*sustainability*

MDPI

*Article*

# Differences between Public-Sector and Private-Sector Project Management Practices in Hungary from a Competency Point of View

**Bálint Blaskovics [1], Zalán Márk Maró [2], Gábor Klimkó [3], Viktória Papp-Horváth [1] and Ágnes Csiszárik-Kocsir [4,*]**

[1] Department of Project Management, Institute of Strategy and Management, Corvinus University of Budapest, Fővám tér 8, H-1093 Budapest, Hungary; balint.blaskovics@uni-corvinus.hu (B.B.); viktoria.horvath@uni-corvinus.hu (V.P.-H.)
[2] Department of Agricultural Economics, Institute of Sustainable Development, Corvinus University of Budapest, Fővám tér 8, H-1093 Budapest, Hungary; zalan.maro@uni-corvinus.hu
[3] Department of Information Systems, Institute of Data Analytics and Information Systems, Corvinus University of Budapest, Fővám tér 13-15, H-1093 Budapest, Hungary; gabor.klimko@uni-corvinus.hu
[4] Department of Economics and Finance, Keleti Károly Faculty of Business and Management, Óbuda University, Tavaszmező utca 15-17, H-1084 Budapest, Hungary
* Correspondence: kocsir.agnes@kgk.uni-obuda.hu

**Abstract:** Both sustainability and strategic goals are realized in the course of implementing projects and in this way, projects are crucial for companies. Despite the growing importance of projects and the vast resources allocated to them, the success rates achieved by these projects are still considered low. Numerous reasons have been identified in the literature for why a project might succeed or fail, and it has also been revealed that a competent project manager is a key factor in this process. However, papers have mainly focused on analyzing the required competencies in general, while the sector involved is rarely considered. Thus, this paper investigates, within an exploratory framework, the success and failure rates of projects and project management competencies in Hungarian public- and private-sector organizations by using the Mann–Whitney test. Based on the results, the authors reject the idea that public-sector organizations perform better than those in the private sector, but the analysis of the data also revealed that there were differences in the perceived importance of skills in the two sectors. Customer orientation and business acumen were considered significantly more important in the private sector than in the public sector, based on the sample available. This study also revealed possible correlations among the knowledge areas and skills required. In addition to contributions to the understanding of project success, this paper can also help to improve the project management frameworks applied in public and private companies. Furthermore, the findings can be adapted for projects that require a special attribute, such as sustainability.

**Keywords:** entrepreneurial ecosystem; public sector project management; project performance; project success; project competences; project manager's competencies; project management knowledge area; project manager's skills; sustainability in project management



**Citation:** Blaskovics, B.; Maró, Z.M.; Klimkó, G.; Papp-Horváth, V.; Csiszárik-Kocsir, Á. Differences between Public-Sector and Private-Sector Project Management Practices in Hungary from a Competency Point of View. *Sustainability* **2023**, *15*, 11236. https://doi.org/10.3390/su151411236

Academic Editors: Bálint Csaba Illés and Anna Dunay

Received: 16 May 2023
Revised: 18 June 2023
Accepted: 27 June 2023
Published: 19 July 2023



## 1. Introduction

Numerous authors have highlighted the importance of projects and the large amount of money spent on them [1–5]; however, it has also been highlighted that approximately 10% of the money spent on projects is wasted due to inappropriate management. At the same time, many authors have revealed that appropriate project management could be a source of competitive advantage and long-term survival both for SMEs and large organizations [6–12]. These authors have also highlighted that sustainability, which can also be a source of competitive advantage, can be realized during the course of projects [13–16]. Moreover, in the case of projects, the sustainability perspective is of increasing importance and can

have an impact both on the perceived success and the perceived importance of projects [17]. Füller, Hutter, and Kröger [18] pointed out that innovation performance can be increased by means of crowdsourcing projects. Zubizarreta and co-authors [19] also discovered that effective project management is crucial for disruptive innovation. Gareis [20] highlighted that company success via sustainability could be achieved by means of appropriate project scope definition and project process management. Despite this importance, the success rate achieved for projects is still considered low, and cost and time overruns are not atypical, although a positive tendency can also be identified, and the performance of projects has been improving [21–23]. The success rate in the IT sector does not exceed 70%. The situation is far worse if a harsher evaluation criterion is applied, namely, if the predefined project triangle is considered, which encompasses the timely completion of the project, being within budget, and meeting the quality parameters defined as the baseline. This rate does not exceed 40% [24,25]. One of the reasons for this could be the nature of projects since, as Görög [26,27] pointed out, projects have two immanent characteristics, uncertainty and interdependence. Wiewiora and O'Connor [28] came to a similar conclusion; however, they approached the question from a position of ambiguity. The latter further increased the need for an integrated planning mechanism at both the project and organizational levels [29,30]. This was in accordance with the findings of Judgev and Müller [31], who highlighted that projects should be managed within a comprehensive system, not as a separate element in an organization. Verzuh [32] also stated that projects are a complex set, within which there are strong correlations between elements. Gareis and Gareis [33] came to a similar conclusion, since they stated that project management should be aligned with the other processes of the company. They also emphasized that not only the project implementation process but the whole project lifecycle should be considered in the course of project management. However, they found that the key element in the project management process is a competent project manager. The other immanent characteristic, uncertainty, is manifested in risks, which increases the need for appropriate business planning and a sound and up-to-date business case [29,34,35]. These authors have also highlighted that the planning mechanism and surrounding business environment should be managed properly, but that a high degree of focus should be put on project managers. Appropriate knowledge transfer and training, and as a result of this, a comprehensive set of competencies possessed by the project manager, can further reduce the uncertainty of projects and might increase the chances for project success [2,8,36]. Miković and co-authors [37] came to the same conclusion for non-profit organizations.

Toljaga-Nikolić et al. [14] and Di Maddaloni and Sabini [38] revealed that applying sustainability principles in project management could increase public and stakeholder acceptance and, in this way, the potential for achieving project success. Gareis et al. [20] found it important to apply sustainable principles in project management, especially in the project scope definition process, i.e., when the project result characteristics are decided. Silvius and Schipper [15,16] focused more on the project process and stated that the project management principles should inform that part of the project. However, they argued that sustainability is a new school of thought. As a result of this, sustainability in project management is more like an attitude than a new set of skills or knowledge elements to be applied in project management. Baba, Mohammad, and Young [39] also identified attitudes towards projects, but within these attitudes, they identified general activities. Maqbool and Amaechi [40] identified how applying sustainable factors in project management practices could help to achieve sustainable project results, but they also relied on classic project management practices. Zaman and co-authors [41] found that a supportive leadership style might increase the chances for sustainable project success. At the same time, these authors have pointed out that, although project management mostly relies on those tools and techniques which are identified by frameworks or standards, sustainability deeply enhances them [42–45]. These authors emphasized that a sustainability-oriented attitude (or capability elements related to it) is crucial to achieving sustainable project success. As a result of this, when project managers manage sustainability-centric projects,

they can apply the tools and techniques which have been identified by numerous authors or organizations, with sustainability in project management enhancing those techniques. A 'sustainability-oriented' attitude can also help to apply methodologies effectively and efficiently.

At the same time, these authors have also pointed out that different types of projects might require different tools and techniques to manage them, or at least that the emphasis might be on different elements [8]. Some authors have differentiated projects based on their duration [46], others focused on the organizational impact [47], while others identified the content and nature of the projects as distinctive features [8,10,48,49]. Some authors point out that the industry can have a crucial impact on the whole toolkit of the project; for example, the application of agile project management methodology in IT is essential [50,51]. Maqbool and Amaechi [40] highlighted that, in the course of analyzing construction projects from the perspective of sustainable project success, considering and applying public-sector-specific elements can be crucial. Thus, the applied knowledge elements and skillsets vary from industry to industry. Despite the abundant literature on competencies, there are relatively few papers focusing on analyzing them as differentiated by one of the aforementioned features.

Based on this, the following research contributes to the existing literature on competencies by highlighting potential differences between the public and private sectors. This can be important for achieving project success, both for traditional projects and those which have a special focus (such as creating sustainable project results or achieving sustainable project results). Analyzing this difference is essential to improve current frameworks and standards. Thus, the goal of this study was to analyze whether there is a difference between the success and failure rates of projects in the public sector versus those in the private sector, as well as to explore the possible differences between them in terms of the perceived importance of knowledge elements and competencies.

## 2. Literature Review

### *2.1. Project Success*

Project success can be measured in numerous ways. Most studies define it based on the success criteria, which include the project triangle (time, cost, and quality), client satisfaction (whether the project achieved the underlying strategic objective/business requirement), and stakeholder satisfaction (whether the other relevant stakeholders accept the project's results and process) [8,10,32,52]. The Project Management Institute [4] argues that a project's success can be measured in terms of the project triangle (time, cost, and quality parameters) and whether the project satisfied the business demands. Based on this, they identify two categories: (i) champions (with a success rate above 80%) and (ii) underperformers (with a success rate below 60%). However, based on this categorization, a third category can also be identified: the performers (with a 60% to 80% success rate). According to the same source, the average success rate of projects related to government institutions is lower than the average and the number of failed projects with a budget loss is higher than the average [4].

Researchers have also highlighted that not only should the success rate be identified, and the success criteria based on which the success rate is defined, but also the factors that increase the potential for achieving success [10,31,53–55]. Moreover, Müller and Turner [56,57] revealed that project managers play a key role in achieving project success since they can compensate for minor deficiencies; Goleman [58] highlighted the need for a proper, empathy-based leadership style; Fekete and Szontágh [29] and Jovanović et al. [59] identified how risk management bears critical importance; Abdi Khalife and co-authors [1] argued that project management can increase efficiency and effectiveness; and Wang et al. [60] noted that, in addition to adequate resource availability and public support, stakeholder management, communication, and a clear strategic vision are invaluable for achieving project success. However, researchers have also highlighted the need for a strong

business case [61,62]. Based on Görög's study [8], Blaskovics [2] identified the following nine elements:

- The clarity of the underlying strategic objectives of the project;
- The scope definition of the project;
- Continuous communication amongst the project team members (including user involvement and the support of the senior management);
- The reliability of the project triangle and the availability of the resources needed;
- The competency of the project manager and his/her leadership style;
- The competency of the project team and the team's motivation;
- Risk management;
- Change management;
- Organizational and environmental characteristics.

Judgev and Müller [31] identified four stages in the evolution of project success, highlighting that project management should have a strategic focus and emphasizing that the critical success factors are dynamic and strongly interrelated with each other. Ika and Pinto [63] note that sustainability issues should also be considered. Following these findings, Fortune and White [64] summarized two crucial shortcomings in the understanding of these critical success factors: First, the interrelationships between them are rarely considered. Second, researchers usually assume that the importance or the impact of a factor is equal in each phase of a project. Blaskovics [2] highlighted that project success is usually considered to be a homogenous phenomenon and is not differentiated using different criteria.

