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Research article

Project management in healthcare: An examination of organizational competence

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ABSTRACT

This research aims to identify the factors that influence the organizational competence (OC) of hospitals in effectively managing projects. It follows a quantitative approach, analyzing data collected from three Portuguese hospitals (51 respondents) using R software. An organizational competence score (OCS) was calculated based on standardized values across five different competence areas.

The results indicate significant associations between the competence areas and project categories, organizational alignment, governance, management, people's competence, and resources. Furthermore, the study explores the relationships between the competence areas and quantitative variables such as the number of project team members and former experience in projects. The OCS is also examined regarding project categories, region, experience in projects, and number of project members.

The findings provide insights into the features that impact the OC of hospitals in PM, highlight the importance of organizational alignment, effective governance, competent management, skilled personnel, and adequate resources in enhancing PM capabilities. However, the wide confidence interval for the Odds Ratio indicates a high degree of uncertainty in the effect size estimates, suggesting the need for larger sample sizes and more robust models in future research to obtain more precise estimates.

1. Introduction

The strategy of every organization defines the approach to attract and maintain clients and create a supportive network of stakeholders that assures business continuous development. It comprises the business processes for selecting, prioritizing, and developing projects [1] while executing operations and projects with the expected quality [2].

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Project management is a critical competency for organizations across various sectors, including healthcare. Project management capabilities can lead to improved efficiency, cost savings, and successful implementation of strategic plans. In this context, the concept of organizational competence in project management has gained significant attention. Organizational competence (OC) refers to the ability of an organization to manage its resources effectively and achieve strategic goals. According to the vision of the International Project Management Association (IPMA) [3], OC is the demonstrated ability to apply knowledge and/or skills, and, where relevant, demonstrated personal attributes.

The Project Management Institute (PMI) [4] describes it as the demonstrated ability to perform activities within a project environment that leads to expected outcomes based on defined and accepted standards. In both cases, competence is considered more than the collective competence of its individuals; it is a combination of individual competences, together with all its assets - strategic, structural, cultural, financial - to implement projects in dynamic and complex environments.

According to Wagner [5], the strategic component is related with the organization competence to develop a strategy for project management, and align projects, programs and project portfolios with the corporate strategy; the structural component links with the inherent processes, routines, roles and responsibilities usually described in standards and applied through projects and programs; the cultural component relates with the corporate culture (beliefs, values and behaviours) and orientation to projects; assets management is a wide range component employing the organization ability to quickly adapt, adjust to constantly changing environmental conditions, such as customers' demands, new competitors or lack of resources.

In the healthcare sector, public and private stakeholders deliver primary healthcare, acute and chronic services; they often undertake numerous and complex projects addressing infrastructure upgrades and quality improvement requirements, which require extra care, attention and alertness [6]. Healthcare systems are continually evolving to adapt to epidemiological, demographic and societal shifts [7] and working on the provision of cost-effective care on a geographical basis, including health promotion and disease prevention services and integration of coordinated efforts across regions. This involves the implementation of prevention programs, support in health emergencies, enhancement of IT infrastructure, development and testing deep tech solutions (e.g., artificial intelligence for diagnostic purposes), education projects, clinical trials, business processes and change management [8]. Projects are perceived as a pathway for enhancing patient care and operational efficiency, nevertheless, their management can be a hard task due to several factors, such as resource constraints, regulatory requirements, levels of bureaucracy, cultural resistance to change and the need for crosswise coordination across various departments and teams. Medical services are sensitive and operational in nature, hence the potential resulting from the improvement of project management is easily not noticed by managers and practitioners. The transition to a project-oriented culture must be primarily driven by increasing awareness on the relevance of projects - drivers of change - to move forward on the idea of professional project management [9]. This transition is frequently interrupted by strong hierarchization, low professional autonomy, governmental and political pressures, lack of financial resources and control over them, and absence of project managers in the workforce [10].

This study aims to explore the features influencing organizational competence in project management in hospitals. The research focuses on strategic, structural, culture competences, and overall assets for project work, and corresponding areas derived from the IPMA OCB: Organizational alignment, Governance, Management, People's competence, and Resources. We employ a quantitative approach to investigate the relationships between these competence areas and various features such as project category and the existence of a project management office. Our analysis is conducted using R software [11], which allows for robust statistical testing.

The research provides a valuable contribution for the theory of organizational competence in project management. It can contribute for the development of a model for the readiness of hospitals in developing organizational competence. The findings can provide valuable insights for hospital administrators, project managers, project support offices, top management and policymakers interested in enhancing project management competence and ultimately improving healthcare delivery.

