



# Knowledge Sharing in Project Environments: Case Study in a Financial Sector Company

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## ABSTRACT

Projects have been increasingly used in the implementation of organizations' business operations. Knowledge sharing has been considered essential in project environment; therefore, the integration of knowledge management within project management becomes crucial for project success. The objective of this research is to study how knowledge sharing is integrated within the context of a project, and what is the perception of project team members about it. A case study was carried out in a company within the financial sector, focused on a project team of the entity. The results revealed that project managers, other professionals in project management, and the organization itself are very much aware of the importance of knowledge sharing. The results also emphasized that, regardless of the lack of incentives by top management, project team members consider that knowledge sharing highly contributes for a successful execution of projects.

## KEYWORDS

Knowledge, Knowledge Management, Knowledge Sharing, Knowledge Sharing in Project Management, Project Management

## 1. INTRODUCTION

An increasing number of organizations have implemented their business operations through projects (Todorović, et., 2015). Projects that can be defined as a temporary effort to create a specific product or service (PMI, 2017). Temporary, in the sense that a project has a defined beginning and end and, unique, in the sense that the product/service is different in some way distinct from other products/services (Owen & Burstein, 2005; PMI, 2017).

Projects are collective endeavors with goals based on the development of common understandings, which generate personal and group knowledge that contributes to their own success (Sankarasubramanian, 2009). For many organizations, knowledge is the most important asset and its survival depends on the organization's ability to effectively use existing knowledge and to effectively create, develop and use new knowledge (Pascoe & More, 2005). Proper knowledge is a basic prerequisite for effective project management (Gasik, 2011) and the knowledge management is vital factor to successfully undertake projects (Sokhanvar, 2014).

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According to Koskinen and Pihlanto (2008), projects are often dependent on knowledge that is not in their possession. Within this context, the integration of knowledge management in project management is necessary to share information and knowledge to solve problems effectively and efficiently (Yeong & Lim, 2010). Knowledge, defined by Gao et al (2018) as the practical and theoretical understanding of a subject, is considered as an essential organizational resource (Buvik & Tvedt, 2017; Hanisch et al., 2009) and its management is considered as a fundamental tool for the success of the projects (Romani, 2017).

Generically knowledge management represents the set of processes and practices carried out in organizations with the objective of increasing intellectual potential, improving the effectiveness and efficiency of the management of organizational knowledge resources (Heisig, 2009; Andreeva and Kianto, 2012). The basic purpose of knowledge management is to create and share knowledge within organizations (Chen et al., 2018). Knowledge sharing is especially important in a project environment and contributes significantly to the performance of organizations (Buvik & Tvedt, 2017) and to understand the best way to share knowledge between teams and between members of a project (Fernie et., 2003). Further, Al Ahbabi et al. (2019) conclude that the dimensions of knowledge management had a positive impact on innovation, quality and operational performance of employees. Gürlek & Çemberci (2020) shows that firms under the leadership of knowledge-oriented leaders have high knowledge management capacity, innovation performance and firm performance.

Also, due to the temporary nature of projects, knowledge management in project-based organizations is not similar to functional companies (Kasvi, Vartiainen, & Hailikari, 2003). Project team members split up or leave after project completion and this poses a number of challenges to projects and project-based organizations (Ajmal, Helo, & Kekale, 2010)

The objectives of the research study are, at first, to understand how knowledge sharing is integrated in project environments, and second, how it is observed from the perspective of individuals belonging to project teams. The research question was defined as: “What is the perception of project managers and project teams about knowledge sharing in a project environment?”.

Through a case study approach, it is proved that team members use different knowledge sharing practices, in addition to recognizing its importance for the most successful management of their projects.

## **2. LITERATURE REVIEW**

### **2.1 Knowledge**

“Knowledge is seen as an intangible asset, which is valuable, distinctive, path-dependent, causally ambiguous and hard to substitute or replicate” (Fang et al., 2013, p. 945). Knowledge is considered an essential strategic resource that allows organizations to maintain competitive advantage in a dynamic market environment (Rashed, 2016).