Based on the formal system model, Fortune and White [64] identified three levels of managing project success: (i) the implementation system, (ii) the project board, and (iii) the environment. The first encapsulates the project level, wherein factors that refer to planning and implementation are considered. The second encapsulates the factors that define the circumstances of the project (such as budgeting issues or major change requests). The third encapsulates the factors that are beyond the domain of the company, i.e., macroeconomic factors. Thus, a project manager's biggest influence on project success takes place at those levels where he/she has the biggest impact, i.e., on the implementation system. Wong [65] applied a similar focus in his research in which he identified three potential project managerial domains, called spaces, where a project manager should perform: (i) the individual level, (ii) the team level, and (iii) the organizational level. The project manager's biggest impact on project success can be achieved at the first two levels. Goldman and Taylor [66] also highlighted the importance of appropriate management at the team level.

To link project management practices and success criteria, Görög [8] matched project management tools and techniques with the project success criteria. He found that the quantitative tools support achieving success based on the project triangle, while the qualitative tools support client and stakeholder satisfaction. He also added that other competency elements (such as leadership and personal characteristics) have a more complex impact on project success. These findings are summarized in Table 1.

**Table 1.** Relationship between PM toolkit and the success criteria (Görög [8]).

| Project Management Tools | Success Criteria |
|---|---|
| Quantitative tools:<br>Time planning, resource allocation, and cost estimation<br>Risk assessment<br>Process control (earned value analysis) | The project triangle |
| Qualitative tools:<br>Scope definition<br>Feasibility studies<br>Project organization<br>Project implementation strategy<br>Scope control | Client satisfaction |
| Qualitative tools:<br>Stakeholder analysis<br>Project marketing | Stakeholder satisfaction |

### *2.2. Project Competencies*

As Robotham and Jubb [67] pointed out, competence is one of the most controversial terms in organizational theories because of its numerous interpretations. The existential competence model differentiates between four basic types of competence: personal, social, cognitive, and special/professional [68]. While personal competencies are responsible for serving an individual's basic biological survival, social competencies help them to be integrated into a community. Cognitive competence has a basic and complex role in information processing and problem solving, while professional competency contributes to efficient performance in "special functions, different professions, occupations, special activity circles" [69] (p. 11).

Spencer and Spencer [70] identified five basic elements of competence: knowledge, skill, motives, traits, and self-concept. The first two were called input competencies by Finn [71], while Crawford [72] referred to the last three as personal competencies. The knowledge element focuses on the possession of information, while skill focuses on the ability to apply this information. This research focuses on input competencies.

Katz [73] introduced an effective administration model in which three basic developable skills are distinguished: human, conceptual, and technical skills. El-Sabaa [74] applied this model to project management. Based on this approach, human skills are required to manage/lead the project group, to manage stakeholders, and to manage effective cooperation between the project and the organization. Conceptual and organizing skills support the understanding of the whole project environment including its organizational context. Technical skills are required to compete in professional tasks, which involve, on the one hand, understanding the domain of the project (the professional/functional content) and effectively completing the related tasks and, on the other hand, the successful application of project management tools and techniques. Following this, Haschka and Herwartz [75] pointed out that managing knowledge could also be a key competence both for organizations and project managers. In addition, Medina and Medina [76] pointed out that project managers and their competencies are key to success; however, this is a complex phenomenon.

Senghi [77] (p. 2) defined competencies as "the range of skills which are satisfactorily performed", and described competency as "the behavior adopted in competent performance". Görög [8] differentiated between a project manager's competencies and project management competencies. The latter encapsulates those tools and techniques that are needed to manage a project. Based on Cleland's study [6], he highlighted that project management competency has three levels: lexical knowledge, ability to use, and attitude toward projects. Meanwhile, the project manager's competencies comprise the personal characteristics that can harness knowledge and the appropriate leadership style. The researcher identified the competency-based leadership style's suitability for projects.

The Project Management Institute [10,78] also approached project management competencies from two angles: (i) knowledge areas and (ii) skills. Regarding the required set of knowledge, 10 areas were identified that are each "an identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools, and techniques" [10] (p. 23). These 10 areas are as follows: (i) project integration management, (ii) project scope management, (iii) project time management, (iv) project cost management, (v) project quality management, (vi) project resource management, (vii) project communications management, (viii) project risk management, (ix) project procurement management, and (x) project stakeholder management. These knowledge areas are not independent of each other; there are several connection points. It was pointed out that the project integration management knowledge area includes all those practices and tools that could help to successfully coordinate project elements. Those project knowledge areas that deal with the elements of the iron triangle (time, cost, quality, and scope) also impact each other. The required skills are encapsulated in the talent triangle, which summarizes all elements that are needed for professionals working in the field of project management [78,79]. The current version of the model contains three skill categories

(skill areas), which are as follows: (i) ways of working (formerly called technical project management), (ii) power skills (formerly called leadership), and (iii) business acumen (formerly called strategic and business management). The ways of working category focuses on the practical tools and techniques of project management (in any project management approach). Power skills include soft skills, which are necessary to effectively manage a project team and successfully influence stakeholders. Business acumen includes those skills that are necessary to understand the complex environment (organization-, industry-, function-, or domain-specific knowledge), the underlying organizational strategy, and global business trends [79]. This is encapsulated in Table 2.

**Table 2.** Talent triangle (Project Management Institute [79]).

| Ways of Working | Power Skills | Business Acumen |
|---|---|---|
| Agile and hyper-agile | Leadership | Benefits management and realization |
| Hybrid | Active listening | Business models and structures |
| Design thinking | Communication | Competitive analysis |
| Transformation | Adaptability | Customer relationships and satisfaction |
| Data gathering and modeling | Brainstorming | Industry domain knowledge |
| Earned value management | Coaching and mentoring | Legal and regulatory compliance |
| Governance | Conflict management | Market awareness |
| Performance management | Emotional intelligence | Function-specific knowledge |
| Requirements management and traceability | Influencing | Strategic planning, analysis, and alignment |
| Risk management | Interpersonal skills | |
| Schedule management | Negotiation | |
| Scope management | Problem solving | |
| Time, budget, and cost estimation | Teamwork | |

The International Project Management Association (IPMA) [80] also distinguishes three main competency categories: (i) perspective (focusing on the context of a project), (ii) people (focusing on the human aspects), and (iii) practice (focusing on project management tools). However, the first two categories encompass those skills that were mentioned, while the latter comprises the required knowledge area of a project manager.

Based on a systematic literature review, De Rezende and Blackwell [81] created a project management competency framework including 81 competencies, which were divided into 11 dimensions: influencing, communication, teamwork, emotional, contextual, management, cognitive skills, professionalism, knowledge and experience, project management knowledge, and personal skills and attributes. In addition, Alvarenga and co-authors [82] analyzed 28 project management competencies and ranked them based on their importance, and communication, commitment, and leadership were identified as the most important aspects. They also identified seven competency groups: leadership, self-management, interpersonal, communication, technical, productivity, and managerial. Chen et al. [83] investigated how competencies change during the career path of a project manager.

Similar to the talent triangle [79], Gartner [84] also defined skills (in the context of IT projects); however, that research focused on those skills which differentiate successful and less-successful project managers. They identified the following 10 skills:

- Ownership and commitment (focusing on achieving organizational objectives);
- Emotional intelligence (having empathy and the ability to face pressure and problems);
- Servant leadership (properly managing others through coaching, guidance, and motivation);
- Stakeholder partnership (properly communicating and managing stakeholders);
- Learning agility (learning and adapting);
- Business acumen (focusing on the outcome);
- Network performance (using and creating networks, even for colleagues);
- Risk management (minimizing risks and unwanted changes);

- Judgment (balancing between risk and escalation, as well as decision making);
- Customer-centricity (using feedback and meeting customer expectations).

### *2.3. Project Management in the Public Sector*

The difference between public- and private-sector projects, particularly regarding their success, is a recurrent theme in the literature [85–95]. However, the concepts used are vague and can be interpreted in different ways. As was defined earlier in this paper, the success of a project can be interpreted on different levels and from several angles, and the same is true for the definition of the public sector [96]. Sometimes, authors use this term without defining it [97], and sometimes they interpret it as referring to government agencies or a public service providers [95].

Public-sector projects are carried out by public-sector organizations, and it is, therefore, appropriate to start from the concept of a public-sector organization, which is simply defined by ownership [98]. In the private sector, the owners are shareholders, commercial legal entities, or individuals, while public organizations are collectively owned by the members of political communities. Another way of defining public-sector organizations is requiring that they should be "publicly funded" [99].

Boyne listed several aspects in which private- and public-sector organizations differ (complexity, permeability, instability, and the absence of competitive pressures [86] (p. 100)). Wirick [95] (pp. 2–7) collected similar characteristics of public-sector organizations (purpose, overlapping oversight mechanisms, short planning horizons, contentious environments, and overlapping service delivery mechanisms) based on specific examples of public-sector organizations. For this paper, we separated private- and public-sector organizations and their projects based on ownership as well.

The misleading nature of stereotypes about the differences between private- and public-sector projects was pointed out by Baker, Fisher, and Murphy more than half a century ago [85]. The authors used a large sample-based statistical analysis of factors determining the success of projects published in 1974 [100]. In their paper, they reported a 17-item table of preconceptions about the differences between projects in the two sectors [85] (p. 921), and they stated that, in 13 of these cases, the preconceptions were not supported by the data. Surprisingly, there was no statistically significant difference in the cost and scope overruns of projects between the two sectors.

In more recent publications analyzing public-sector projects, authors have discussed the reasons for project success, such as the existence of an appropriate governance structure [92,97,98,101,102], cultural aspects [103], and the key competencies of project managers [104–106]. The last topic is within the scope of this paper.

Yasin et al. [106] used a predefined list of 20 project manager competencies and then used factor analysis to identify the required skills. In a sample of 102 Portuguese respondents, they found eight factors: management skills; attitude toward others; managerial style; social skills; being an effective team player; desire for power; desire for achievement; and confidence and vision. Jalocha et al. [105] wanted to identify the most important competencies of public-sector project managers. The authors used the International Project Management Association's ICB 3.0 to determine an initial list of competencies and selected a subset based on their qualitative research. The authors noted that there would likely be differences in the competencies required from a project manager in the public sector based on the subsector (e.g., healthcare or higher education). Blixt and Kirytopoulos [104] concluded that project management competency standards must be supplemented with public administration competencies to describe the full set of skills needed to successfully deliver public-sector projects.

## 3. Research Design

### *3.1. Research Goals and Hypotheses*

The fundamental aim of this research was to highlight the main differences between the project management practices of public and private organizations in Hungary. We

conducted exploratory research on the topic based on the data collection of the Hungarian Project Management Association, which examined the project management culture of its members. Numerous authors have examined the success and failure rates achieved in projects, but this has not been analyzed comparatively [4,107]. Moreover, some researchers [2,8,56,57,108] have pointed out that a key element in achieving project success, which can be considered a critical success factor, is the project manager possessing the appropriate level of competencies. Following Finn's [71] input competencies, numerous researchers have found that there may be two categories within project management competency: lexical knowledge and skill [2,8,79,109]. This can be valid for projects requiring special attitudes as well, such as sustainability [16,39,42,110]. Due to their popularity, we accepted the Project Management Institute's knowledge areas [111] and used them for further analysis. For measuring skills, we adopted Gartner's 10 elements because (1) they have considerable overlap with the talent triangle but condense skills in a more efficient manner, and (2) they identify those skills that are needed for a successful project manager, as per the research aim of this paper [79,84]. We also considered the findings of Fortune and White [64] on critical success factors and focused on revealing the possible interrelationships between them. Moreover, the difference in the success and failure of projects between the two sectors was explored. The failure rate was expressed in terms of the rate of canceled projects, those which commenced without finishing; in such a case, none of the three success criteria can be achieved. As per the analyses of the Project Management Institute [79] and the Standish Group [23], the success rate was determined based on the project triangle. Furthermore, we explored whether there is a difference in the perceived importance of competencies expressed in terms of knowledge areas and skills between public and private organizations. Thus, the following two research questions were formulated:

- Is there a difference in success and failure rates between the public and private sectors?
- Is there a difference in the key knowledge areas and skills between the public and private sectors, and are there any interrelationships among these knowledge areas and skills?

