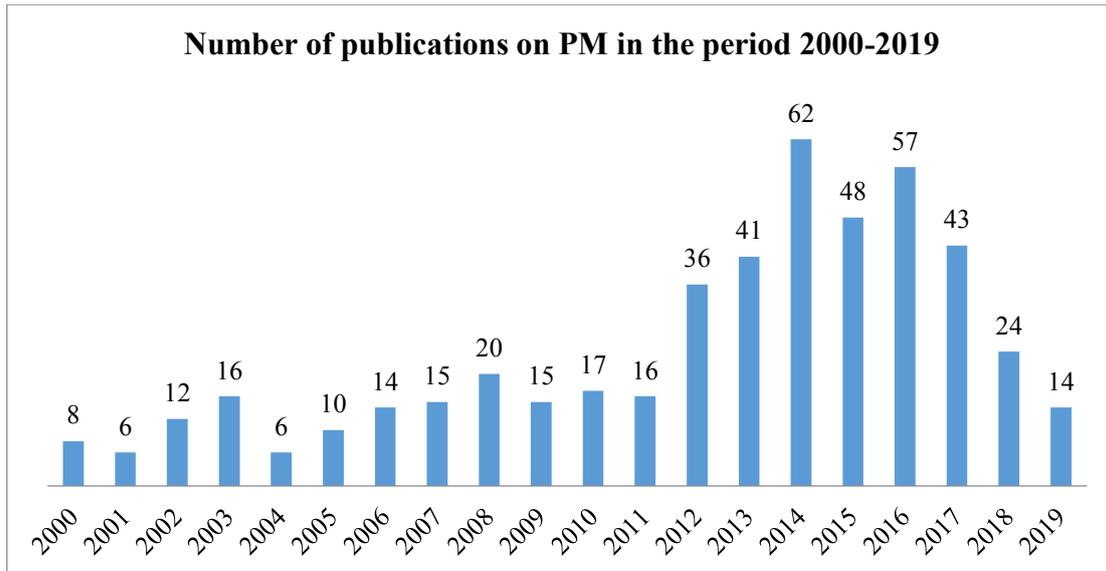


Figure 2. Number of publications on PM in the period 2000-2019. Source: own study.

Almost a third of articles (154 of 480) refer to one clearly defined economic sector. Others (326 of 480) raise universal topics for PM. Most articles concern the construction and building industry (48 articles) and information techniques (48 articles), while in the last group, as many as 20 articles concern software development. Another 14 articles concern the manufacturing industry (including the automotive industry – 4 articles, metal processing – 1 article). Other fields have 6 or fewer articles and in succession are: fuel sector, transport, health care, education and learning, public sector, finance and banking, water management, energy, infrastructure, research and development institutes, shipbuilding, multimedia, electrical industry, defense industry, chemical industry, architecture, aviation industry and advertising. A summary of publications in individual sectors is presented in Figure 3.

59 different trade journals were identified, in which topics related to project management were discussed. The most publications were published in journals: International Journal of Project Management (193 articles), Procedia – Social and Behavioral Sciences (76 articles), Procedia – Computer Science (45 articles), Procedia – Technology (17 articles), Procedia – Economic & Finance (12 articles), Automation in Construction (11 articles), The Journal of Systems and Software (10 articles). In other journals, 8 or fewer articles were identified.

A summary of the number of publications on PM in the period 2000-2019 by trade journals is shown in Figure 4.