There is no single definition of knowledge, it has different understandings depending on the context in which it is being defined (Ekambaram et al., 2018). It can be defined as the practical and theoretical understanding of a subject (Gao et al., 2018), the ability to make judgments (Fernie et al., 2003), based on reflection and human experience (De Long & Fahey, 2000), a system of connections between facts and ideas (Romani, 2017) or information combined with experience, context, interpretation and reflection (Davenport, De Long & Beers, 1998).

De Long and Fahey (2000) believe that there are three types of knowledge: human knowledge, social knowledge and structured knowledge. In addition, they believe that there are two dimensions to understanding knowledge in an organizational context: first, that knowledge can exist at the individual, group or organizational level; and second, that knowledge can be tacit or explicit (De Long & Fahey, 2000). This latter dimension, between tacit knowledge and explicit knowledge, is

frequently mentioned in the literature (Buvik & Tvedt, 2017; Chen et al., 2018; De Long & Fahey, 2000; Fernie et al., 2003; Hoorn & Whitty, 2019; Nonaka, 1994).

Explicit knowledge consists of words and numbers that are easily accessible (Uğurlu & Kizildağ, 2013), information defined in a tangible way (Gao et al., 2018; Owen & Burstein, 2005), formal and well structured, through documentation, databases and reports (Terzieva, 2014; Mazur et al., 2014). According to Nonaka (1994), explicit knowledge refers to knowledge that is transmissible in a formal and systemic language.

Tacit knowledge is defined as what we know, but we cannot explain (De Long & Fahey, 2000), the experience rooted in the individual's mind (Koskinen et al., 2003; Chen et al., 2018). Tacit knowledge is not in a structured or documented form. It is internalized by the experience, intuition and insight of individuals who are experts within their organizations (Terzieva, 2014; Mazur et al., 2014; Davenport et al., 1998). According to Nonaka (1994), tacit knowledge has a personal quality, which makes it difficult to formalize and communicate. According to the same author, tacit knowledge has two types of elements or dimensions. A cognitive dimension based on paradigms, beliefs and points of view that provide individuals with unique perspectives, and a technical dimension supported by informal skills and know-how applied to a specific context (Nonaka, 1994; Nonaka & Konno, 1998). Tacit knowledge is expressed by human action (Koskinen et al., 2003), know-how (Bryde et al., 2018), characterized by being complex and dynamic (Chen et al., 2018), personal and context dependent (Fernie et al., 2003), and subjective (Hoorn & Whitty, 2019).

However, according to Owen & Burstein (2005), there is a third type of knowledge, implicit knowledge, which, like tacit knowledge, is present in the individual's mind. The same authors explain that the main difference between implicit and tacit knowledge is the fact that the latter can be captured and transferred within the organization through social networks, while the implicit knowledge can potentially be captured, encoded and stored in databases or documents (Owen & Burstein, 2005).

## 2.2 Knowledge Management

Knowledge management has a fundamental role in the success of organizations' activities and strategies, namely in the effective support to environmental changes, in increasing productivity, in the relationships between employees, and in opening the way for development and innovation (Castrogiovanni et al., 2016; Ekambaram et al., 2018; Mueller, 2012). It is considered a key element for organizations looking to obtain a competitive advantage (Wang & Ko, 2012). In a simplified way, the concept is based on the vision of the strategic value of organizational knowledge, using information technologies (e.g., databases and others) to facilitate the acquisition, sharing, storage, retrieval and use of knowledge (Easterby-Smith & Lyles, 2011).

Inkinen (2016) defines knowledge management practices as the conscious organizational and managerial practices intended to achieve organizational goals through efficient and effective management of the firm's knowledge resources.

Different studies define knowledge management processes in different ways, according to Costa & Monteiro (2016) and Inkinen (2016), knowledge management is an aggregated process composed of the acquisition, creation, transfer, storage and application of knowledge. However, in operational terms, the definition of knowledge management processes is related to the creation, sharing and use of knowledge (Ahmad et al., 2017; Shujahat et al., 2017).