Based on these research questions, four hypotheses were formulated to guide the investigations:

**H1.** *The success rate is significantly higher in the case of private organizations than in public organizations.*

**H2.** *In the case of private organizations, the failure rate of projects is significantly lower than in public organizations.*

**H3.** *There is a significant difference in the perceived importance of knowledge areas between public and private organizations.*

**H4.** *There is a significant difference in the perceived importance of skills between the public and private sectors.*

Furthermore, we analyzed whether there are interrelationships among the knowledge areas and skills in both the public and private sectors in an explorative manner.

### *3.2. Sample*

For this research, the data collection by online questionnaire was carried out by the Hungarian Project Management Association using Qualtrics's research software, cloud-based Qualtrics XM. The data collection took place between May and July 2022. The questionnaire was distributed by the Hungarian Project Management Association to its organizational and individual members. The sample included organizations in Hungary that have a more developed project management culture. From the data of the final survey, comprising 93 responses, 49 were evaluated after data cleaning, which cannot be generalized due to the exploratory nature of this research. The most important characteristics of the sample are summarized in Table 3. The sample included 13 public and 36 private

organizations and contained both small- and medium-sized enterprises (SMEs), as well as large companies. The answers to the questions reflected the whole organization's responses, due to the fact that for the data collection, a key senior project manager was asked in each case to answer on behalf of the organization (if applicable). The companies were divided by industry. Most companies were from the information technology industry (17 companies), followed by government (9 companies) and consulting (6 companies).

**Table 3.** Sample characteristics.

| Characteristics | Item | Frequency | Percentage |
|---|---|---|---|
| Owner of the company | Public | 13 | 26.5% |
| | Private | 36 | 73.5% |
| Company size | 1–9 | 9 | 18.4% |
| | 10–49 | 4 | 8.2% |
| | 50–249 | 17 | 34.7% |
| | 250–1499 | 10 | 20.4% |
| | 1500+ | 9 | 18.4% |
| Main industry | Bank and insurance | 3 | 6.1% |
| | Construction and real estate | 4 | 8.2% |
| | Consulting | 6 | 12.2% |
| | Government | 9 | 18.4% |
| | Information technology | 17 | 34.7% |
| | Mechanical | 3 | 6.1% |
| | Other | 3 | 6.1% |
| | Training/education | 4 | 8.2% |

### *3.3. Research Instrument and Analysis Methods*

Considering the low number of responses, the non-normal distributions, and the ordinal scales, non-parametric tests were applied to answer the research questions and accept or reject the hypotheses [112,113]. For the analysis, we used the Mann–Whitney test to compare the two groups [114]. To reveal possible interrelationships, an exploratory analysis was conducted, i.e., Spearman's rank correlation was applied to measure the degree of similarity between two rankings and to assess the significance of the relationship between them [115]. The data were analyzed using IBM SPSS 27 software, and the results were considered significant when the significance level (if applicable) was below 0.05.

## 4. Results

Table 4 shows the ratios of successful projects in the public and private sectors. The ratio of successful projects for private organizations (mean = 57.94; std. dev. = 33.934; median = 62.50) seemed to be higher than that for public organizations (mean = 46.38; std. dev. = 35.070; median = 50.00).

First, we examined whether the data met the normality assumption (Table 5) using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Based on both tests, in the case of the private sector, at a 5% significance level, the null hypothesis on normal distribution could be rejected. The number of elements in the sample was relatively low, so we chose a non-parametric procedure to decide the question of success.

The results of the Mann–Whitney test (Table 6) showed no significant difference between the public and private sectors regarding the success of projects.

The public sector (mean = 3.92; std. dev. = 4.941; median = 3.00) and private sector (mean = 6.47; std. dev. = 9.117; median = 5.00) were also compared based on the failure rate of projects (see Table 7).

Based on descriptive statistics and the Mann–Whitney test, the H2 hypothesis could be rejected at all significance levels. The Mann–Whitney test was used for the same reason as before, i.e., the normal distribution of the data at 5% could be rejected, as seen in Tables 8 and 9.

**Table 4.** Success rates of projects in the public and private sectors.

| | Public | | Private | |
|---|---|---|---|---|
| | **Statistic** | **Std. Error** | **Statistic** | **Std. Error** |
| Mean | 46.38 | 9.727 | 57.94 | 5.656 |
| 95% confidence interval | 25.19–67.58 | | 46.46–69.43 | |
| 5% trimmed mean | 46.09 | | 58.83 | |
| Median | 50 | | 62.5 | |
| Variance | 1229.923 | | 1151.540 | |
| Std. deviation | 35.07 | | 33.934 | |
| Minimum | 0 | | 0 | |
| Maximum | 98 | | 100 | |
| Interquartile range | 68 | | 63 | |
| Skewness | 0.165 | 0.616 | −0.446 | 0.393 |
| Kurtosis | −1.474 | 1.191 | −1.203 | 0.768 |

**Table 5.** Normality tests of project success rates.

| | Kolmogorov–Smirnov | | | Shapiro–Wilk | | |
|---|---|---|---|---|---|---|
| | **Statistic** | **df** | **Sig.** | **Statistic** | **df** | **Sig.** |
| Public | 0.159 | 13 | 0.200 * | 0.916 | 13 | 0.219 |
| Private | 0.165 | 36 | 0.015 | 0.899 | 36 | 0.003 |

* This is a lower bound of the true significance.

**Table 6.** Results of the Mann–Whitney test of project success rates.

| | |
|---|---|
| Mann–Whitney U | 191.000 |
| Wilcoxon W | 282.000 |
| Z | −0.976 |
| Asymp. Sig. (1-tailed) | 0.1645 |

**Table 7.** Failure rates of projects in the public and private sectors.

| | Public | | Private | |
|---|---|---|---|---|
| | **Statistic** | **Std. Error** | **Statistic** | **Std. Error** |
| Mean | 3.92 | 1.370 | 6.47 | 1.519 |
| 95% confidence interval | 0.94–6.91 | | 3.39–9.56 | |
| 5% trimmed mean | 3.53 | | 5.22 | |
| Median | 3.00 | | 5.00 | |
| Variance | 24.410 | | 83.113 | |
| Std. deviation | 4.941 | | 9.117 | |
| Minimum | 0 | | 0 | |
| Maximum | 15 | | 40 | |
| Interquartile range | 8 | | 10 | |
| Skewness | 1.181 | 0.616 | 2.174 | 0.393 |
| Kurtosis | 0.517 | 1.191 | 5.196 | 0.768 |

**Table 8.** Normality tests of project failure rates.

| | Kolmogorov–Smirnov | | | Shapiro–Wilk | | |
|---|---|---|---|---|---|---|
| | **Statistic** | **df** | **Sig.** | **Statistic** | **df** | **Sig.** |
| Public | 0.248 | 13 | 0.028 | 0.803 | 13 | 0.007 |
| Private | 0.239 | 36 | 0.000 | 0.721 | 36 | 0.000 |

**Table 9.** Results of the Mann–Whitney test of project failure rates.

| | |
|---|---|
| Mann–Whitney U | 201.000 |
| Wilcoxon W | 292.000 |
| Z | −0.774 |
| Asymp. Sig. (1-tailed) | 0.7805 |

For the next hypothesis, we searched for the answer to whether there was a difference in the perceived importance of knowledge areas between the public and private sectors at 5% (Table 10). Based on the results, there was no significant difference between the two sectors.

**Table 10.** Comparison of the perceived importance of knowledge areas in the public and private sectors.

| | **Integration m.** | **Scope m.** | **Time m.** | **Cost m.** | **Quality m.** | **Resource m.** | **Communication m.** | **Risk m.** | **Stakeholder m.** | **Procurement m.** |
|---|---|---|---|---|---|---|---|---|---|---|
| Mean rank public | 25.96 | 25.12 | 25.85 | 27.19 | 25.04 | 22.77 | 24.69 | 24.65 | 19.88 | 28.42 |
| Mean rank private | 24.65 | 24.96 | 24.69 | 24.21 | 24.99 | 25.81 | 25.11 | 25.13 | 26.85 | 22.31 |
| Mann–Whitney U | 221.500 | 232.500 | 223.000 | 205.500 | 233.500 | 205.000 | 230.000 | 229.500 | 167.500 | 163.500 |
| Wilcoxon W | 887.500 | 898.500 | 889.000 | 871.500 | 899.500 | 296.000 | 321.000 | 320.500 | 258.500 | 758.500 |
| Z | −0.314 | −0.039 | −0.326 | −0.800 | −0.012 | −0.718 | −0.098 | −0.108 | −1.589 | −1.450 |
| Asymp. Sig. (2-tailed) | 0.754 | 0.969 | 0.745 | 0.424 | 0.990 | 0.473 | 0.922 | 0.914 | 0.112 | 0.147 |

However, in the case of skills (Table 11), there were two elements for which a significant difference (at 5%) in the perceived importance between the public and private sectors could be identified. For business acumen (Z = −2.236; p (2-tailed) = 0.025), the perceived importance was higher in the private sector (mean rank = 27.58) than in the public sector (mean rank = 17.85). The situation was similar in the case of customer-centricity (Z = −2.696; p [2-tailed] = 0.007), where the perceived importance was significantly higher in the private sector (mean rank = 27.99) than in the public sector (mean rank = 16.73).

Next, we explored the relationship between the perceived importance of individual knowledge areas in the public and private sectors using rank correlation (Table 12). In the public sector, there was a significant relationship (cor. coef. = 0.613; sig. = 0.026) between integration management and scope management. Scope management also correlated with time management (cor. coef. = 0.737; sig. = 0.004), cost management (cor. coef. = 0.737; sig. = 0.004), quality management (cor. coef. = 0.574; sig. = 0.040), and communication management (cor. coef. = 0.602; sig. = 0.029). There was a significant relationship (cor. coef. = 0.567; sig. = 0.043) between time management and cost management. The degree of similarity (cor. coef. = 0.690; sig. = 0.009) was also significant between cost management and quality management. Finally, there was also a relatively high correlation (cor. coef. = 0.712; sig. = 0.006) between resource management and communication management.

Regarding the private sector (Table 13), there were several rank correlations between knowledge areas. The strongest significant relationship was between integration management and scope management (cor. coef. = 0.715; sig. = 0.000). In addition, there was a relatively strong correlation between resource management and cost management (cor. coef. = 0.692; sig. = 0.000) and risk management (cor. coef. = 0.600; sig. = 0.000);

between integration management and stakeholder management (cor. coef. = 0.581; sig. = 0.000); and between scope management and resource management (cor. coef. = 0.570; sig. = 0.000), time management (cor. coef. = 0.565; sig. = 0.000), and cost management (cor. coef. = 0.564; sig. = 0.001).