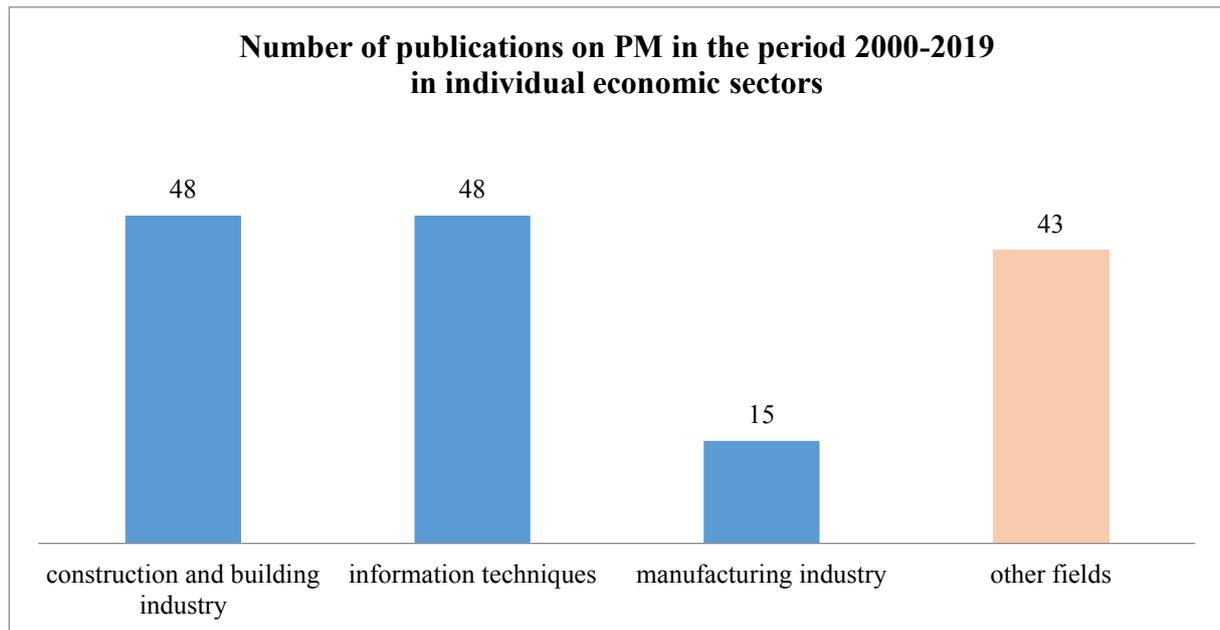


Figure 3. Number of publications on PM in the period 2000-2019 in individual economic sectors. Source: own study.

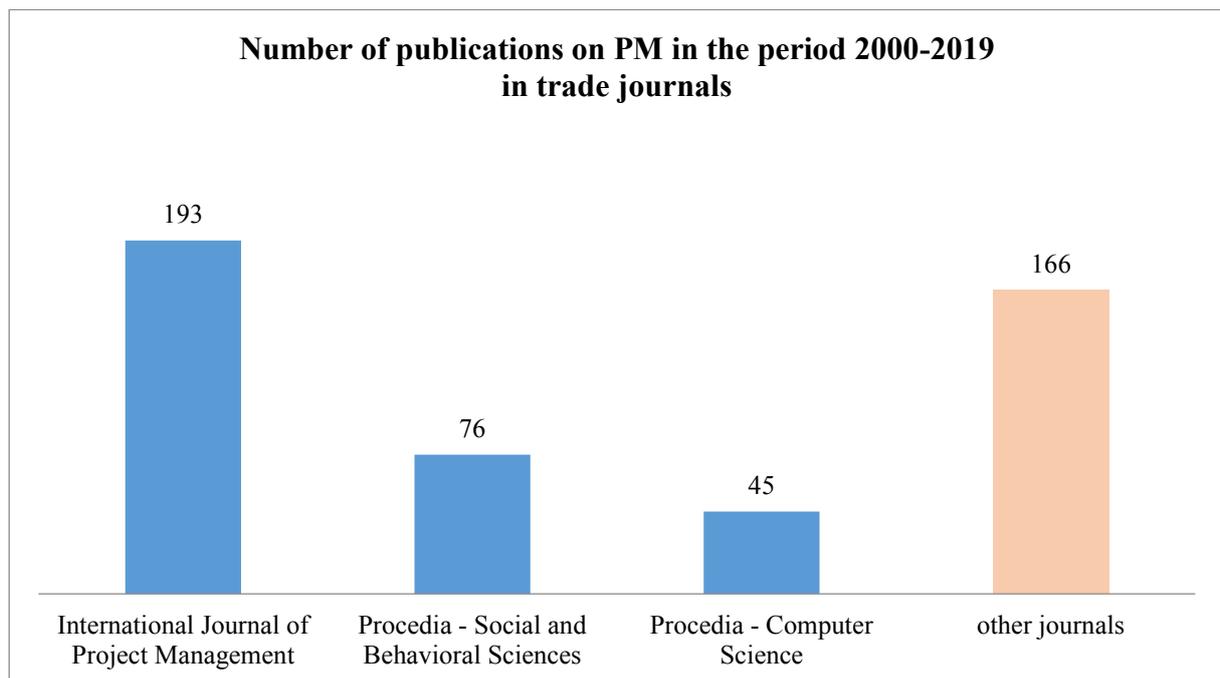


Figure 4. Number of publications on PM in the period 2000-2019 in trade journals. Source: own study.