Knowledge creation is a process in which new knowledge is created through the four sub-processes of organizational knowledge creation (Andreeva & Kianto, 2011; Collins & Smith, 2006), namely through socialization, combination, externalization and internationalization (Collins & Smith, 2006; Lai et al., 2014)

Knowledge sharing is the donation and collection of knowledge between different knowledge units in a company (Becerra-Fernandez, Gonzalez, & Sabherwal, 2004). It is the act of transferring the respective insights between workers (Hooff & De Ridder, 2004). It can be categorized as formal versus informal elements or donation versus collection of knowledge (Hooff & De Ridder, 2004;

Taminiau, Smit, & Lange, 2009). Singh et al (2021) claims that organizations with strong knowledge sharing practices are more competent in chasing open innovation. Abbas et al (2019) shows a substantial positive linkage between knowledge sharing and organizational innovation in Pakistani Islamic banks. Therefore, to have an effective knowledge exchange among employee and employers, there must be effective knowledge sharing and helping (Singh et al., 2021). A complete process of knowledge sharing includes sharing intention, sharing behaviours, and sharing results (Akhavan & Mahdi Hosseini, 2016).

The use of knowledge is the application of knowledge that has been shared (Song, Bij, & Weggeman, 2005). It is a newly created knowledge that becomes part of organizational behavior and processes for problem solving through assimilation (Chen et al., 2012).

Seiner (2001), defined knowledge management as the way the company collects, organizes, shares and analyzes the knowledge of individuals and groups, and the ways that directly affect organizational performance (Mazur et al., 2014). Mahdi et al. (2019) see knowledge as a dynamic and recurring process, in which employees must constantly connect with information and obtain new knowledge and apply that knowledge to improve their decision making, while developing knowledge and information new in the process. Knowledge management describes all methods, instruments and tools in a holistic approach to generate, store, distribute and apply knowledge supported by the identification of knowledge and the definition of knowledge goals in all areas and levels of the organization (Mahdi et al., 2019; Rashed, 2016). It is also considered as a cyclical system that allows the organization to efficiently achieve its objectives by the ability to transform tacit and explicit learning into habits, to better plan and execute (Mazur et al., 2014).

### **2.3 Knowledge Management Strategies**

Knowledge management ensures the correct flow of knowledge through two main strategies: coding and personalization (Shujahat et al., 2017). The coding strategy is related to extracting and storing knowledge explicitly through the ICT framework, while the personalization strategy focuses on direct human interactions for the purposes of knowledge sharing (Curado & Bontis, 2006; Merat & Bo, 2013; Shujahat et al., 2017).

There are two types of strategies for managing knowledge: coding and personalization (Kasvi et al., 2003). In the coding strategy, knowledge is encrypted and stored in databases, which allows for easy access and reuse of knowledge (Hans & Skiver, 2007; Hansen et al., 1999; Kasvi et al., 2003; Ruuska & Vartiainen, 2005). Organizations that adopt the coding strategy depend on the “economics of reuse”, and once acquired or developed, knowledge assets can be used multiple times. The reuse of knowledge reduces the volume of work, reduces costs and allows the organization to take on more projects (Hansen et al., 1999). This strategy is considered a good mechanism for storing large amounts of knowledge and creating an organizational memory for all employees (Polyaninova, 2011).

Opposite to the coding strategy, there is the personalization strategy (Bolisani et al., 2017) in which knowledge is linked to the person who developed it (Hansen et al., 1999; Mannan et al., 2013; Polyaninova, 2011). This strategy focuses on the contribution of tacit knowledge (Bolisani et al., 2017). Personalization as a knowledge sharing mechanism has the flexibility to transmit tacit knowledge and allows discussions and the sharing of interpretations that may lead to the development of new knowledge (Polyaninova, 2011).

Knowledge is transmitted and shared through personal interaction (Mannan, et al., 2013; Polyaninova, 2011), which focuses on dialogue between individuals, in brainstorming sessions, in building networks of people, a “person-to-person” approach (Hansen et al., 1999). Information technologies, when it comes to personalization, have the main purpose of facilitating communication and sharing tacit knowledge (Hansen et al., 1999).

Hansen et al. (1999) emphasize that no organization works with a single knowledge management strategy. The authors believe that organizations that successfully generate knowledge are those that

identify the knowledge management strategy that best fits their competitive strategy, using this as their main strategy and the other as support.