Based on the two tables (Tables 12 and 13) above, Figure 1 compares the various correlations between the knowledge areas in the public and private sectors with a correlogram. Only those correlation coefficients in Tables 12 and 13 that were significant at the 0.05 level were included. The upper part of the matrix, which forms a "triangle", shows the rank correlations between knowledge areas in the public sector, and the lower "triangle" shows the same for the private sector.

| | | Public | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Integration management | Scope management | Schedule management | Cost management | Quality management | Resource management | Communication management | Risk management | Stakeholder management | Procurement management |
| Private | Integration management | 1.000 | 0.613 | | | | | | | | |
| | Scope management | | 1.000 | 0.737 | 0.737 | 0.574 | | 0.602 | | | |
| | Schedule management | 0.456 | 0.565 | 1.000 | 0.567 | | | | | | |
| | Cost management | | 0.564 | | 1.000 | 0.690 | | | | | |
| | Quality management | | | | | 1.000 | | | | | |
| | Resource management | | 0.570 | 0.402 | 0.692 | | 1.000 | 0.712 | | | |
| | Communicatio n management | 0.715 | | 0.562 | | | | 1.000 | | | |
| | Risk management | 0.408 | 0.532 | 0.385 | 0.598 | 0.383 | 0.600 | 0.400 | 1.000 | | |
| | Stakeholder management | 0.581 | 0.423 | 0.554 | | | | 0.556 | 0.470 | 1.000 | |
| | Procurement management | 0.531 | 0.373 | 0.399 | 0.439 | | 0.410 | 0.476 | 0.528 | 0.497 | 1.000 |

**Figure 1.** Comparison: rank correlations between knowledge areas in the public and private sectors.

A cell is empty where the correlation coefficient was not significant at the 0.05 level. If the correlation coefficient was significant at the 0.05 level, then the square size for the r value is as follows (r is absolute value): $0.3 < r \leq 0.5$—one quarter; $0.5 < r \leq 0.7$—two quarters; $0.7 < r \leq 0.9$—three quarters; or $r < 0.9$—four quarters. Moreover, the higher the correlation, the darker is the shade of the cell's background color.

In addition, the relationships between the perceived importance of skills in the public and private sectors were explored. In the public sector (Table 14), emotional intelligence correlated with ownership, commitment (cor. coef. = 0.647; sig. = 0.017), and servant leadership (cor. coef. = 0.695; sig. = 0.008). The correlation was also relatively high between business acumen and network performance skills (cor. coef. = 0.674; sig. = 0.011) and risk management (cor. coef. = 0.737; sig. = 0.004). Moreover, there was a significant relationship (cor. coef. = 0.567; sig. = 0.043) between customer orientation and judgment (cor. coef. = 0.749; sig. = 0.003).

Similar to what we found with knowledge areas, there were many significant correlations between individual competencies in the private sector (Table 15). The strongest significant relationship was between servant leadership and emotional intelligence (cor. coef. = 0.688; sig. = 0.000) and networking performance skills (cor. coef. = 0.570; sig. = 0.000). Furthermore, there was a moderate but significant correlation between ownership, commitment, and customer centricity (cor. coef. = 0.452; sig. = 0.006) and between stakeholder partnership and servant leadership (cor. coef. = 0.453; sig. = 0.005).

Based on the two tables above (Tables 14 and 15), Figure 2 compares the various correlations between the skills in the public and private sectors with a correlogram. Only those correlation coefficients in Tables 14 and 15 that were significant at the 0.05 level were included. The upper part of the matrix, which forms a "triangle", shows the rank correlations between skills in the public sector, and the lower "triangle" shows the rank correlations between skills in the private sector.

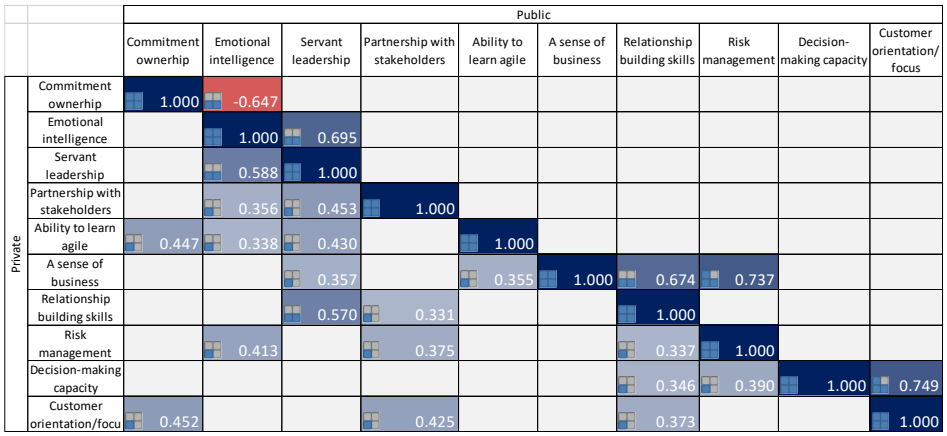


**Figure 2.** Comparison: rank correlations between the skills in the public and private sectors.

A cell is empty where the correlation coefficient was not significant at the 0.05 level. If the correlation coefficient was significant at the 0.05 level, then the square size for the r value is as follows (r is absolute value): $0.3 < r \leq 0.5$—one quarter; $0.5 < r \leq 0.7$—two quarters; $0.7 < r \leq 0.9$—three quarters; or $r < 0.9$—four quarters. Moreover, the higher the correlation, the darker is the shade of the cell's background color. A red background indicates that the correlation was negative.

**Table 11.** Comparison of the perceived importance of skills in the public and private sectors.

| | Ownership and Commitment | Emotional Intelligence | Servant Leadership | Stakeholder Partnership | Learning Agility | Business Acumen | Network Performance | Risk Management | Judgment | Customer Centricity |
|---|---|---|---|---|---|---|---|---|---|---|
| Mean rank public | 25.38 | 19.31 | 25.04 | 27.00 | 19.85 | 17.85 | 21.96 | 22.19 | 22.31 | 16.73 |
| Mean rank private | 24.86 | 27.06 | 24.99 | 24.28 | 26.86 | 27.58 | 26.10 | 26.01 | 25.97 | 27.99 |
| Mann–Whitney U | 229.000 | 160.000 | 233.500 | 208.000 | 167.000 | 141.000 | 194.500 | 197.500 | 199.000 | 126.500 |
| Wilcoxon W | 895.000 | 251.000 | 899.500 | 874.000 | 258.000 | 232.000 | 285.500 | 288.500 | 290.000 | 217.500 |
| Z | −0.123 | −1.798 | −0.012 | −0.655 | −1.642 | −2.236 | −0.975 | −0.902 | −0.911 | −2.696 |
| Asymp. Sig. (2-tailed) | 0.902 | 0.072 | 0.990 | 0.513 | 0.101 | 0.025 | 0.330 | 0.367 | 0.363 | 0.007 |

**Table 12.** Rank correlations between knowledge areas in the public sector.

| | | Integration m. | Scope m. | Time m. | Cost m. | Quality m. | Resource m. | Communication m. | Risk m. | Stakeholder m. | Procurement m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Integration management | Correlation coefficient | 1.000 | **0.613** * | 0.433 | 0.433 | 0.046 | −0.208 | 0.000 | −0.045 | −0.359 | 0.444 |
| | Sig. (2-tailed) | | **0.026** | 0.139 | 0.139 | 0.882 | 0.495 | 1.000 | 0.884 | 0.229 | 0.128 |
| Scope management | Correlation coefficient | **0.613** * | 1.000 | **0.737** ** | **0.737** ** | **0.574** * | 0.255 | **0.602** * | 0.109 | −0.091 | 0.235 |
| | Sig. (2-tailed) | **0.026** | | **0.004** | **0.004** | **0.040** | 0.400 | **0.029** | 0.723 | 0.766 | 0.440 |
| Time management | Correlation coefficient | 0.433 | **0.737** ** | 1.000 | **0.567** * | 0.504 | 0.180 | 0.477 | 0.364 | −0.233 | 0.108 |
| | Sig. (2-tailed) | 0.139 | **0.004** | | **0.043** | 0.079 | 0.556 | 0.100 | 0.221 | 0.443 | 0.725 |
| Cost management | Correlation coefficient | 0.433 | **0.737** ** | **0.567** * | 1.000 | **0.690** ** | 0.180 | 0.477 | 0.104 | −0.233 | 0.270 |
| | Sig. (2-tailed) | 0.139 | **0.004** | **0.043** | | **0.009** | 0.556 | 0.100 | 0.735 | 0.443 | 0.372 |
| Quality management | Correlation coefficient | 0.046 | **0.574** * | 0.504 | **0.690** ** | 1.000 | 0.294 | 0.438 | 0.207 | −0.135 | 0.331 |
| | Sig. (2-tailed) | 0.882 | **0.040** | 0.079 | **0.009** | | 0.329 | 0.135 | 0.497 | 0.661 | 0.270 |
| Resource management | Correlation coefficient | −0.208 | 0.255 | 0.180 | 0.180 | 0.294 | 1.000 | **0.712** ** | 0.447 | 0.259 | −0.337 |
| | Sig. (2-tailed) | 0.495 | 0.400 | 0.556 | 0.556 | 0.329 | | **0.006** | 0.125 | 0.394 | 0.260 |
| Communication management | Correlation coefficient | 0.000 | **0.602** * | 0.477 | 0.477 | 0.438 | **0.712** ** | 1.000 | 0.483 | 0.514 | −0.158 |
| | Sig. (2-tailed) | 1.000 | **0.029** | 0.100 | 0.100 | 0.135 | **0.006** | | 0.094 | 0.072 | 0.605 |
| Risk management | Correlation coefficient | −0.045 | 0.109 | 0.364 | 0.104 | 0.207 | 0.447 | 0.483 | 1.000 | 0.040 | −0.259 |
| | Sig. (2-tailed) | 0.884 | 0.723 | 0.221 | 0.735 | 0.497 | 0.125 | 0.094 | | 0.896 | 0.392 |
| Stakeholder management | Correlation coefficient | −0.359 | −0.091 | −0.233 | −0.233 | −0.135 | 0.259 | 0.514 | 0.040 | 1.000 | −0.052 |
| | Sig. (2-tailed) | 0.229 | 0.766 | 0.443 | 0.443 | 0.661 | 0.394 | 0.072 | 0.896 | | 0.867 |
| Procurement management | Correlation coefficient | 0.444 | 0.235 | 0.108 | 0.270 | 0.331 | −0.337 | −0.158 | −0.259 | −0.052 | 1.000 |
| | Sig. (2-tailed) | 0.128 | 0.440 | 0.725 | 0.372 | 0.270 | 0.260 | 0.605 | 0.392 | 0.867 | |

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). Bold indicates correlation is significant at 0.05 level (2-tailed) and correlation coefficient is higher than 0.5.