60 countries were identified, in which topics related to project management were raised. Most publications were made in English-speaking countries: England (56 articles), United States (50 articles), Australia (47), Canada (29) – which represented almost half (47%) of all sources analysed. The next countries are Portugal (26 articles), France (25 articles), Spain (25 articles), Germany (25 articles), Brazil (24 articles), China (24 articles), Sweden (21 articles), Norway (15 articles), Taiwan (14 articles), Finland (13 articles) and the

Netherlands (12 articles). In other countries, the number of identified publications is less than 10. A summary of the number of publications on PM in the period 2000-2019 by country (for countries where the number of publications was not less than 10) is presented in Figure 5.

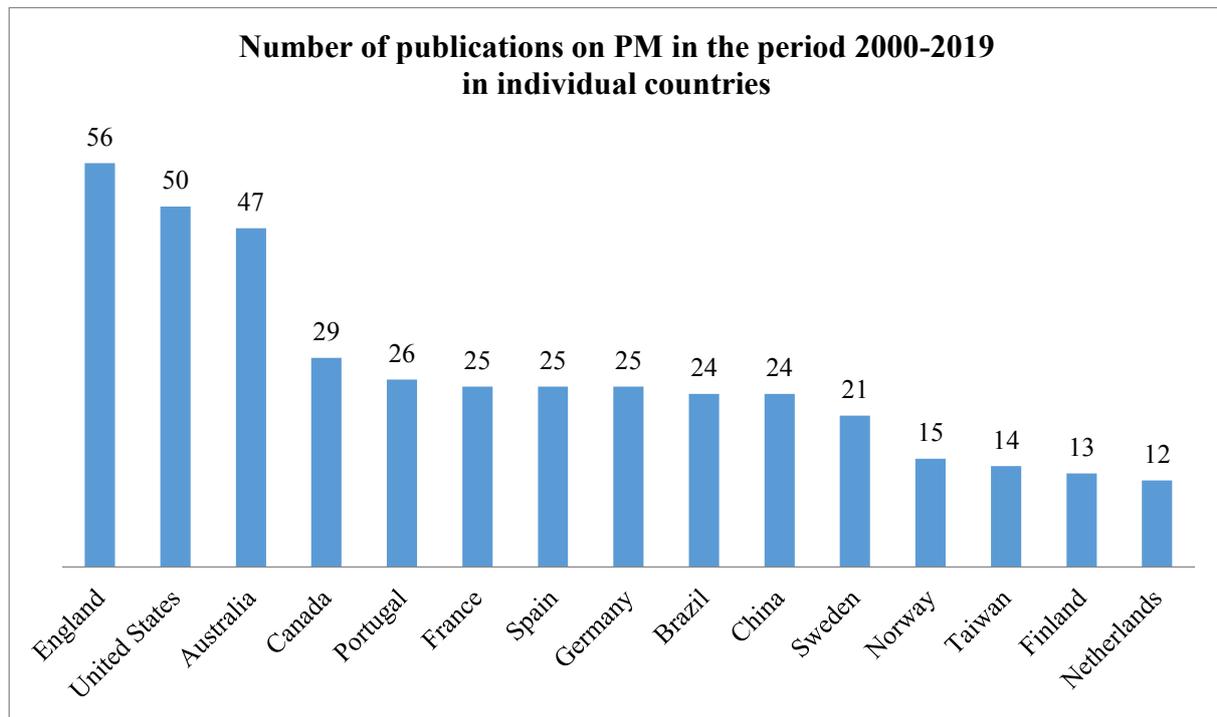


Figure 5. Number of publications on PM in the period 2000-2019 in individual countries. Source: own study.