Bolisani et al. (2017), present a third strategy, the sharing strategy, which refers to an approach where individuals are assumed to work better collectively, arguing that there is a need to share and socialize the elements of their private knowledge. This strategy exists under the premise that no individual has all the knowledge necessary to perform a complex task, that individuals should be encouraged to put their experiences and knowledge in common, leading to the creation of specialized islands of knowledge, where they can create and sharing knowledge and implementing collective learning processes (Bolisani et al., 2017).

## 2.4 Knowledge Sharing Management in Project Environment

Knowledge sharing refers to the dissemination of organizational knowledge to all the organization's stakeholders (Kishore, et al., 2009), playing a critical role in the growth of companies' businesses, through the generation of new ideas, products or services (Fields, 2016) and by the transfer of thoughts, information, perceptions and experiences and, consequently, becoming a source of creativity and innovation in organizations (Ciulli & Kolk, 2019). Love, Fong and Irani (2005) have made a valuable contribution to understanding knowledge management in project environments. Considering the role and processes of knowledge management in project environments, they focus on knowledge management in the context of cross-functional project teams, as well as the role of organizational learning in projects.

Knowledge is considered an essential asset for a project (Holzman, 2013), and is linked to the methodology and communication practices used in projects (Hanisch et al., 2009; Frey et al., 2009). Consequently, knowledge management is an essential tool, available to the project manager for the successful completion of a project (Romani, 2017). Some researchers have linked knowledge and learning from project performance (Reich et al., 2008). Several empirical studies show a strong correlation between project management and knowledge management practices (McElroy, 2000) and between good knowledge management practices and project performance (Leseure & Brookes, 2004).

Project knowledge management is defined as the application of concepts, tools and techniques to complete a project within the defined time and budget, responding to the client's needs (Romani, 2017). Project knowledge management, especially in complex projects, is one of the main success factors in project management and its lack is one of the main reasons for failure (Desouza & Evaristo, 2004). Frey et al. (2009), states that project knowledge management comprises not only knowledge within projects, but also between different projects and about projects. Soderlund (2010) stated that in large transformation projects, it is necessary to integrate a number of knowledge bases in these projects. For these projects, knowledge integration depends on the ability of the people involved to relate to each other, share and absorb findings and knowledge assets that have been developed in the project, and adjust them to the speed of other parts of the project. Polyaninova (2011) states that knowledge management in the project environment occurs in the transfer of experience between projects or between project teams and in the dissemination and development of new competences from central departments to project teams.

For Bassi (2014), within an organization there are two levels of knowledge to be managed: individual knowledge and organizational knowledge. The first refers to what individuals learn during project execution, while the second refers to what the organization has developed and learned from managing its projects. Hanish et al. (2009) states that knowledge in projects is linked to the project management methodology and communication practices in projects, making project knowledge contribute to the organizational knowledge base.

According to Pretorius & Steyn (2005), the challenge of knowledge management in project environments is in the documentation and management, as well as the distribution and sharing of newly created knowledge. Failure in this knowledge transfer within the organization leads to waste and impacts project performance (Leseure & Brookes, 2004).

Knowledge about project management, explicit or tacit, plays a decisive role in understanding this discipline (Morris, 2002).

Knowledge increases in value, when it is shared (Cabrera & Cabrera, 2002), knowledge sharing is potentially considered the most important activity in knowledge management (Chen et al., 2018). Sharing is recognized as strategically important for organizations, as it allows individuals to acquire the necessary knowledge to improve their performance (Wang & Ko, 2012). It is a key process in translating individual knowledge into organizational knowledge (Nesheim & Hunskaar, 2015), and vital to innovation, increasing productivity and maintaining competitive advantage (Mueller, 2015). Knowledge sharing can be defined as the action of disseminating knowledge among individuals, groups and organizations (Chen et al., 2018), the organizational processes associated with making knowledge available to others (Chen et al., 2018). However, some authors (Alavi & Denford, 2011), differentiate the concepts of knowledge sharing and transfer. Knowledge transfer is considered as the communication of knowledge from a source to a recipient. Knowledge transfer involves the transmission of knowledge from its original location, to where it needs to be applied (Alavi & Denford, 2011). Some authors argue that knowledge sharing is a voluntary act, suggesting that the individual presents the knowledge so that it can be used by others, and that it involves conscious action and active participation by the individual who possesses the knowledge (Wickramasinghe & Widyaratne, 2012). Others, in turn, suggest that knowledge sharing may not only be voluntary, but also requested, referring to the sending and receiving of requests for knowledge and the consequent fulfillment of those same requests (Wickramasinghe & Widyaratne, 2012). Knowledge sharing is especially important within the context of the project, where individuals work together and interact to perform their tasks and is positively associated with project performance (Buvik & Tvedt, 2017).