2. Background

2.1. Healthcare organizations

Hospitals are entities with unique characteristics that operate 365 days a year, without interruption, with high orientation to operations, desirably through a planned, integrated and efficient management of available resources [12]. Their mission is to ensure excellence in the service provided to patients, but also increased productivity of personnel, reduced costs and waste [13]. The desirable results are achieved through management of operations (reducing to the minimum the level of variety in routines/processes is the main focus) and careful introduction of innovation through projects, which relies on having a commitment to strengthening competence in project management. Health organizations integrate people, resources, processes and structures mainly in the management of operations, and strive to find potential sources of co-funding to their novel ideas, innovations and research (e.g., European funds, sponsorships). The government is usually a stakeholder and public funding plays an important role in healthcare [12]. Capturing money from sources that are not conventional in nature (contracts with the government and insurance companies) is usually perceived as an addon for running projects that bring value to the clients. Healthcare providers must assure stability, efficiency and effectiveness of operations, and be able to smoothly introduce organizational change whenever it contributes to strategy implementation and business priorities. The activity of hospitals is particularly complex and focused on the reduction of risks to patients and delivery of high-quality care. A variety of projects are usually ongoing and range from infrastructure and technology upgrades to the improvement or implementation of new guidelines, services, business models, programs or technologies [14]. The methods and processes employed to deliver are similar to other industries, however, patient care often trumps other metrics such as cost and profitability [13]. Projects success is crucial for the continuous improving of patient outcomes, enhancing productivity and operational efficiency, meeting new

Table 1
Characterization of the respondents.

Description	Absolute Frequency (n)	Relative Frequency (%)
Gender		
Male	36	70.6 %
Female	15	29.4 %
Other	0	0.0 %
Age (years)		
18-30	0	0.0 %
31-40	9	17.6 %
41-50	22	43.1 %
51-60	14	27.5 %
>60	6	11.8 %
Academic degree		
High School	0	0.0 %
Bachelor's or Degree	13	25.5 %
Graduate/MBA	10	19.6 %
Master's degree	22	43.1 %
Doctorate	6	11.8 %
Other(s)	0	0.0 %
Current role/position		
Top Management	2	3.9 %
Intermediate management - Hospital Administration	8	15.7 %
Intermediate management - Service Management	9	17.6 %
Doctor	2	3.9 %
Nurse	4	7.8 %
Senior Technician	7	13.7 %
Senior Diagnostic and Therapeutic Technician/Senior Health Technician	11	21.6 %
Other (s)	8	15.7 %
Certification or specific training in project management		
Yes	7	13.7 %
No	44	86.3 %
Participation in projects (number of projects)		
1 to 5	29	56.9 %
6 to 10	14	27.5 %
11 to 20	5	9.8 %
21 to 30	3	5.9 %
>30	0	0.0 %
Experience in project management		
Yes	29	56.9 %
No	22	43.1 %
Experience in project management (number of projects)		
1 to 5	41	80.4 %
6 to 10	6	11.8 %
11 to 20	2	3.9 %
21 to 30	0	0.0 %
>30	2	3.9 %
Year of starting participation or management of projects		
Before 1999	6	11.8 %
Between 2000 e 2010	19	37.3 %
Between 2011 e 2020	15	29.4 %
Since 2021	11	21.6 %
Actual position/Role		
Project Manager	16	31.4 %
Project team member	26	51.0 %
Project Owner	3	5.9 %
Other (s)	6	11.8 %
Number of hours of work/week devoted, on average, to the actual project		
1-8	26	51.0 %
9-16	15	29.0 %
17-24	6	12.0 %
25-32	1	2.0 %
33-40	2	4.0 %
>40	1	2.0 %
Type of the actual project/project category		
Research project	12	23.5 %
Development project (development and pre-testing of an intervention)	8	15.7 %
Implementation project (dissemination/implementation of an intervention)	31	60.8 %
Project duration (in months)		
1-6	17	33.3 %
7-12	15	29.4 %

(*continued on next page*)

Table 1 (*continued*)

Description	Absolute Frequency (n)	Relative Frequency (%)
13-18	4	7.8 %
19-24	7	13.7 %
25-36	5	9.8 %
>36	3	5.9 %
Project funding sources		
Organization's Funds	20	39.2 %
Community Funds	7	13.7 %
Specific European funding program	7	13.7 %
Patronage	1	2.0 %
Other (s)	16	31.4 %

regulatory requirements, and addressing the ongoing digital revolution driven by artificial intelligence, big data, IoT and machine learning [8]. The work of managers can be challenging due to severe resource constraints, particularly workforce shortages, strong orientation of activity to routines and operations, the need to engage and align multiple stakeholders with conflicting logics and interests in change management (patients, staff, citizens, and politicians as well as other stakeholders) and cross-coordination of work inside the hospital, without missing the focus on improving access, quality and safety, and health outcomes, responsiveness and system performance [15]. Leadership and management styles adaptation to the virtualization and digitization of the work [13] and progressive development of telework is also essential nowadays [16]. Project managers must deal with strong regulatory requirements influencing clinical processes and the use of data, the need of clinical standardization and compliance, and the challenges brought by value-based healthcare, i.e., assessing performance according to clinical endpoints and patient outcomes. Risk management is particularly critical – some types of risk are to be avoided at all costs – while the management of power and influence of stakeholders is paramount as it can appoint or dismiss a project manager [13].