**Table 13.** Rank correlations between knowledge areas in the private sector.

| | | Integration m. | Scope m. | Time m. | Cost m. | Quality m. | Resource m. | Communication m. | Risk m. | Stakeholder m. | Procurement m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Integration management | Correlation coefficient | 1.000 | 0.299 | 0.456 ** | 0.292 | 0.327 | 0.190 | **0.715 ** ** | 0.408 * | **0.581 ** ** | **0.531 ** ** |
| | Sig. (2-tailed) | | 0.086 | 0.007 | 0.094 | 0.059 | 0.282 | **0.000** | 0.016 | **0.000** | **0.001** |
| Scope management | Correlation coefficient | 0.299 | 1.000 | **0.565 ** ** | **0.564 ** ** | 0.046 | **0.570 ** ** | 0.264 | **0.532 ** ** | 0.423 * | 0.373 * |
| | Sig. (2-tailed) | 0.086 | | **0.000** | **0.001** | 0.796 | **0.000** | 0.131 | **0.001** | 0.013 | 0.030 |
| Time management | Correlation coefficient | 0.456 | **0.565 ** ** | 1.000 | 0.304 | −0.050 | 0.402 * | **0.562 ** ** | 0.385 * | **0.554 ** ** | 0.399 * |
| | Sig. (2-tailed) | 0.007 | **0.000** | | 0.081 | 0.780 | 0.019 | **0.001** | 0.025 | **0.001** | 0.019 |
| Cost management | Correlation coefficient | 0.292 | **0.564 ** ** | 0.304 | 1.000 | 0.281 | **0.692** | 0.126 ** | **0.598 ** ** | 0.182 | 0.439 ** |
| | Sig. (2-tailed) | 0.094 | **0.001** | 0.081 | | 0.107 | **0.000** | 0.479 | **0.000** | 0.303 | 0.009 |
| Quality management | Correlation coefficient | 0.327 | 0.046 | −0.050 | 0.281 | 1.000 | 0.330 | 0.135 | 0.383 * | 0.221 | 0.047 |
| | Sig. (2-tailed) | 0.059 | 0.796 | 0.780 | 0.107 | | 0.056 | 0.446 | 0.025 | 0.209 | 0.792 |
| Resource management | Correlation coefficient | 0.190 | **0.570 ** ** | 0.402 | **0.692 ** ** | 0.330 | 1.000 | 0.274 | **0.600 ** ** | 0.332 | 0.410 * |
| | Sig. (2-tailed) | 0.282 | **0.000** | 0.019 | **0.000** | 0.056 | | 0.116 | **0.000** | 0.055 | 0.016 |
| Communication management | Correlation coefficient | **0.715 ** ** | 0.264 | **0.562 ** ** | 0.126 | 0.135 | 0.274 | 1.000 | 0.400 * | **0.556 ** ** | 0.476 ** |
| | Sig. (2-tailed) | **0.000** | 0.131 | **0.001** | 0.479 | 0.446 | 0.116 | | 0.019 | **0.001** | 0.004 |
| Risk management | Correlation coefficient | 0.408 * | **0.532 ** ** | 0.385 * | **0.598 ** ** | 0.383 * | **0.600 ** ** | 0.400 * | 1.000 | 0.470 ** | **0.528 ** ** |
| | Sig. (2-tailed) | 0.016 | **0.001** | 0.025 | **0.000** | 0.025 | **0.000** | 0.019 | | 0.005 | **0.001** |
| Stakeholder management | Correlation coefficient | **0.581 ** ** | 0.423 * | **0.554 ** ** | 0.182 | 0.221 | 0.332 | **0.556 ** ** | 0.470 ** | 1.000 | 0.497 ** |
| | Sig. (2-tailed) | **0.000** | 0.013 | **0.001** | 0.303 | 0.209 | 0.055 | **0.001** | 0.005 | | 0.003 |
| Procurement management | Correlation coefficient | **0.531 ** ** | 0.373 ** | 0.399 * | 0.439 ** | 0.047 | 0.410 * | 0.476 ** | **0.528 ** ** | 0.497 ** | 1.000 |
| | Sig. (2-tailed) | **0.001** | 0.030 | 0.019 | 0.009 | 0.792 | 0.016 | 0.004 | **0.001** | 0.003 | |

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). Bold indicates correlation is significant at 0.05 level (2-tailed) and correlation coefficient is higher than 0.5.

**Table 14.** Rank correlations between skills in the public sector.

| | | Ownership and Commitment | Emotional Intelligence | Servant Leadership | Stakeholder Partnership | Learning Agility | Business Acumen | Network Performance | Risk Management | Judgment | Customer Centricity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ownership and commitment | Correlation coefficient | 1.000 | **−0.647 *** | −0.447 | 0.226 | −0.168 | −0.033 | 0.151 | −0.290 | −0.023 | 0.346 |
| | Sig. (2-tailed) | | **0.017** | 0.126 | 0.458 | 0.583 | 0.915 | 0.623 | 0.337 | 0.940 | 0.247 |
| Emotional intelligence | Correlation coefficient | **−0.647 *** | 1.000 | **0.695 **** | −0.029 | 0.136 | 0.343 | 0.384 | 0.452 | 0.148 | −0.180 |
| | Sig. (2-tailed) | **0.017** | | **0.008** | 0.925 | 0.657 | 0.251 | 0.195 | 0.121 | 0.630 | 0.557 |
| Servant leadership | Correlation coefficient | −0.447 | **0.695 **** | 1.000 | −0.004 | 0.384 | 0.119 | 0.219 | 0.126 | 0.216 | 0.012 |
| | Sig. (2-tailed) | 0.126 | **0.008** | | 0.991 | 0.195 | 0.699 | 0.472 | 0.681 | 0.479 | 0.970 |
| Stakeholder partnership | Correlation coefficient | 0.226 | −0.029 | −0.004 | 1.000 | −0.169 | −0.014 | 0.148 | −0.251 | −0.003 | 0.028 |
| | Sig. (2-tailed) | 0.458 | 0.925 | 0.991 | | 0.582 | 0.963 | 0.630 | 0.408 | 0.991 | 0.929 |
| Learning agility | Correlation coefficient | −0.168 | 0.136 | 0.384 | −0.169 | 1.000 | 0.402 | −0.032 | 0.284 | 0.292 | 0.308 |
| | Sig. (2-tailed) | 0.583 | 0.657 | 0.195 | 0.582 | | 0.173 | 0.917 | 0.346 | 0.332 | 0.306 |
| Business acumen | Correlation coefficient | −0.033 | 0.343 | 0.119 | −0.014 | 0.402 | 1.000 | **0.674 *** | **0.737 **** | 0.389 | 0.142 |
| | Sig. (2-tailed) | 0.915 | 0.251 | 0.699 | 0.963 | 0.173 | | **0.011** | **0.004** | 0.189 | 0.644 |
| Network performance | Correlation coefficient | 0.151 | 0.384 | 0.219 | 0.148 | −0.032 | **0.674 *** | 1.000 | 0.351 | 0.178 | 0.083 |
| | Sig. (2-tailed) | 0.623 | 0.195 | 0.472 | 0.630 | 0.917 | **0.011** | | 0.240 | 0.561 | 0.788 |
| Risk management | Correlation coefficient | −0.290 | 0.452 | 0.126 | −0.251 | 0.284 | **0.737 **** | 0.351 | 1.000 | 0.544 | 0.253 |
| | Sig. (2-tailed) | 0.337 | 0.121 | 0.681 | 0.408 | 0.346 | **0.004** | 0.240 | | 0.055 | 0.405 |
| Judgment | Correlation coefficient | −0.023 | 0.148 | 0.216 | −0.003 | 0.292 | 0.389 | 0.178 | 0.544 | 1.000 | **0.749 **** |
| | Sig. (2-tailed) | 0.940 | 0.630 | 0.479 | 0.991 | 0.332 | 0.189 | 0.561 | 0.055 | | **0.003** |
| Customer centricity | Correlation coefficient | 0.346 | −0.180 | 0.012 | 0.028 | 0.308 | 0.142 | 0.083 | 0.253 | **0.749 **** | 1.000 |
| | Sig. (2-tailed) | 0.247 | 0.557 | 0.970 | 0.929 | 0.306 | 0.644 | 0.788 | 0.405 | **0.003** | |

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). Bold indicates correlation is significant at 0.05 level (2-tailed) and correlation coefficient is higher than 0.5.

**Table 15.** Rank correlations between skills in the private sector.

| | | Ownership and Commitment | Emotional Intelligence | Servant Leadership | Stakeholder Partnership | Learning Agility | Business Acumen | Network Performance | Risk Management | Judgment | Customer Centricity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ownership and commitment | Correlation coefficient | 1.00 | 0.295 | 0.172 | 0.114 | **0.447** ** | 0.000 | 0.152 | 0.246 | 0.270 | **0.452** ** |
| | Sig. (2-tailed) | | 0.080 | 0.316 | 0.509 | **0.006** | 1.000 | 0.378 | 0.149 | 0.112 | **0.006** |
| Emotional intelligence | Correlation coefficient | 0.295 | 1.000 | **0.588** ** | **0.356** * | **0.338** * | 0.229 | 0.277 | 0.413 * | 0.060 | 0.205 |
| | Sig. (2-tailed) | 0.080 | | **0.000** | **0.033** | **0.043** | 0.179 | 0.103 | 0.012 | 0.728 | 0.231 |
| Servant leadership | Correlation coefficient | 0.172 | **0.588** ** | 1.000 | **0.453** ** | **0.430** ** | **0.357** * | **0.570** ** | 0.306 | 0.143 | 0.303 |
| | Sig. (2-tailed) | 0.316 | **0.000** | | **0.005** | **0.009** | **0.032** | **0.000** | 0.069 | 0.405 | 0.073 |
| Stakeholder partnership | Correlation coefficient | 0.114 | **0.356** * | **0.453** ** | 1.000 | 0.238 | 0.082 | **0.331** * | **0.375** * | −0.021 | **0.425** ** |
| | Sig. (2-tailed) | 0.509 | **0.033** | **0.005** | | 0.162 | 0.635 | **0.049** | **0.024** | 0.902 | **0.010** |
| Learning agility | Correlation coefficient | **0.447** ** | **0.338** * | **0.430** ** | 0.238 | 1.000 | **0.355** * | 0.290 | 0.049 | −0.023 | 0.228 |
| | Sig. (2-tailed) | **0.006** | **0.043** | **0.009** | 0.162 | | **0.034** | 0.086 | 0.775 | 0.895 | 0.180 |
| Business acumen | Correlation coefficient | 0.000 | 0.229 | **0.357** * | 0.082 | **0.355** * | 1.000 | 0.323 | 0.061 | 0.221 | 0.229 |
| | Sig. (2-tailed) | 1.000 | 0.179 | **0.032** | 0.635 | **0.034** | | 0.054 | 0.726 | 0.195 | 0.180 |
| Network performance | Correlation coefficient | 0.152 | 0.277 | **0.570** ** | **0.331** * | 0.290 | 0.323 | 1.000 | **0.337** * | **0.346** * | **0.373** * |
| | Sig. (2-tailed) | 0.378 | 0.103 | **0.000** | **0.049** | 0.086 | 0.054 | | **0.044** | **0.039** | **0.025** |
| Risk management | Correlation coefficient | 0.246 | **0.413** * | 0.306 | **0.375** * | 0.049 | 0.061 | **0.337** * | 1.000 | **0.390** * | 0.233 |
| | Sig. (2-tailed) | 0.149 | **0.012** | 0.069 | **0.024** | 0.775 | 0.726 | **0.044** | | **0.019** | 0.171 |
| Judgment | Correlation coefficient | 0.270 | 0.060 | 0.143 | −0.021 | −0.023 | 0.221 | **0.346** * | **0.390** * | 1.000 | 0.178 |
| | Sig. (2-tailed) | 0.112 | 0.728 | 0.405 | 0.902 | 0.895 | 0.195 | **0.039** | **0.019** | | 0.299 |
| Customer centricity | Correlation coefficient | **0.452** ** | 0.205 | 0.303 | **0.425** ** | 0.228 | 0.229 | **0.373** * | 0.233 | 0.178 | 1.000 |
| | Sig. (2-tailed) | **0.006** | 0.231 | 0.073 | **0.010** | 0.180 | 0.180 | **0.025** | 0.171 | 0.299 | |

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at 0.01 level (2-tailed). Bold indicates correlation is significant at 0.05 level (2-tailed) and correlation coefficient is higher than 0.5.