In addition to the twenty areas of knowledge defined a priori, an additional six areas were identified, for which the number of publications was not less than 10. These are:

- **PMIS** (40 articles) – Project Management Information Systems – IT systems supporting the planning, monitoring and controlling of project management processes.
- **Decision support** (28 articles) – techniques and methods of decision support and their implementation within PMIS.
- **Complexity** (17 articles) – problems arising from the complexity of projects.
- **Innovations** (17 articles) – innovation management in PM.
- **Sustainability** (15 articles) – issues of social, economic and ecological impact of projects on the environment.
- **Benefits** (11 articles) – tangible and intangible, long and short term benefits resulting from the implementation of the project (but excluding issues related to cost management).

A summary of the number of publications on PM in the period 2000-2019 by knowledge areas is presented in Figure 6.

Within the “Tools/Techniques” area, three subgroups were identified, in succession referring to: agile methodologies (19 articles), standardisation (13 articles) and certification (6 articles).

Within the “Organisation” area, four subgroups were identified, in succession referring to: the impact of PM on organisation (30 articles), organisational maturity (19 articles), project management offices – PMO (18 articles) and the influence of the environment on PM (16 articles).

Figure 7 shows the number of publications in relation to knowledge areas defined in PMBoK (Project Management Institute, 2013).