2.2. Organizational competence in project management

In the last two decades, there has been growing interest in understanding and enhancing organizational competence in project management and research has shown that higher levels of competence can lead to improved project performance and organizational effectiveness. However, there is limited evidence on strong/reliable success surrounded by all the human and organizational factors contributing to excellence.

Competence is an umbrella term which covers resources and capabilities. According to Prahalad and Gary [17] core competence is the engine for effective product and service innovation. It unfolds on collective learning in the organization, especially the capacity to coordinate diverse production skills and integrate streams of technologies. Sanchez [18] defines organizational competence as "the ability to maintain the coordinated deployment of assets in a way that helps a company to achieve its objectives".

According to Barney [19] when resources are valuable, rare, imperfectly imitable, and non-substitutable, they could create competitive advantages, which explain the differences in overall organization performance and the sustainability of the business. The Resource-Based View of the Firm [19] emphasizes that each organization must focus on the exploitation of internal resources and competences to survive in the competitive landscape, not only on shaping market conditions. Pavitt [20] posits that organizations

Table 2
Characterization of the organizations of the respondents (Hospitals).

Description	Absolute Frequency (n)	Relative Frequency (%)
Region		
North	6	11.8 %
Center	0	0.0 %
Lisboa e Vale do Tejo	21	41.2 %
Alentejo	0	0.0 %
Algarve	24	47.1 %
Approximate number of employees		
≤1000	5	9.8 %
1001-2000	4	7.8 %
2001-3000	15	29.4 %
>3000	21	41.2 %
Don't know	6	11.8 %
Project Management Office in the organization		
Yes	16	31.4 %
No	35	68.6 %
Computer tool to support project management in the organization		
Yes	2	5.9 %
No	11	37.3 %
Don't know	14	56.9 %

Table 3
Descriptive statistics for organizational competence areas.

	Minimum	Maximum	Mean	Standard Deviation
Governance	9.0	79.0	48.3	19.1
Organizational Alignment	0.0	41.0	20.5	10.0
People's competence	1.0	50.0	24.7	11.4
Management	0.0	16.0	8.3	4.7
Resources	1.0	57.0	27.7	12.6

could profit from innovative advantage by building up their competencies, which are costly and difficult for competitors to imitate.

According to Turner [21], strategy, leadership and policy provide direction in an organization, talented leaders and managers decide on the allocation of resources, and a skilled workforce carries out operations, innovating and improving processes along the way. A combination of static aspects cannot explain organizational competence, but a combination of factors that influence each other. Turner [21] emphasizes the role of the interaction of business strategies with management practices to produce coherent, aligned and mutually reinforcing systems and processes that give superior business outcomes. Along the same way, competence reveals the ability of the organization to learn and adapt and the growth, whilst the degree of adaptation depend upon how well the system is engaged

Table 4
Bivariate analysis (OA - Organizational alignment; G - Governance; M - Management; PC - People's competencies; R - Resources; OCS - Organizational Competence Score).