## 5. Discussion

Competency is regarded as a critical factor for successful project management [8,11,58,116,117]; however, defining the required competencies for project managers is considered difficult. On one hand, this can be due to the complex nature of this phenomenon, or, on the other hand, it can vary industry by industry and sector by sector [2]. Although researchers have identified various competencies that are needed for successfully managing projects, most of them identify these as lexical knowledge and skills. Moreover, these skills can be applied to both sustainability-focused and traditional projects, although in some cases, they should be enhanced with sustainability principles [42]. However, researchers all agree on the key role played by a project manager in achieving project success. Researchers have also revealed that project success is complex and covers effectiveness (business-related) and efficiency (the project triangle, i.e., time, cost, and quality) criteria. However, it can also be concluded that, while both competency and project success are usually considered, in general, sector-based differentiation is rarely considered [10,25,80,105]. Thus, the aim of this paper was two-fold: on the one hand, to analyze whether there is a significant difference between the performance of the private sector and the public sector, and, on the other hand, to analyze whether there are differences between the attitudes of the two sectors toward the required knowledge and skills. This paper has both theoretical and practical implications for the project management profession.

Although there are minor differences in the success rates achieved on projects and the failure rates between the different sectors [25,107], researchers have not been able to determine whether the private sector outperforms the public sector. Considering the limitations of the sample used, this research found no evidence of any significant difference in performance in terms of the project triangle (time, cost, and quality) between companies operating in the two sectors. Moreover, this research found that there was no difference between the failure rates either. We also focused on competencies, which were analyzed through knowledge areas and skills [10,11,84,111]. Although some researchers have pointed out there could be different focal points in the applied knowledge elements between the public and private sectors [118–120], we could not identify a significant difference. As a result of this research, the given knowledge areas were evaluated as having the same importance regardless of the sector in which a project manager operated. However, this research did reveal a difference in the two business-focused skills, whereby private-sector project managers perceived business acumen and customer orientation as more important than did public-sector project managers. This could also mean that, considering the hierarchical nature of the public sector [121,122], a project manager is able to focus on managing the process due to the relative stability of the surrounding environment, while a private-sector project manager must manage interdependencies to a greater extent since business needs could vary in a more turbulent way [8,31,120]. This has an impact on the potential frameworks and guidelines in both the public and private sectors. Project managers belonging to the latter sector may need to place increased emphasis on managing complexity [123] and increased focus on identifying and monitoring (changing) business needs. Thus, they need to use skills that facilitate this.

Researchers have identified potential interdependencies between competency elements [2,8,64,79,124]. We strengthened these potential interrelationships via exploratory analysis. Considering the limitations of the sample, Spearman's correlation was used to determine the potential existence of links between knowledge areas and between skills. In both the public and private sectors, there was a strong correlation between scope and time management as well as cost management. In the private sector, there was also a strong correlation between communication management and integration management. Regarding skills, the correlation between emotional intelligence and servant leadership was significant in both sectors. However, in the case of the private sector, the strongest correlation was between customer centricity and judgment, while in the public sector, the aforementioned one was the highest, but the correlation between servant leadership and network performance was relatively high as well. These results further reinforce Goleman's [58] research outcome, which revealed that emotional intelligence can play a crucial role in managing projects via

its impact on numerous areas of competency. These correlations between knowledge areas might justify managing the project triangle as one, which follows the findings of Gareis [20] and the Project Management Institute [11].

## 6. Conclusions

This research focused on two areas of competency: the potential knowledge and the skills of project managers. The former was expressed in terms of the PMI's knowledge areas, while the latter were expressed in terms of Gartner's [84] skills for success. Success and failure rates were also analyzed and were expressed in terms of the project triangle and the rates of canceled projects. We analyzed and formulated four hypotheses focusing on whether the private sector outperforms the public sector in terms of success and failure rates, and whether there are differences in the perceived importance of knowledge areas and skills between the two sectors.

This research (considering its limitations) revealed that, for this sample, there were no crucial differences in the analyzed project-management-related phenomena between the public and private sectors; however, it may be worth conducting further research. The conclusions were as follows:

- There was no significant difference in the success rates of projects between the public and private sectors (H1 was rejected).
- There was no significant difference in the failure rates of projects between the public and private sectors (H2 was rejected).
- There was no significant difference in the perceived importance of the knowledge areas between the two sectors (H3 was rejected).
- There was a significant difference between the public and private sectors in the perceived importance of skills regarding business acumen and customer orientation (H4 was partially accepted).

Regarding the third hypothesis, this research did not identify significant differences in the importance of the knowledge areas between the two sectors, but it highlighted the relationships between certain knowledge areas, which were interrelated based on their content. In both sectors, the interrelationships between the knowledge areas connected to the three elements of the "iron triangle" (scope, cost, and time) were confirmed.

Considering the fourth hypothesis, for the private sector, skills connected to business and customers (business acumen and customer orientation) were of greater importance than in the public sector. Thus, there may be a difference in the project management practices between the two sectors. In the public sector, the focus is primarily on managing the process and the hierarchy, while in the private sector, the focus is on customer demands. This could be due to the stability of business demand and the nature of politics.

These findings, considering the limitations of this research, may be valid for both sustainability-centric and more profit-centric projects.

The main limitation of this study was the sample size (49 respondents). Due to this, further studies are needed with the participation of more companies to obtain a more accurate picture of the situation of project management and the differences between companies in the public and private sectors. Without this, the conclusions cannot be generalized. Furthermore, the companies that were analyzed presumably have stronger project management cultures, which could further reduce the possibility of generalization. Moreover, the analyzed skills could be broadened by considering those mentioned in Table 2, or by adding other competency elements that would allow the analysis of sustainability principles in more detail. However, this research aimed to explore whether there is a possible difference between the project management practices of the public and private sectors, and the results demonstrated that there could be, but this needs to be confirmed by using a larger sample and examining a broader skillset.

**Author Contributions:** Conceptualization, B.B., G.K., Z.M.M., V.P.-H. and Á.C.-K.; Methodology, B.B., Z.M.M. and Á.C.-K.; Validation, G.K. and V.P.-H.; Formal analysis, B.B., Z.M.M. and Á.C.-K.; Investigation, B.B., G.K., Z.M.M., V.P.-H. and Á.C.-K.; Writing—original draft preparation, B.B., G.K., Z.M.M. and V.P.-H.; Writing—review and editing, Á.C.-K.; Visualization, B.B.; Supervision, B.B., G.K. and Á.C.-K. All authors have read and agreed to the published version of the manuscript.

**Funding:** This study was conducted as part of the OTKA T139225 project entitled "Management readiness level towards Strategic Technology Management Excellence".

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Data are available from the corresponding author by request.

**Acknowledgments:** The authors express their deep gratitude to the management of the Hungarian Project Management Association.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Khalife, M.A.; Dunay, A.; Illés, C.B. Bibliometric Analysis of Articles on Project Management Research Bibliometric Analysis of Articles on Project Management Research. *Periódica Polytech. Soc. Manag. Sci.* **2021**, *29*, 70–83. [CrossRef]
2. Blaskovics, B. The Impact of Personal Attributes of Project Managers Working in ICT Sector on Achieving Project Success. Ph.D. Thesis, Corvinus University of Budapest, Budapest, Hungary, 2014.
3. Bredillet, C.N. From the Editor. *Proj. Manag. J.* **2007**, *38*, 3–4. [CrossRef]
4. Project Management Institute. Pulse of Profession—Success in Disruptive Times. 2018. Available online: https://www.pmi.org/-/media/pmi/documents/public/pdf/learning/thought-leadership/pulse/pulse-of-the-profession-2018.pdf (accessed on 5 March 2023).
5. Welch, R.J.; Calderin Morales, D.; Gastelum, J.A. *Quantitative Risk Management—Risk Informed Decision Making on High-Risk Waste Remediation Projects-19022*; WM Symposia, Inc.: Mesa, AZ, USA, 2019.
6. Cleland, D.I. *Project Management—Strategic Design and Implementation*, 2nd ed.; McGraw-Hill: New York, NY, USA, 1994.
7. Deutsch, N.; Mészáros, T.; Szabó, L. Modelling the development of strategic management. In Proceedings of the 31st European Conference on Modelling and Simulation: ECMS 2017, Budapest, Hungary, 23–26 May 2017; Zoltay-Paprika, Z., Horák, P., Váradi, K., Zwierczyk, P.T., Vidovics-Dancs, Á., Rádics, P., Eds.; European Council for Modelling and Simulation: Regensburg, Germany, 2017; pp. 67–73.
8. Görög, M. *Projektvezetés a Szervezetekben*; Panem Könyvek—Taramix Könykiadó: Budapest, Hungary, 2013.
9. Pintér, É.; Bagó, P.; Berényi, L.; Molnár, L.; Deutsch, N.; Szigeti, G.; Pintér, T. How do Digitalization and the Fintech Phenomenon Affect Financial Decision-Making in the Younger Generation? *Acta Polytech. Hung.* **2021**, *18*, 191–208. [CrossRef]
10. Project Management Institute. *A Guide to The Project Management Body of Knowledge (PMBOK Guide)*, 6th ed.; Project Management Institute: Newton Square, PA, USA, 2007.
11. Project Management Institute. *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*, 7th ed.; Project Management Institute: Newton Square, PA, USA, 2021.
12. Varga, J. Defining the Economic Role and Benefits of Micro, Small and Medium-sized Enterprises in the 21st Century with a Systematic Review of the Literature. *Acta Polytech. Hung.* **2021**, *18*, 209–228. [CrossRef]
13. Lotfian Delouyi, F.; Ghodsypour, S.H.; Ashrafi, M. Dynamic Portfolio Selection in Gas Transmission Projects Considering Sustainable Strategic Alignment and Project Interdependencies through Value Analysis. *Sustainability* **2021**, *13*, 5584. [CrossRef]
14. Toljaga-Nikolić, D.; Todorović, M.; Dobrota, M.; Obradović, T.; Obradović, V. Project Management and Sustainability: Playing Trick or Treat with the Planet. *Sustainability* **2020**, *12*, 8619. [CrossRef]
15. Silvius, A.J.G.; Schipper, R.P.J. Sustainability in project management: A literature review and impact analysis. *Social Bus.* **2014**, *4*, 63–96. [CrossRef]
16. Silvius, A.J.G.; Schipper, R.P.J. Exploring variety in factors that stimulate project managers to address sustainability issues. *Int. J. Proj. Manag.* **2020**, *38*, 353–367. [CrossRef]
17. Shaukat, M.B.; Latif, K.F.; Sajjad, A.; Eweje, G. Revisiting the relationship between sustainable projectmanagement and project success: The moderating roleof stakeholder engagement and team building. *Sustain. Dev.* **2022**, *30*, 58–75. [CrossRef]
18. Füller, J.; Hutter, K.; Kröger, N. Crowdsourcing as a service—From pilot projects to sustainable innovation routines. *Int. J. Proj. Manag.* **2021**, *39*, 183–195. [CrossRef]
19. Zubizarreta, M.; Ganzarain, J.; Cuadrado, J.; Lizarralde, R. Evaluating Disruptive Innovation Project Management Capabilities. *Sustainability* **2021**, *13*, 1. [CrossRef]
20. Gareis, R.; Huemann, M.; Martinuzzi, A.; Weninger, C.; Sedlacko, M. *Project Management and Sustainable Development Principles*; Project Management Institute: Newton Square, PA, USA, 2013.
21. Deák, C. Változás, Változtatás, Újjáalakítás a Mai Magyar Vállalati Gyakorlatban. Ph.D. Thesis, University of Miskolc, Miskolc, Hungary, 2000.