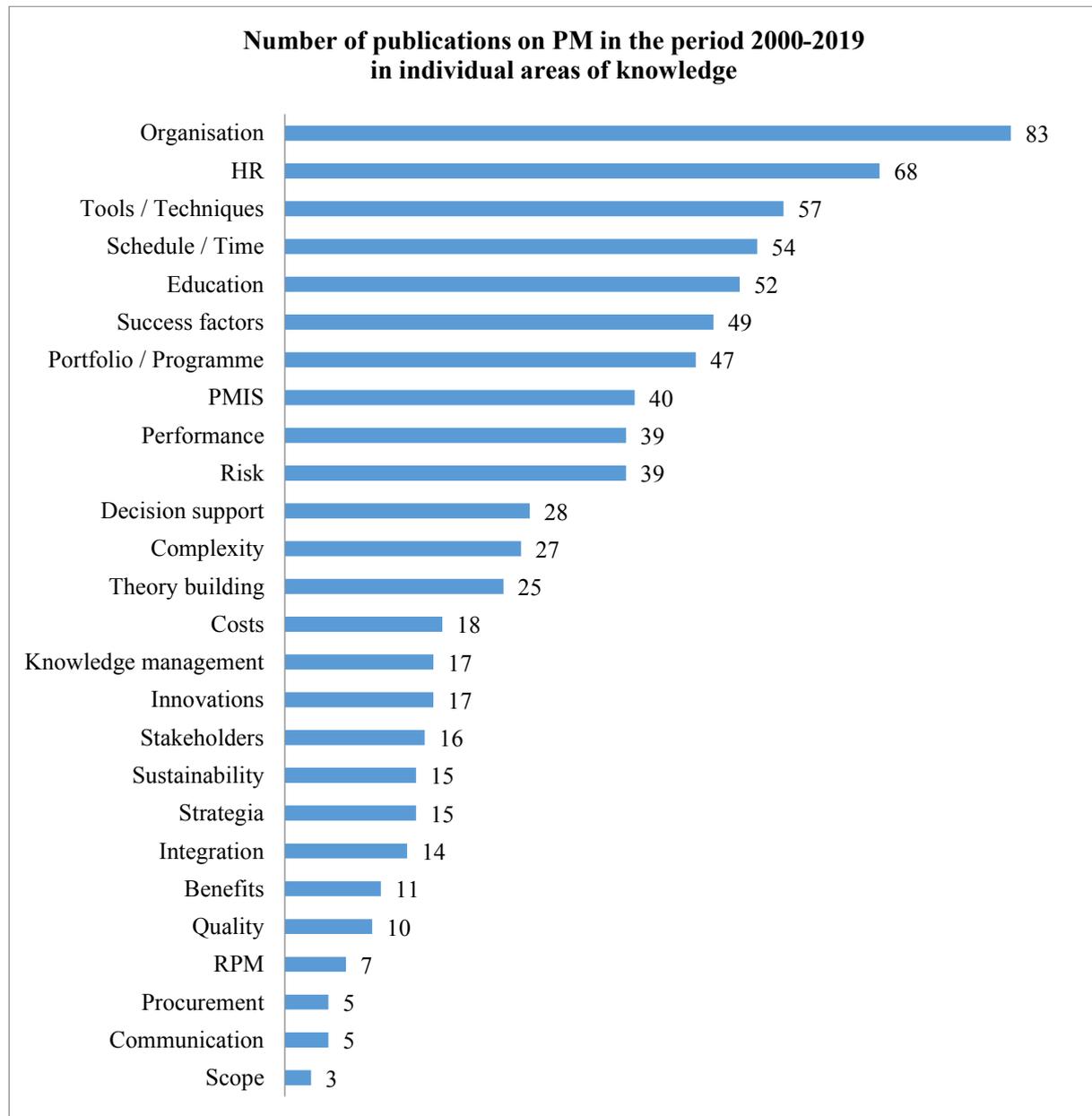


Figure 6. Number of publications on PM in the period 2000-2019 in individual areas of knowledge. Source: own study.

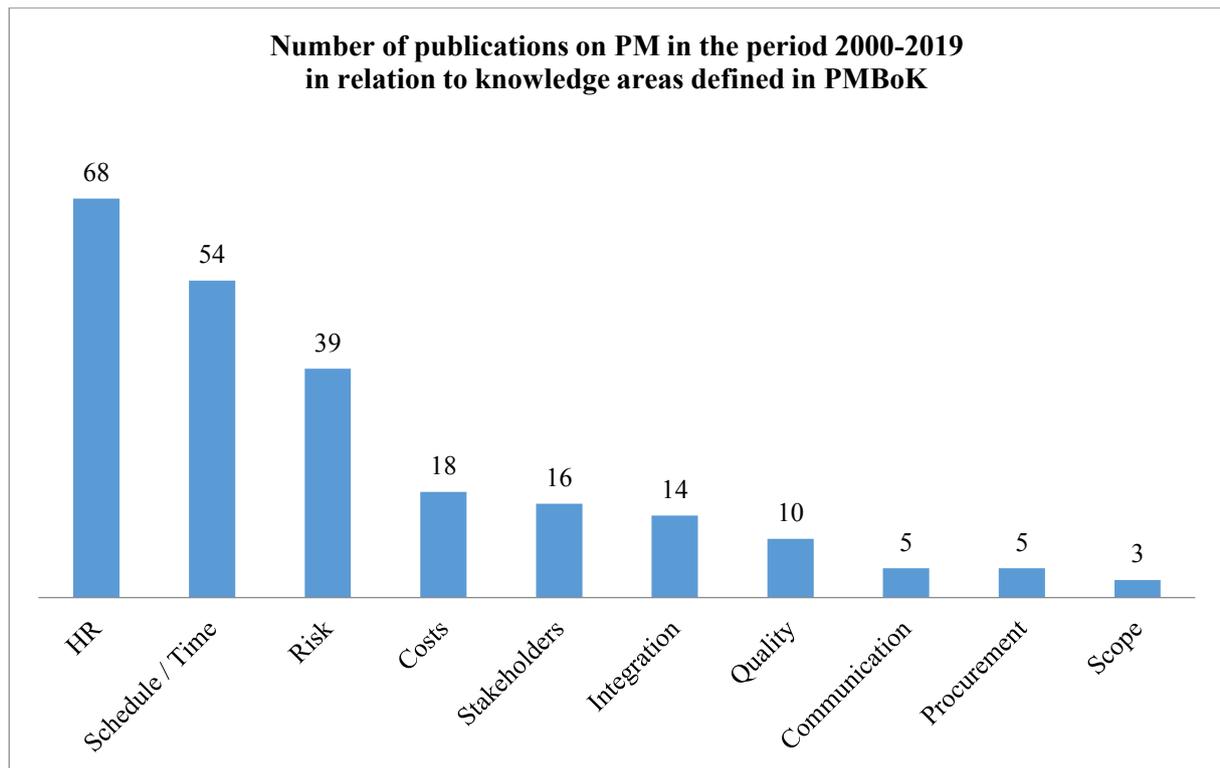


Figure 7. Number of publications on PM in the period 2000-2019 in relation to knowledge areas defined in PMBoK. Source: own study.