		OA	G	M	PC	R	OCS
Academic qualifications	P-value	0.92	0.78	0.08	0.37	0.96	0.76
	Test statistic	0.16*	1.10†	6.70†	1.07*	0.11*	0.38*
Age	P-value	0.33	0.78	0.80	0.35	0.94	0.76
	Test statistic	0.14¤	-0.04§	0.04§	0.13¤	-0.01¤	0.04¤
Average weekly hours dedicated to the project	P-value	0.60	0.40	0.83	0.59	0.19	0.43
	Test statistic	0.07¤	0.12§	0.03§	0.08¤	0.19¤	0.11¤
Function within the organization	P-value	0.51	0.54	0.77	0.57	0.46	0.55
	Test statistic	0.90*	5.99†	4.05†	0.82*	0.97*	0.85*
Function within the project	P-value	0.10	0.22	0.25	0.12	**0.02**	0.09
	Test statistic	2.18*	4.42†	4.11†	2.05*	3.55*	2.32*
Funding source	P-value	0.65	0.28	0.70	0.45	0.06	0.27
	Test statistic	0.61*	5.07†	2.21†	0.94*	2.40*	1.34*
Number of collaborators in the organization	P-value	0.15	**0.04**	0.33	0.11	**<0.01**	**0.01**
	Test statistic	0.55*	4.18†	1.46†	1.19*	3.70*	2.04*
Number of project team elements	P-value	**0.01**	**0.01**	**0.03**	**0.01**	**<0.01**	**<0.01**
	Test statistic	0.36¤	0.38§	0.3§	0.38¤	0.39¤	0.42¤
Number of projects managed	P-value	0.46	0.66	0.83	0.70	0.84	0.98
	Test statistic	0.15¤	0.09§	-0.04§	-0.08¤	-0.04¤	-0.01¤
Number of projects participated	P-value	**0.02**	**<0.01**	**0.01**	**0.02**	**<0.01**	**<0.01**
	Test statistic	0.32¤	0.43§	0.35§	0.32¤	0.45¤	0.45¤
Previous project management experience	P-value	0.39	0.25	0.25	0.08	0.08	0.13
	Test statistic	-0.86#	258.5**	129.5**	-1.77#	-1.82#	-1.55#
Project category	P-value	**<0.01**	**<0.01**	**0.01**	**<0.01**	**<0.01**	**<0.01**
	Test statistic	7.90*	15.88†	10.44†	6.15*	13.63*	13.09*
Project duration in months	P-value	0.36	0.25	0.23	0.06	0.07	0.15
	Test statistic	0.13¤	0.16§	0.17§	0.26¤	0.25¤	0.21¤
Project management office	P-value	**0.04**	0.19	0.65	0.12	0.21	0.10
	Test statistic	-2.17#	215.5**	257**	-1.62#	-1.27#	-1.68#
Project management software	P-value	0.26	0.75	0.07	0.67	0.10	0.32
	Test statistic	0.73#	0.44**	5.15**	0.12#	1.12#	0.62#
Project management specific certification	P-value	0.07	0.47	0.51	0.64	0.80	0.50
	Test statistic	-2.04#	127**	129.5**	-0.49#	-0.27#	-0.71#
Region	P-value	**0.03**	**0.04**	0.12	**0.03**	**0.02**	**0.02**
	Test statistic	3.6*	6.32†	4.27†	3.64*	4.12*	4.40*
Sex	P-value	0.95	0.78	0.28	0.52	0.39	0.70
	Test statistic	-0.06#	284**	217**	-0.66#	-0.88#	-0.38#

R^2– Pearson correlation;
* : F-value – ANOVA;
† : chi-squared – Kruskal-Wallis;
# : t – t-test for independent samples;
** : W – Mann-Whitney U;
§ : R^2– Spearman correlation

Table 5
Logistic regression model results.

	Odds-Ratio [95 % Confidence Interval]	Standard Error	Wald Statistic	p-value
Total IPMA OCB Score (β_1)	95.7 [2.2, 4176.6]	1.9	5.6	0.018
Intercept (β_0)		5.2	5.7	0.017

with its environment and other contexts influencing the system organization like the availability of resources. Systems theory highlights the relationships and interdependence among the components of a system to evidence how the structure, patterns, and relationships of an organization, and thus performance, emerge from interactions among components, such as hierarchical ordering, coupling, permeability, equifinality. According to Tidd [22] organizational competence embodies people's knowledge, managerial systems, and norms together in a broader dimension to cover the organization's ability to understand and develop the business. In summary, organizational competence is a holistic phenomenon influenced by the overall dynamics of the organization.

IPMA developed the Organizational Competence Baseline (OCB), which defines organizational competence in managing projects as "the ability to integrate people, resources, processes, structures and cultures in projects within a supporting governance and management system" and provides a "comprehensive framework for assessing and developing organizational competence in project management" [3]. IPMA OCB is grounded in various theories and frameworks that aim to enhance project management practices within organizations (e.g., systems theory, organizational learning, RBV theory). The standard launched by IPMA [3] describes in detail the relevance of defining and effectively communicating the mission, vision, strategies, policies, guidelines, leadership, decisions, monitoring and controlling performance (GOVERNANCE); managing roles at different levels of the organization, supporting team work, continuous improvement and effective communication (MANAGEMENT); aligning project processes, structures and cultures with internal and external parties (ORGANIZATIONAL ALIGNMENT); assessing and assuring the conditions for human resources development, in alignment with the pre-defined requirements (PEOPLE'S COMPETENCES); fulfilling the goals and expectations of top management in relation to the availability and use of resources (RESOURCES).