22. Project Management Institute. Pulse of Profession 2023—Power Skills, Redefining Project Success. 2023. Available online: https://www.pmi.org/learning/thought-leadership/pulse/power-skills-redefining-project-success (accessed on 5 June 2023).
23. Standish Group. Chaos Report. 2015. Available online: https://www.standishgroup.com/sample_research_files/CHAOSReport2015-Final.pdf (accessed on 12 January 2023).
24. Standish Group. *CHAOS Report: Beyond Infinity*; Standish Group: Boston, MA, USA, 2020.
25. Project Management Institute. Pulse of Profession—Beyond Agility. 2021. Available online: https://www.pmi.org/-/media/pmi/documents/public/pdf/learning/thought-leadership/pulse/pmi_pulse_2021.pdf (accessed on 8 March 2023).
26. Görög, M. *Általános Projektmenedzsment*; General Project Management; Aula: Budapest, Hungary, 1996. (In Hungarian)
27. Görög, M. *A Strategic-Oriented Implementation of Projects*; Project Management Institute: Newton Square, PA, USA, 2013.
28. Wiewiora, A.M.; O'Connor, P.J. Not all project ambiguity is equal: A typology of project ambiguity and implications for its management. *Int. J. Proj. Manag.* **2020**, *40*, 921–933. [CrossRef]
29. Fekete, I.; Szontágh, P. Projektek Programszintű Kockázatmenedzsmentje (Risk management on project program level). *Vez. Bp. Manag. Rev.* **2020**, *51*, 46–59. (In Hungarian) [CrossRef]
30. Sebestyén, Z. A projektportfólió-menedzsment elmúlt évtizede (The Past Decade of Project Portfolio Management—A Domestic Overview). *Hazai körkép. Vez. Bp. Bus. Rev.* **2020**, *51*, 49–58. (In Hungarian) [CrossRef]
31. Judgev, K.; Müller, R. A Retrospective Look at Our Evolving Understanding of Project Success. *Proj. Manag. J.* **2005**, *36*, 19–31.
32. Verzuh, E. *The Fast Forward MBA in Project Management*, 6th ed.; John Wiley & Sons, Inc.: Hoboken, NJ, USA, 2021.
33. Gareis, R.; Gareis, L. *Project. Program. Change*; CRC Press: Boca Raton, FL, USA, 2018; p. 548.
34. Garai-Fodor, M. Analysis of Financially Aware Consumer Segments from the Perspective of Conscious Consumer Behaviour. *Acta Polytech. Hung.* **2023**, *20*, 83–100. [CrossRef]
35. Pervez, H.; Yousaf, A.; Pamucar, D.; Garai-Fodor, M.; Csiszárik-Kocsir, Á. Evaluation of critical risk factors in the implementation of modular construction. *PLoS ONE* **2022**, *17*, e027244. [CrossRef]
36. Hadi, A.; Yang, L.; Li, S. Transcending the silos through project management office: Knowledge transactions, brokerage roles, and enabling factors. *Int. J. Proj. Manag.* **2022**, *40*, 142–154. [CrossRef]
37. Miković, R.; Petrović, D.; Mihić, M.; Obradović, V.; Todorović, M. The integration of social capital and knowledge management—The key challenge for international development and cooperation projects of nonprofit organizations. *Int. J. Proj. Manag.* **2022**, *38*, 515–533. [CrossRef]
38. Di Maddaloni, F.; Sabini, L. Very important, yet very neglected: Where do local communities stand when examining social sustainability in major construction projects? *Int. J. Proj. Manag.* **2022**, *40*, 778–797. [CrossRef]
39. Baba, S.; Mohammad, S.; Young, C. Managing project sustainability in the extractive industries: Towards a reciprocity framework for community engagement. *Int. J. Proj. Manag.* **2021**, *39*, 887–901. [CrossRef]
40. Maqbool, R.; Amaechi, I.E. A systematic managerial perspective on the environmentally sustainable construction practices of UK. *Environ. Sci. Pollut. Res.* **2022**, *29*, 64132–64149. [CrossRef]
41. Zaman, S.; Wang, Z.; Rasool, S.F.; uz Zaman, Q.; Raza, H. Impact of critical success factors and supportive leadership on sustainable success of renewable energy projects: Empirical evidence from Pakistan. *Energy Policy* **2022**, *162*, 112793. [CrossRef]
42. Al Amri, T.; Khetani Puskas, K.; Marey-Perez, M. Towards Sustainable I4.0: Key Skill Areas for Project Managers in GCC Construction Industry. *Sustainability* **2021**, *13*, 8121. [CrossRef]
43. De la Cruz López, M.P.; Cartelle Barros, J.J.; del Caño Gochi, A.; Coira, M.L. New Approach for Managing Sustainability in Projects. *Sustainability* **2021**, *13*, 7037. [CrossRef]
44. Mbiru, J.E.; Ayentimi, D.T.; Wickham, M. Does entrepreneurial project monitoring and controlling process matter in social enterprises? Evidence from a developing African country. *Int. J. Proj. Manag.* **2023**, *41*, 102435. [CrossRef]
45. Žužek, T.; Gosar, Ž; Kušar, J.; Berlec, T. Adopting Agile Project Management Practices in Non-Software SMEs: A Case Study of a Slovenian Medium-Sized Manufacturing Company. *Sustainability* **2020**, *12*, 9245. [CrossRef]
46. Gareis, R. *Happy Projects!* Mainz: Vienna, Austria, 2005.
47. Wheelwright, S.C.; Clark, K.B. *Revolutionizing Product Development: Quantum Leaps in Speed, Efficiency and Quality*; Free Press: New York, NY, USA, 1992.
48. Cicmil, S. An insight into management of organizational change projects. *J. Workplace Learn.* **1999**, *11*, 5–15. [CrossRef]
49. Turner, R.J. Editorial—Towards a theory of project management: The nature of the project. *Int. J. Proj. Manag.* **2006**, *24*, 1–3. [CrossRef]
50. Marnewick, C.; Marnewick, A.L. Benefits realisation in an agile environment. *Int. J. Proj. Manag.* **2022**, *40*, 454–465. [CrossRef]
51. Serrador, P.; Pinto, J.K. Does Agile work?—A quantitative analysis of agile project success. *Int. J. Proj. Manag.* **2015**, *33*, 1040–1051. [CrossRef]
52. Gido, J.; Clements, J.P.; Baker, B.N. *Successful Project Management*, 7th ed.; Cengage Learning: Boston, MA, USA, 2017.
53. Cooke-Davies, T. The "real" success factors on projects. *Int. J. Proj. Manag.* **2002**, *20*, 185–190. [CrossRef]
54. Cserháti, G.; Szabó, L. The relationship between success criteria and success factors in organisational event projects. *Int. J. Proj. Manag.* **2014**, *32*, 613–624. [CrossRef]
55. Qing, C.; Li, H.; Tian, W.; Zhang, Y. Critical Success Factors for Safety Program Implementation of Regeneration of Abandoned Industrial Building Projects in China: A Fuzzy DEMATEL Approach. *Sustainability* **2022**, *14*, 1550. [CrossRef]