5. Discussion

Project management has enjoyed unflagging interest in recent years, as proven by the large number of publications in this area. This is understandable, because PM has become an important element of the organisational environment, guaranteeing survival in changing market conditions, by achieving long- and short-term goals (Hyväri, 2006). Such great importance for the developing economy is conducive to the spread and institutionalisation of this subfield (Calabrese, and Mastroberardino, 2015). Unfortunately, despite its development, practitioners are constantly struggling with many problems, such as exceeding deadlines (Rivera, and Kashiwagi, 2016; Ingasona, and Shepherd, 2014) or the budget (Doloi, 2011) during the implementation of various investments. That is why the integration of theoretical research with a practical business approach becomes such an important topic (Söderlund, and Maylor, 2012). In the area of project management, one can observe constant changes of perspectives (Kolltveita et al., 2007) and interests, one should try to identify the main directions and research gaps in order to build a strong and coherent theory.

The pragmatic nature of project management is demonstrated by the large number of publications dealing with the development and implementation of solutions within specific sectors of the economy (nearly a third of the articles analysed), most of which concern the

building industry and information technologies. Focusing on these two sectors may result from their specific nature – work within them focuses on the implementation of one-off ventures, with unique and strictly defined start and end dates. The complexity of construction projects and the need to participate in their implementation of many different entities (Van Der Velde, and Van Donk, 2002) is the source of many problems and, as a consequence, a significant percentage of failures. It is currently an important issue, due to the large economic dimension and social significance of this type of implementation (Eriksson et al., 2017). In turn, IT industry projects are a powerful tool, supporting the creation of economic value within an organisation, and their success is part of building a competitive advantage (Sanchez et al., 2017; Chmielarz, and Zborowski, 2018; Gomes, and Romão, 2016). This developed economic value, largely derived from small and medium-sized enterprises (Turner et al., 2010) is the building block of global economic capital.

Competition between companies in providing high quality products and services is now a common phenomenon. This necessitates the search for new solutions, not only in the technological sphere, but also in the process and management sphere, as well as mutual integration of all these elements (Mossalama, and Arafab, 2017). Perhaps for this reason, the relationship between organisation and PM is the most frequently discussed topic in the analysed group of articles. Institutions that successfully shape a culture based on projects, mainly by raising employee awareness (Rehor, and Vrchota, 2018), noticeably stabilise their market position (Do Carmo Silva, and Simoes Gomes, 2015).

The second trend, that has been observed in the researched publications, is the role of building and shaping human capital. The main reason for this may be the seeking of success and high efficiency of the project in this area (Brown et al., 2007) and especially in raising employee competences (Ekrot et al., 2016; Saidoun, 2016) – as many as 37 articles deal with competence, with the main emphasis being placed on the role of leadership and managerial skills (Hyväri, 2016; Cooke-Davies, and Arzymanow, 2003) (15 articles). Several publications have focused on gender as an element affecting the way of management (Okoro, 2016; Bilgin et al., 2017; Legault, and Chasserio, 2012) and the importance of inter-cultural differences in building project teams (Lückmann, and Färber, 2016; Vlahov et al., 2016; Pheng, and Leong, 2000; Zwikael et al., 2005). It should be added, that the differences shown are considered as favourable and contributing factors to the way the project is conducted.

Scheduling (including time management) is another of the ten areas of knowledge specified in PMBoK (Project Management Institute, 2013), which enjoys great interest among project management practitioners. It should be noted, that the sum of publications within HR and Scheduling is higher than in the other eight areas combined.

A greater share of articles on risk was expected in the projects, as it was characterised as significant in the period 2000-2015 in the work of Padalkar, and Gopinath (Padalkar, and Gopinath, 2016), and as one of the main trends in the period 2006-2012 in the work of Pollack and Adler (Pollack, and Adler, 2015). It also seems that some of the project failures are

due to neglect in this matter (Masár et al., 2019; Teller, and Kock, 2013; Khameneh et al., 2016). Articles dealing with uncertainty in the project (11 articles) have also been included in this area, as there is a close relationship between uncertainty and risk (Lachhab et al., 2017).

Few publications related to quality management (10 articles), communication (5 articles) and scope (3 articles).