Strategic management promotes the alignment of the project portfolio with the organization's mission, values, vision, and strategy. It regards the traditional management role connecting the organization with opportunities and threats of the external environment and introducing a systemic-oriented, fast-moving, and creative mindset in individuals that assumes uncertainty and steers the organizations preparedness to deal with the future. In a project environment, strategic thinking strengthens the ability to manage complexity, survive under uncertainty, join networks, and follow the values of healthcare with intrinsic motivation [23]. Strategic thinking and management have not yet been sufficiently implemented in most healthcare systems. Competence can be explored both at the individual and organizational level. The first case regards a view on to what extent the team members demonstrate managerial and intellectual capabilities to make strategic, meaningful decisions and use instruments of strategic management to make evidence-based decisions relative to the services provided; in the second case, on how hospitals handle change, bring innovation to the service to better serve the patients and increase business potential through systems and networking-oriented thinking [23]. Strategic thinking is profoundly connected with governance, i.e., how decisions are made, and authority is exercised to achieve transparency, accountability, participation, integrity, and capacity [24]. Therefore, effective governance is a process that requires leadership, engagement of stakeholders, participation, positive relationships, partnership building, accountability, effectively dealing with risks, and a major priority on health outcomes. It helps hospitals fulfil their strategic mission of providing highly effective, equitable and quality patient-centered care, assuring responsiveness to the client needs, adhering to quality and ethical standards and regulations, fostering a culture of continuous improvement, and ensuring their financial sustainability [25]. Leadership and open communication are essential for creating and sustaining a community of interested parties and partnerships, approaching, and developing the right people for the right roles, making people closely connect with colleagues, patients, and the larger community, and developing a supportive network for all staff members. In healthcare, the governance role promotes the development of solutions for individuals and populations with the participation of the local actors and assures that structures for participation and accountable decision-making are well-developed, honest, transparent, and connecting [26]. A vision on how to lead based on reliable information and trust, with a focus on positive thinking, relationship building and creation of positive emotional bonds between people and the organization, and attention to the details that matter to patients, staff and partners together is central in the successful delivery of projects addressing new solutions and services and quality improvement initiatives [26]. Governance involves financial planning and controlling to ensure that resources are allocated efficiently and in a manner that generates the expected project results, desirable benefits for the participants and for the organization. The collection and use of data from a solid IT infrastructure provides conditions for financial and performance analysis, benchmarking between projects, accountability, knowledge management and individuals competence development in alignment with the pre-defined needs. In addition to allowing the assessment of individuals' performance, the automation of competence-based models enables the fast profile of new performance requirements for the project [27] the assessment of overall teams' potential, acknowledges the gaps and areas in need of further development, thus becoming the basis for investments in education and in-job training. It must be emphasized that competence management involves timely identification of the skills, abilities, behaviours, knowledge required for each role and specific tasks to be performed and ensuring that individuals possess or can develop those competencies. According to Heinsman et al. [28] comprises processes applied in organizations for selecting, classifying, developing, and evaluating individuals, managing careers, and accessing global performance. Competence management assures the availability of capabilities needed for the successful completion of the projects, the set of observable performance dimensions, including individual

knowledge, skills, attitudes, and behaviors, as well as collective team, process, and organizational capabilities, that are linked to high performance, both at individual and collective level [29]. The mapping and management of competencies for specific work area or job position can support recruitment, promotion (e.g., career planning), and talent management roles in the organization [30]. Due to the ever-changing dynamics of project work and the competitive landscape where project-oriented organizations operate, competences are also perceived as high-level skills and new ways of thinking or behaving that individuals demonstrate when completing assigned tasks or achieve the project goals [31], that provide value to the business and assure distinctive advantage from competitors [32]. Providing information on how far competence requirements match with the competence development of individuals and associate both to both organizational and individual outcomes [33] is a challenge that performance and knowledge management systems must address. Knowledge management includes the organization and sharing of knowledge and generating new knowledge and putting it into use effectively [34]. It is the process through which people in organizations find, share, and develop knowledge for action [35]. In healthcare involves developing a culture that promotes learning, with interaction between the patients and healthcare staff [36]. Currently, the evidence of managers competence in knowledge management is limited [37] and only some organizations have plans and structures for avoiding the segmentation of knowledge and ensuring its transfer to the entire organization as a global asset [38] that benefits knowledge or skills associated with the current or future job (individual perspective) and enhancement of organizational or business performance and competitive advantage in the market (organizational perspective).

In summary, current research fails to adequately explain why health projects involving highly skilled individuals and experienced project managers don't achieve success. Excellence in project management requires an understanding of the contributing individual and environmental factors, commitment, leadership, adaptability, and a focus on continuous learning and improvement. This study contributes to addressing a gap in knowledge on the features influencing organizational competence in project management in hospitals, aims to support management in avoiding the common sources of low performance and improve the overall capabilities of healthcare organizations for managing projects.