However, it is necessary to be aware of any barriers that may develop within the organization. There are numerous barriers that we can group into three homogeneous dimensions (Crupi et al., 2020):

**Cultural dimension** - The culture of an organization can be a barrier to interorganizational knowledge sharing (Lotti Oliva, 2014). The culture can impact the knowledge sharing by not implementing knowledge management tools, not providing an adequate reward system, changing the organizational climate and relationships (Zawawi et al., 2011).

**Structural dimension** - Organizational relationships seems to be an important barrier to the transfer of information from the organization to the team (Connelly & Kelloway, 2003). For this reason, organizations must promote the culture of teamwork as a knowledge sharing generating factor, facilitating the work conditions and the adequate infrastructure (Mariotti, 2007).

**Strategic dimension** - Strategy development and collaborative encouragement require leadership. Knowledge is an individual resource that needs to be coordinated and integrated at the organizational level (Tiwari, 2015)

At individual level, we highlighted some dimension, namely, Culture (Chmielecki, 2013), emotions (Riege, 2005), trust (Park & Kim, 2018), communication skills and social networks' breadth (Riege, 2005) and time constraints (Razmerita et al., 2016). Technology issues, cross-organizational information transfer, the idea of taking tangible advantage from the information exchange, situations where one of the organizations involved in the KS imposes the sharing of information with other organizations, configure a set of barriers at the interorganizational level (Boonstra & de Vries, 2005).

### **3 METHODOLOGY**

#### **3.1 Data Collection Instrument**

This study aims to study how knowledge sharing is framed and carried out within a project environment, and to analyze it from the perspective of project managers and other individuals belonging to project teams.

The methodological approach used in this research is a case study. According to Yin (2016), the qualitative research is not limited or constrained by the inability to establish specific research conditions, the unavailability of sufficient data series or the lack of coverage of sufficient variables; or the difficulty in obtaining an adequate sample of respondents and obtaining a sufficiently high response rate. The variant applied in this study is an empirical research method that inquiries about a phenomenon within its real context (Yin, 2018). To understand the perception of individuals in relation to the topic of knowledge sharing, an interview guide (Appendix) was created based on a literature review and applied within a project team in a financial sector organization.

The questions created can be categorized using the knowledge sharing inventory, developed by Liebowitz and Megbolugbe (2003) to assess how well an organization implements the knowledge management and sharing structure. This approach is divided into 4 categories (Liebowitz & Megbolugbe, 2003):

1. Communication flow - how knowledge and communication exchanges are captured and disseminated by the organization.
2. Knowledge management environment - which looks at the internal cultural factors related to knowledge management within the organization.
3. Organizational availability - which assesses the sophistication of the knowledge management infrastructure and the ability to share knowledge within the organization.
4. Measurement - which measures the likelihood of knowledge sharing and knowledge management being successful within an organization.