56. Müller, R.; Turner, R.J. Matching the project manager's leadership style to project type. *Int. J. Proj. Manag.* **2007**, *25*, 21–32. [CrossRef]
57. Müller, R.; Turner, R.J. Leadership competency profiles of successful project managers. *Int. J. Proj. Manag.* **2010**, *28*, 437–448. [CrossRef]
58. Goleman, D. What makes a leader? *Harv. Bus. Rev.* **2004**, *82*, 82–91.
59. Jovanović, F.; Milijić, N.; Dimitrova, M.; Mihajlović, I. Risk Management Impact Assessment on the Success of Strategic Investment Projects: Benchmarking Among Different Sector Companies. *Acta Polytech. Hung.* **2016**, *16*, 221–241. [CrossRef]
60. Wang, T.; Xu, J.; He, Q.; Chen, A.P.C.; Kingsford Owusu, E. Studies on the success criteria and critical success factors for mega infrastructure construction projects: A literature review. *Eng. Constr. Archit. Manag.* **2022**, *30*, 1809–1834. [CrossRef]
61. Fekete, I.; Dobreff, C. *Távközlési Projektmenedzsment*; Műegyetemi Kiadó: Budapest, Hungary, 2003.
62. Garai-Fodor, M.; Szemere, T.P.; Csiszárik-Kocsir, Á. Investor Segments by Perceived Project Risk and Their Characteristics Based on Primary Research Results. *Risks* **2022**, *10*, 159. [CrossRef]
63. Ika, L.A.; Pinto, J.K. The "re-meaning" of project success: Updating and recalibrating for a modern project management. *Int. J. Proj. Manag.* **2022**, *40*, 835–848. [CrossRef]
64. Fortune, J.; White, D. Framing of project critical success factors by a system model. *Int. J. Proj. Manag.* **2006**, *24*, 53–65. [CrossRef]
65. Wong, Z. *Human Factors in Project Management: Concepts, Tools, and Techniques for Inspiring Teamwork and Motivation*; Jossey Bass: San Francisco, CA, USA, 2007.
66. Goldman, B.; Taylor, P. *Team Analytics—The Future of High-Performance Teams and Project Success*; Routledge: New York, NY, USA, 2023.
67. Robotham, D.; Jubb, R. Competences: Measuring the immeasurable. *Manag. Dev. Rev.* **1996**, *9*, 25–29. [CrossRef]
68. Nagy, J. *Kompetencia Alapú, Kritérium-Orientált Pedagógia (Competency-Based, Criteria-Oriented Pedagogy)*; Mozaik: Szeged, Hungary, 2007. (In Hungarian)
69. Nagy, J. A személyiség kompetenciái és operációs rendszere (The competences and operating system of the personality). *Iskolakultúra* **2010**, *20*, 3–21. (In Hungarian)
70. Spencer, L.M.; Spencer, S.M. *Competence at Work*; John Wiley & Sons: New York, NY, USA, 1993.
71. Finn, R. *A synthesis of Current Research on Management Competencies*; HWP 10/93; Henley Management College: Henley-on-Thames, UK, 1993.
72. Crawford, L. Senior management perceptions of project management competence. *Int. J. Proj. Manag.* **2005**, *23*, 7–16. [CrossRef]
73. Katz, R.I. Skills of an effective administer. *Harv. Bus. Rev. Bus. Class. Fifteen Key Concepts Manag. Success* **1991**, *14*, 1–2.
74. El-Sabaa, S. The skills and career path of an effective project manager. *Int. J. Proj. Manag.* **2001**, *19*, 1–7. [CrossRef]
75. Haschka, R.E.; Herwartz, H. Endogeneity in pharmaceutical knowledge generation: An instrument-free copula approach for Poisson frontier models. *J. Econ. Manag. Strategy* **2022**, *31*, 942–960. [CrossRef]
76. Medina, R.; Medina, A. The project manager and the organisation's long-term competence goal. *Int. J. Proj. Manag.* **2014**, *32*, 1459–1470. [CrossRef]
77. Senghi, S. The Handbook of Competency Mapping. In *Understanding, Designing and Implementing Competency Models in Organizations*; Sage Publications: New Delhi, India, 2004.
78. Project Management Institute. *A Guide to The Project Management Body of Knowledge (PMBOK Guide)*, 5th ed.; Project Management Institute: Newton Square, PA, USA, 2013.
79. Project Management Institute. The PMI Talent Triangle®Flyer—Navigate our Profession's Evolving Landscape with Confidence. 2022. Available online: https://www.pmi.org/-/media/pmi/documents/public/pdf/certifications/talent-triangle-flyer.pdf (accessed on 1 March 2023).
80. International Project Management Association. *ICB—IPMA Competence Baseline*; Version 4.0.; International Project Management Association: Nijkerk, The Netherlands, 2015.
81. De Rezende, L.B.; Blackwell, P. Project management competency framework. *Iberoam. J. Proj. Manag.* **2019**, *10*, 34–59.
82. Alvarenga, J.C.; Branco, R.R.; Azevedo Guedes, A.L.; Pereira Soares, C.A.; da Silveira e Silva, W. The project manager core competencies to project success. *Int. J. Manag. Proj. Bus.* **2020**, *13*, 277–292. [CrossRef]
83. Chen, T.; Fu, M.; Liu, R.; Xu, X.; Zhou, S.; Liu, B. How do project management competencies change within the project management career model in large Chinese construction companies? *Int. J. Proj. Manag.* **2019**, *37*, 485–500. [CrossRef]
84. Gartner. 10 Skills Project Managers Need to Succeed in Digital Business. 2021. Available online: https://www.gartner.com/en/documents/4005974 (accessed on 3 March 2023).
85. Baker, B.N.; Fisher, D.; Murphy, D.C. Project Management in the Public Sector: Success and Failure Patterns Compared to Private Sector Projects. In *Project Management Handbook*, 2nd ed.; John Wiley & Sons, Inc.: Hoboken, NJ, USA, 1997.
86. Boyne, G.A. Public and Private Management. What's the Difference? *J. Manag. Stud.* **2002**, *39*, 97–122. [CrossRef]
87. Da Silva Bezerra, E.C.; Amorim, B.P.; and de Melo, F.J.C. Barriers to maturity in project management in the public sector: A systematic literature review. *Res. Soc. Dev.* **2021**, *10*, e513101019223. [CrossRef]
88. Gasik, S. A framework for analysing differences between public-sector and other-sector projects. *Zarządzanie Publiczne/Public Gov.* **2018**, *3*, 73–88. [CrossRef]
89. Haraké, M.F. Building on Chaos Public Sector Project Management in Post-Conflict Countries. *PM World J.* **2021**, *10*, 1–35.
90. Jacobsen, R. Public Sector Projectification–A Systematic Review of the Literature. *Scand. J. Public Adm.* **2022**, *26*, 91–112. [CrossRef]

91. Obeidat, M.A.; Max, M.N. A comparative review of information technology project management in private and public sector organization. *Int. Manag. Rev.* **2014**, *10*, 55–62.
92. Obradović, V. Contemporary trends in the public sector project management. *Eur. Proj. Manag. J.* **2018**, *8*, 52–56. [CrossRef]
93. Ribeiro, A.; Luisa, D. Acceptance of an agile methodology in the public sector. *Procedia Comput. Sci.* **2018**, *138*, 621–629. [CrossRef]
94. Van der Waldt, G. The uniqueness of public sector project management: A contextual perspective. *Politeia* **2011**, *30*, 66–87.
95. Wirick, D. *Public-Sector Project Management: Meeting the Challenges and Achieving Results*; John Wiley & Sons: Hoboken, NJ, USA, 2011.
96. Lane, J.E. *The Public Sector: Concepts, Models and Approaches*; SAGE Publications Ltd.: London, UK, 2000.
97. Crawford, L.H.; Helm, J. Government and governance: The value of project management in the public sector. *Proj. Manag. J.* **2009**, *40*, 73–87. [CrossRef]
98. Blair, G.; Stuart, B.; Pagano, R. Serving the public in the post pandemic world': A study of project management in the public sector. *J. Adv. Res. Altern. Energy Environ. Ecol.* **2022**, *9*, 11–18.
99. Kassel, D.S. *Managing Public Sector Projects: A Strategic Framework for Success in an Era of Downsized Government*; Routledge: New York, NY, USA, 2010.
100. Murphy, D.C.; Baker, B.N.; Fisher, D. *Determinants of Project Success*; No. NASA-CR-139407; Boston College: Boston, MA, USA, 1974.
101. Brunet, M.; Aubry, M. The three dimensions of a governance framework for major public projects. *Int. J. Proj. Manag.* **2016**, *34*, 1596–1607. [CrossRef]
102. Klakegg, O.J.; Williams, T.; Magnussen, O.M.; Glasspool, H. Governance frameworks for public project development and estimation. *Proj. Manag. J.* **2008**, *39*, S27–S42. [CrossRef]
103. Hall, M.; Holt, R. UK Public Sector Project Management—A Cultural Perspective. *Public Perform. Manag. Rev.* **2002**, *25*, 298–312. [CrossRef]
104. Blixt, C.; Kirytopoulos, K. Challenges and competencies for project management in the Australian public service. *Int. J. Public Sect. Manag.* **2017**, *30*, 286–300. [CrossRef]
105. Jałocha, B.; Krane, H.P.; Ekambaram, A.; Prawelska-Skrzypek, G. Key competences of public sector project managers. *Procedia-Soc. Behav. Sci.* **2014**, *119*, 247–256. [CrossRef]
106. Yasin, M.M.; Carlos Ferreira, G.; Miller, P.E. Characteristics of Portuguese public-sector project managers: Toward closing the effectiveness gap. *Proj. Manag. J.* **2009**, *40*, 47–55. [CrossRef]
107. Hungarian Project Management Association. Projektmenedzsment Körkép (Project Management Overview). 2020. Available online: https://pmsz.hu/img.php?type=infolist&id=417&file=20211019120931288941.pdf.pdf (accessed on 9 March 2023). (In Hungarian).
108. Pinto, J.K.; Slevin, D.P. Project success: Definitions and measurement techniques. *Proj. Manag. J.* **1988**, *19*, 67–72.
109. Horváth, V. The Relationship between Project Management Competence and Project Success in the Project-Intensive Upstream Sector of the Oil Industry. Ph.D. Thesis, Corvinus University of Budapest, Budapest, Hungary, 2019.
110. Vrchoza, J.; Řehoř, P.; Maříková, M.; Pech, M. Critical Success Factors of the Project Management in Relation to Industry 4.0 for Sustainability of Projects. *Sustainability* **2020**, *13*, 281. [CrossRef]
111. Horváth, V. Project Management Competence in Standards—A Comparative Analysis. In Proceedings of the 13th International Forum on Knowledge Asset Dynamics: Societal Impact of Knowledge and Design, Proceedings IFKAD 2018, Delft, The Netherlands, 4–6 July 2018; Van der Meer, H., Enthoven, G., Schiuma, G., Eds.; Delft University of Technology: Delft, The Netherlands, 2018; pp. 411–424.
112. Siegel, S. Nonparametric statistics. *Am. Stat.* **1957**, *11*, 13–19.
113. Simar, L.; Wilson, P.W. Non-parametric tests of returns to scale. *Eur. J. Oper. Res.* **2002**, *139*, 115–132. [CrossRef]
114. Hart, A. Mann-Whitney test is not just a test of medians: Differences in spread can be important. *Br. Med. J.* **2001**, *323*, 391–393. [CrossRef]
115. Kendall, M.G. *Rank Correlation Methods*; Griffin: London, UK, 1948.
116. International Project Management Association. *ICB—IPMA Competence Baseline*; Version 3.0; International Project Management Association: Nijkerk, The Netherlands, 2006.
117. Onalan, M.S.; Ersoy, K.; Magda, R. Measurement of Entrepreneurial Profiles in Turkey: A Multi-dimensional Scale Development. *Pol. J. Manag. Stud.* **2020**, *22*, 362–383. [CrossRef]
118. Aranyossy, M.; Blaskovics, B.; Horváth, Á.A. How universal are IT project success and failure factors? Evidence from Hungary. *Inf. Syst. Manag.* **2018**, *35*, 15–28. [CrossRef]
119. Blaskovics, B. A projektvezető vezetési stílusának hatása a projektsikerre—Egy hazai vállalat példája alapján (The impact of the project manager's leadership style on project success—Based on the example of a domestic company). *Vez. Bp. Bus. Rev.* **2015**, *46*, 14–23. (In Hungarian) [CrossRef]
120. Wysocki, R.K. *Effective Project Management: Traditional, Agile, Extreme, Hybrid*, 8th ed.; John Wiley & Sons: Indianapolis, IN, USA, 2019.
121. Al-Qatawneh, M.I. The Impact of Organizational Structure on Organizational Commitment: A Comparison between Public and Private Sector Firms in Jordan. *Eur. J. Bus. Manag.* **2014**, *6*, 30–37.
122. Dobák, M. *Szervezeti Formák és Vezetés (Organisational Forms and Leadership)*; Akadémia: Budapest, Hungary, 2006. (In Hungarian)

123. Tofallis, C. An automatic-democratic approach to weight setting for the new human development index. *J. Popul. Econ.* **2013**, *26*, 1325–1345. [CrossRef]
124. Khalife, A.M.; Dolatabadi, A.H.K.; Illés, B.C.; Dunay, A. Application of big data in Project Management. In Proceedings of the XIV International Balkan and Near Eastern Social Sciences Congress Series on Economics, Business and Management, Plovdiv, Bulgaria, 26–27 September 2020; Dimitrov, D.K., Nikoloski, D., Ylmaz, R., Eds.; Ibaness: Plovdiv, Bulgaria, 2021; pp. 365–369.