3. Methods

The retrospective observational study employed a quantitative approach to investigate the features influencing organizational competence in project management within hospitals. Authorizations were obtained from Ethics Committees and Administration Councils. The anonymity of respondents and confidentiality of responses was assured. Data was collected in three public hospitals located in Portugal between June and December 2022. A pre-test was performed (5 respondents) and the final online anonymous questionnaire (provided in Google Forms) was answered by 51 project managers and members of project teams.

3.1. Quantitative Study

The questionnaire comprised 78 questions and was divided into 4 sections: characterization of the respondent and the organization (15 questions); characterization of the last project that the respondent managed or participated (7 questions); characterization of organizational competence in project management (54 questions); and global characterization of the organization's competences (2 questions). These 54 questions referring to organizational competence can be grouped into 16 elements, according to IPMA's OCB referential.

The survey included questions related to five different areas of organizational competence: Organizational alignment (alignment of processes, structures and culture of the project with internal and external parties), Governance (provision of strategic views, policies, guidelines and direction to sustainable development), Management (presence of the elements relevant for the management of projects), People's competence (conditions for the development of competences by people in a sustainable manner, and Resources (conditions for assuring resources availability and utilization).

The collected data were analyzed using R, version 4.3.0 [11]. An organizational competence score was calculated for each respondent by summing the standardized values of the five competence areas.

Statistical analyses were performed to assess the relationship between each competence area and various quantitative and qualitative variables. Descriptive statistics, namely mean and standard deviations, were calculated for each questionnaire item, organizational competence area and element. Pearson or Spearman correlation statistics were used for quantitative variables, depending on the normality of the data. For qualitative variables, a one-way repeated measure *t*-test, Mann-Whitney U, ANOVA, or Kruskal-Wallis tests were used as appropriate. Assumptions of normality were assessed through the Shapiro-Wilk test. Pairwise comparisons were adjusted for multiple comparisons using the Tukey HSD post-hoc test or Dunn's test [39]. A significance level of 5 % was considered for all statistical analyses.

Moreover, we developed a logistic regression model where we compared participants' total IPMA OCB score according to their perception of competency, based on question 6.1 of our survey ("*Considero que a organização reúne as competências necessárias para o sucesso dos projetos*"). This variable was dichotomized, with a positive perception coded as 1 and a negative perception coded as 0. The independent variable in our model was the participants' total IPMA OCB score.

The logistic regression model was specified as follows:

$$\text{logit}(P(Y=1)) = \beta_0 + \beta_1 \cdot \text{Total IPMA OCB Score}$$

where $P(Y=1)$ represents the probability of a participant having a positive perception of organizational competency. β_0 is the intercept of the model, and β_1 is the regression coefficient for the total IPMA OCB score. Model fit and significance of the predictor were

evaluated using the Wald test and goodness of fit was assessed by examining the Hosmer-Lemeshow test and the area under the receiver operating characteristic (ROC) curve.

3.2. Research questions

The main research question guiding this study was: Which features influence hospitals' organizational competence in project management?

4. Results

The survey sample comprised 70.6 % of males, average 49 years-old, 43.1 % with master's degree, 86.3 % without certification in project management, 56.9 % with formal experience in project management/coordination (Table 1).

The majority of respondents work in hospitals located in the Region of Lisbon (41.2 %) with more than 3000 employees. Only 6 % expressed the availability of software to support project management and 69 % pointed out the absence of a PMO in the organization (Table 2).

Descriptive statistics for the five areas of organizational competence are available in Table 3.

The results of the study revealed significant associations between various features and the five areas of organizational competence (Table 4).

All five areas of organizational competence were found to be statistically associated with the project's category (**Organizational alignment (OA)**: $p < 0.01$; **Governance (G)**: $p < 0.01$; **Management (M)**: $p = 0.01$; **People's competence (PC)**: $p < 0.01$; **Resources (R)**: $p < 0.01$).

Other significant associations were found between **OA** and the existence of a project management office ($p=0.04$) and region ($p=0.03$). Governance (**G**) associated statistically with the region ($p=0.04$). People's competence (**PC** was only associated with the region ($p=0.03$). Finally, Resources **(R)** are associated with the organization's number of collaborators ($p=0.02$), function within the project ($p=0.02$) and region ($p=0.02$).

In terms of quantitative variables (Table 4), all areas of organizational competence showed a statistically significant correlation with the number of members of the project's team and the number of projects in which the respondent had participated.

The Organizational Competence Score (OCS) was significantly associated with the region ($p=0.02$), and project category ($p<0.01$), and correlated with the number of projects the respondent had participated in ($p<0.01$), and the number of members of the project team ($p<0.01$) (Table 4).