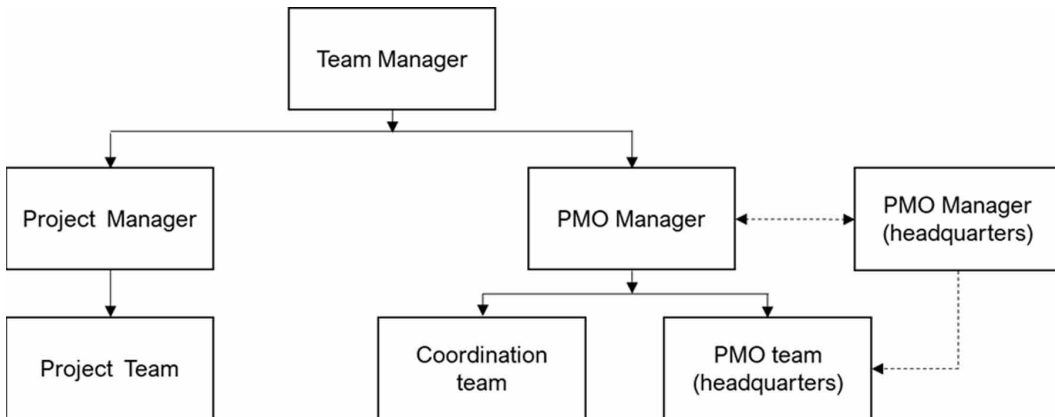
Table 1. Categorization of the interview guide (pre-validation)

The categorization	Question	References
<b>Communication flow</b>	Q.3	(Liebowitz & Megbolugbe, 2003)
	Q.4	(Schindler & Eppler, 2003)
	Q.6	(Terzieva, 2014)
<b>Knowledge Management Environment</b>	Q.2	(Bryde et al., 2018)
	Q.5	(Chen et al., 2018)
	Q.6a	(Todorović et al., 2015)
	Q.9	(Liebowitz & Megbolugbe, 2003)
<b>Organizational availability</b>	Q.1	(Bryde et al., 2018)
	Q.2	(Hanisch et al., 2009)
	Q.6b	(Liebowitz & Megbolugbe, 2003)
	Q.6c	(Liebowitz & Megbolugbe, 2003)
<b>Measurement</b>	Q.7	(Liebowitz & Megbolugbe, 2003)
	Q.8	(Liebowitz & Megbolugbe, 2003)

The categorization and references are detailed in the table below. These questions can be found in Appendix A - Interview guide (pre-validation).

A pre-test applied to the head of the PMO (Project Management Office) team resulted in the reordering of questions. In addition, six of the initially questions (1, 2, 5, 6a and 6b) became more focus on the topic. These changes can be found in Appendix A - Interview Guide (post-validation). The script's structure first asked about: The perception of the relevance of the knowledge sharing theme within the project management; the existence of a project management methodology, knowledge sharing and existing knowledge sources; the incentive for top management to share and the currently used methodologies.

Figure 1. Structure of the project team



The responses obtained were categorized to observe the frequency of the topics mentioned by the respondents.

### 3.2 Case Study: Company Z

Company Z is a multinational company within the financial sector. Its subsidiary in Portugal has project teams made up of project managers and local and central project management professionals, who represent the parent company.

The organization has several project teams within its departments. The target department of this study is made up mostly of project teams whose scope applies to different areas and, in turn, have different project management methodologies. This means that, depending on the type of project carried out by the team, we can find teams that adopt different project management methodologies (Cascade, Agile, Lean Six Sigma, among others).

The project team under study is a team that carries out projects for internal clients, that is, for other business areas within the organization. It consists of a sub-team of project managers and a sub-team of PMO which, in turn, is subdivided into two teams: the coordination team, responsible for supporting the project managers and a PMO team that is part of the team at the company's headquarters.

## 4. ANALYSIS AND DISCUSSION

The unit of analysis for this study was the members of the project and PMO teams. Answers were obtained from 10 respondents (Table 2).

According to the results obtained, most (7 in 10) apply Cascade Project Management methodology and most affirm that the applied methodologies incorporate knowledge management practices (6 in 10). All respondents believe it is relevant to share knowledge within a project environment. The most common sources of knowledge are guides/procedures (23%), SharePoint/Share Drive (16%), experts (13%), reports (10%) and repositories (10%).

Regarding incentives by top management, there is no consensus among respondents, and the answers indicated, both, the existence of incentives and the absence of them.

Notwithstanding the divergence of opinion in relation to the previous question, there is a consensus that the sharing of knowledge between project managers is a common practice among respondent teams. During their projects, most of them claim to use knowledge acquired by other project managers, information which is found in the form of project reports, digital databases and direct contact with project managers.