An interesting thematic area was identified, which is the application of game theory (GT) in project management. Mathematical modeling was identified as popular within the analysed publications (26 articles); however, there is little about game theory (De Magalhães et al., 2015; Bočková et al., 2015; Bočková, 2015) and the existing ones are rather descriptive and do not use the potential of this subfield. This fact may come as a surprise, as the topics in which GT mechanisms and solutions can be successfully applied are repeatedly raised. Such topics include: modeling competition and relationships between specific entities (both real and abstract) (Chen et al., 2018; Bindera et al., 2014; Yan et al., 2000; Marquès et al., 2011; Viglioni et al., 2016; Liang, 2009, 2010; Yang, and Lin, 2013; Chang, and Ishii, 2013), issues of resource limitation and allocation (Lim et al., 2011; Almarri, and Gardiner, 2014; Ponsteen, and Kusters, 2015; Jugdev et al., 2007), strategy implementation (Vilhelsdottir et al., 2016; Martin, 2000) or support decision making (Fallah-Mehdipour et al., 2012; Al-Harbi, 2001).

Although such a large number of articles relate to the building industry, there has been little interest in issues related to legal issues. Only two articles have been identified regarding safety (Åsgård, 2018) and occupational risk (Badri et al., 2012).

Several works concerned lean management. Although this is a philosophy derived from production engineering, its principles can help increase the efficiency and effectiveness of ongoing projects (Heigermoser et al., 2019), especially if they are integrated with other approaches, such as agile methodologies (Sohi et al., 2016; Rivera, and Kashiwagi, 2016) or Six Sigma (Tenera, and Pinto, 2014).

Only eight articles raised the issue of research and development projects. This is not much, taking into account the large contribution to the global economy of this type of undertakings (Žarković et al., 2014) and their significance in the context of acquiring external knowledge (Vicente-Oliva et al., 2015), needed by organisations to raise market competitiveness. This is strange, because many other publications raised the topic of innovation and its importance (Geraldi et al., 2008; Ahn et al., 2010).

6. Conclusions

Project management has become an important business process for many organisations. Its proper use significantly increases the market competitiveness of enterprises, which often determines not only their stability, but even the possibility of surviving in an environment of

rapidly changing economic conditions. That is why it has become so important to correctly identify relevant research areas within PM. Conducted research should build proper knowledge in order to finally raise the competences of managers and entire project teams, which will ultimately lead to increasing the efficiency and reliability of conducted ventures.

The purpose of this article was to identify current development directions and potential research gaps in project management, so as to contribute to building a strong and coherent theory and to identify the best practices within this subdiscipline of management sciences.

An analysis of 480 articles on project management was carried out, published in the Elsevier – Science Direct database in the years 2000-2019, from which the following conclusions were drawn:

- almost a third of the articles concerned the practical application of PM issues in one clearly defined sector of the economy, with the most common reference being to the building sector and IS/IT,
- most articles were created in English-speaking countries (47%),
- the largest number of articles concerned the area of human resource (HR) management, including many subjects of qualifications and leadership,
- of the ten areas of knowledge specified in PMBoK, “HR” and “scheduling/time” were the most popular, followed by risk-related issues – topics in other areas were sporadically addressed.

The analysis identified several interesting areas of knowledge, in which little research has been carried out so far and whose development can positively influence the building of a strong theory of project management and help solve a number of practical problems faced by PM specialists.

One of the identified research gaps is the use of the lean management approach in project management, which is successfully and widely used in manufacturing companies. The assumptions of this philosophy (reducing waste, looking at management from the customer's point of view, continuous improvement) and its accompanying methods and tools (Kaizen, Just In Time, SixSigma) can significantly increase the efficiency of project implementation, and thus increase the likelihood of success and satisfaction of parties interested. Lean management is more than a management concept and its best practices have been developed for decades in the world's largest organisations. Despite this, few attempts have been made to synthesise these two areas so far. Further research is planned to carry out a thorough analysis of lean management solutions and the possibilities of their implementation as part of project management.

Game theory is another interesting but underdeveloped area of knowledge within PM. Although a number of problems were identified, in which its mechanisms could be successfully applied (support in reaching decisions, resource allocation, critical path analysis, competition modeling between entities etc.), little research was found in this area. As part of further

research, it is planned to analyse mathematical models, algorithms and concepts developed inside GT and then try to adapt them inside PM.

Further research, both in the use of lean management solutions and issues taken from game theory, can contribute to the further development of project management and help solve many practical problems identified within this area.

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