4.1. Logistic regression model

The logistic regression analysis revealed that the total IPMA OCB score was significantly associated with the perception of organizational competency. The Hosmer-Lemeshow test did not show evidence of poor fit ($\chi2 = 5.1$, $p = 0.75$) and the area under the curve (AUC) was 0.92, indicating good discriminative ability. The model coefficients are presented in Table 5.

The results suggest that higher total IPMA OCB scores are associated with a higher likelihood of participants perceiving their organization as competent for project success. Specifically, for every one-unit increase in the total IPMA OCB score, the odds of having a positive perception of organizational competency increase by approximately 95.7 times.

5. Discussion

One of the most project management trends in healthcare has been focusing on appropriate change management to deliver effective and permanent change and for a more strategic approach towards success, with a greater focus on organizational barriers and enablers of competence in multiple settings. These comprise the organizational factors influencing performance and considering the interests of the multiple stakeholders, rather than the variables related to individuals' competence, which are more acknowledged.

The findings of this study provide valuable insights into the factors influencing organizational competence in project management within hospital settings and therefore contribute to their knowledge of drivers of sustainability of healthcare services. The significant association between the project category and all five areas of organizational competence underscores the importance of the type of project (research/development/implementation) in shaping the competence of the organization. This is consistent with previous studies that have published lists of variables influencing success related to project management practices and impacting outcomes, either relating them to specific areas, types of projects (e.g., research or development projects), business activities or areas, or pointing them as traditional success factors [43,44].

Interestingly, our study found a significant correlation between the existence of a project management office (PMO) and Organizational Alignment (OA). PMOs are typically focused on standardizing organizational project management methodologies and project management per se [45] and in many industries, the discussion is on how to run high-performing PMOs [46]. This suggests that a lot of emphasis must be focused on the strategic management of projects, how we can assure effective portfolio management by having a dedicated office that can support strategic decision-making (e.g., decisions to kick-off or not a certain project), help align the hospitals' management strategies and strategic goals, and promote effective project governance, thereby enhancing its overall competence. This finding aligns with extended research that demonstrated how far a project management office can deliver internal control systems, facilitate portfolio management, and improve organizational performance [47]. Some studies have not directly

analyzed the impact of having a PMO on organizational competence in PM but have measured organizational maturity in PM using both standardized and specific project management practices and their relevance to success [48,49]. Therefore, this study supports the idea that a PMO is an innovation in healthcare facilities and, as in many other industries, we must delve into how it can support the implementation of strategy, decision-making with a priority on health outcomes, governance management, and work as an integrator that coordinates and supports project activity across the hospital and balances the needs of the larger community of stakeholders. The increasing complexity in health systems driven by advancements in care and technology, growing interest of multiple public and private players, and demanding expectations from patients and civil society, requires that strategy development and implementation through projects incorporates a high level of thinking and flexibility [50] that can be supported by the PMO. PMOs must evidence how organizational competence in project management is a vehicle to implement the overarching agenda of providing a service to patients with high quality, effectiveness, and efficiency and with consideration to the power and interests of the larger network of stakeholders – rather than just delivering the projects on time, budget, and within the quality requirements. Further research is needed to effectively characterize what extension performance is affected by a set of characteristics of the setting (e.g., dimension, funding source, level of differentiation, workforce), region (e.g., rural, urban, mixed), public and non-public actors influencing the provision of services, specific capabilities that support the job-to-be-done, among other aspects, to address the dynamic complexity of introducing change in healthcare, and frame on overall competence in introducing innovation by effective project governance [45,51–54]. The regional differences observed in our study point to the potential influence of local contexts and the availability of human and financial resources on organizational competence. This is an area that warrants further investigation, as understanding these regional disparities and workforce shortages could inform targeted interventions to enhance project management competence in specific regions.

The significant associations between the number of project team members, the number of projects a respondent had participated in, and all areas of organizational competence emphasize the impact of experience and team dynamics in shaping organizational competence. This supports the notion that individual competence in project management influences the organization competence in managing projects. There is large evidence project management is a learned skill that can be enhanced with experience and tailored strategies for resource development [55] and competence benefits from the development of human resources management policy that supports education, in-job training, standardization, customization, and continuous improvement of project management practices [28,30,56,57]. Furthermore, our research suggests that larger teams may offer more diverse skills, expertise, and perspectives, thereby enhancing hospitals' competence in project management. Team members' feeling of being overburdened due to an imbalance of resources and demands affects commitment and the quality of the job done [58]. More complex projects may require larger teams to handle the workload and address various requirements of the project although a larger team may also introduce more complexity in terms of coordination work and communication. Therefore, the optimal team size varies from one project to another and must be defined based on the specific project needs, goals, and requirements. Well-focused, limited resources can also boost individuals' interest and meaning in their work and build their confidence in their ability to achieve, their motivation and engagement [58]. From an organizational perspective, the overall number of resources available can influence its flexibility and adaptability to manage external influences, uncertainty, risks, and emerging opportunities. However, the relationship between resource availability and performance is not straightforward, particularly in healthcare. Superior resources can provide a competitive advantage when they are used efficiently and can handle the strategic goals of the organization [32,33]. It is particularly interesting that the healthcare sector significantly varies from others on this point due to the nature of healthcare services and factors influencing their funding and delivery, which are well described in the literature [10,13,15]. Healthcare managers are constantly striving to improve the quality of their services while increasing productivity and efficiency levels in a context of environmental uncertainty in relation to access to resources [59] and transition to new provider models of governance that consider the increasing interest of civil society (as other non-public actors) and growth of private businesses [60]. Healthcare organizations must have a clear strategy for contracting, developing and maintaining people, growing the human capital of the organization, and based on specific criteria, carefully distributing resources among the various operations and projects. Their focus is on assuring the high quality of the service, successful completion of projects, delivering value to the business, and maintaining interest in their network of partners to hold future collaboration opportunities. The governance of projects in hospitals should consider that quality improvement initiatives can be successful implemented by supportive visionary leadership, proper planning, education and training, availability of resources, effective management of resources, employees and processes, and collaboration and cooperation among providers [61].

The results of our logistic regression model indicate a significant association between the total IPMA OCB score and the perception of organizational competency. Specifically, the analysis revealed that higher scores are associated with a substantially increased likelihood of participants perceiving their organization as competent for project success, highlighting the importance of investing in continuous improvement and capacity-building within project teams. Practically, organizations can utilize the IPMA OCB as a diagnostic tool to assess their current strengths and weaknesses in project management competence. This assessment can inform targeted interventions and training programs aimed at improving organizational capabilities in project execution. By addressing identified areas of improvement, organizations can enhance their overall project management effectiveness and increase the likelihood of successful project outcomes.

However, it is important to note that the confidence interval (CI) for the Odds Ratio (OR) was extremely wide ([2.2, 4176.6]). This broad interval suggests a high degree of uncertainty in the estimated effect size, which can be attributed to several factors, including the relatively small sample size and potential variability in the data. Such a wide CI indicates that while the association between the IPMA OCB score and the perception of organizational competence is statistically significant, the precise magnitude of this effect is uncertain. Future research should aim to address this limitation by increasing the sample size, which would likely result in narrower confidence intervals and more precise estimates. Additionally, exploring more complex models that can account for potential confounders and interactions may help to capture the underlying relationships better and reduce the variability in the estimates.

Our study is not without limitations. The cross-sectional design limits our ability to infer causality, and the reliance on self-reported data may introduce bias. The results capture perceptions of project teams on dimensions associated with organizational competence in managing projects, and professionals who experience perceived organizational competence promote work engagement more than employees with low levels of perceived organizational support [62]. Nevertheless, future research may employ longitudinal designs to address in detail the multi-dimensional environment in which projects are developed, address the different project phases (conceptualizing, planning, implementation, closing), and incorporate objective measures of project success and outcomes to provide more robust evidence on the individual and organizational factors influencing hospitals' competence in project management.

6. Conclusion

This study has effectively identified key factors influencing organizational competence in project management within hospital settings, aligning with and expanding upon the IPMA's Organizational Competence Baseline (OCB). The presence of project management offices (PMOs) was notably associated with improved organizational alignment and governance, highlighting their pivotal role in standardizing project management practices within hospitals. This insight is particularly valuable for hospital administrators and project managers striving to enhance strategic coherence and operational efficiency.

However, it is important to note that the wide confidence interval for the Odds Ratio in our logistic regression analysis indicates a high degree of uncertainty in the estimated effect size. This suggests the need for caution when interpreting the magnitude of the effect. Future research should aim to address this limitation by employing larger sample sizes and more complex models to obtain more precise estimates.

Future research is crucial to explore these relationships in more detail with larger, independent samples. Additionally, longitudinal studies are recommended to assess the impact of project management practices on organizational performance over time and to explore potential interventions that can enhance both organizational and individual competencies throughout the project lifecycle - from requirement mapping to the delivery of final solutions.

Overall, while this study provides foundational insights that can inform strategies to enhance effective project governance and management practices in hospitals, it also highlights the necessity for continued research to refine these strategies and ensure their applicability and effectiveness in improving healthcare project outcomes.

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Disclosure statement

The authors declare that there are no conflicts of interest.

Data availability statement

Data is confidential, will not be made available on request.

CRediT authorship contribution statement

Monica Cristina: Investigation. **Paulo Nogueira:** Investigation. **Maria Miguel Oliveira:** Investigation. **Carolina Santos:** Investigation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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