Table 2. Respondents profile

Member	Job	Age	Sex
GP01	Project Manager	30 - 40	Male
GP02	Project Manager	> 40	Male
GP03	Project Manager	> 40	Male
GP04	Project Manager	20 -30	Male
GP05	Project Manager	20 - 30	Female
PMO01	Project Manager Officer	20 - 30	Male
PMO02	Project Manager Officer	20 - 30	Female
PMO03	Project Manager Officer	20 - 30	Female
PMO04	Project Manager Officer	20 - 30	Male
L01	Coordination Team Manager	30 - 40	Male

When asked about the adequacy of the currently used methodology, the general opinion is that it is in fact adequate, but subject to improvement.

The main problems pointed out are centered on the lack of compliance in the preparation of project documentation and on the lack of harmonization and practicality in the information storage processes.

Respondents also identified several aspects whose improvement would benefit the development of their projects, namely:

1. Reducing bureaucracy in general.
2. Increase of knowledge sharing sessions between teams.
3. Creating new tools that are easier to use.
4. Increased level of contact between the various project managers.
5. Greater promotion of collaborative work.
6. Awareness of filling in the data associated with each project.
7. Simplification and harmonization of information sources.
8. Simplification of project documentation to avoid duplication of work.
9. Simplification of reports for better understanding.

## 5. CONCLUSION

This study was aimed to investigate the way knowledge was shared in a project environment and how it is observed from the perspective of individuals belonging to project teams. The results obtained reveal that knowledge sharing is considered important, both by project management managers and professionals, and at the organizational level, identified in the existence of knowledge management practices and tools, and incorporated into the methodologies adopted by the team's project management.

The study concludes that, despite the lack of incentives on the part of top management, project managers and other members belonging to project teams, considered knowledge sharing as a relevant contribution to a more successful execution of projects.

It was also concluded that, given the disparity of projects, in type and dimension, knowledge sharing practices are not yet standardized in the organization's project management methodologies. Aspects related to the simplification and harmonization of documentation and information sources should be improved to enhance the dissemination of knowledge and benefit the end results of the projects.

Also, most respondents seemed to be aware that it would be important to define more explicit methods and practices for obtaining, storing and sharing knowledge.

## **6. LIMITATIONS AND FUTURE WORK**

The small sample size makes the study reflect only the specific reality of the studied project team, within the specific organizational context.

For future research, it would be of interest to analyze how geographically distant project teams deal with knowledge sharing. Additionally, how organizational cultures and subcultures impact the sharing of knowledge in different project teams within an organization, since the culture under which projects operate has a significant impact on knowledge sharing between projects.

Finally, having carried out the study on knowledge sharing, it would be of interest to study the use of knowledge in the project environment, and to analyze the benefits observed by the project managers.

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## APPENDIX

### INTERVIEW GUIDE (PRE-VALIDATION)

1. Is any project management methodology used in your project team? If so, which one?
2. Within the methodology used, are there specific rules for project knowledge management?
3. What are the sources of project knowledge existing in your team?
4. Of the sources mentioned, which ones do you use most often?
5. Is knowledge sharing encouraged by your top management? if so, in what way?
6. When starting a new project, do you use the knowledge acquired in similar projects by other project managers? If so:
  - a. Is this practice common to the project team?
  - b. Is it easy to access that information?
  - c. In what format is this information found? (e.g., project reports, lessons learned, direct contact with the project manager, etc.)
7. In your opinion, do you think that the knowledge sharing methodology currently used by your team is the most appropriate? Why?
8. In your opinion, what improvements can be applied to the methodology currently used?
9. In your opinion, do you think that knowledge sharing is a relevant aspect of project management?

### INTERVIEW GUIDE (POST-VALIDATION)

1. Is knowledge sharing a relevant aspect of project management?
2. What is the project management methodology applied to your team?
3. If you identified it above, are there any specific rules for project knowledge management in it?
4. What are the sources of project knowledge existing in your team?
5. Of the knowledge sources mentioned, which ones do you use most often?
6. Is knowledge sharing encouraged by top management?
7. In the management of your projects, do you use the knowledge acquired by other project managers?
  - a. Is this practice common to the project team?
  - b. Is it easy to access that information?
  - c. In what format is this information found? (e.g., project reports, lessons learned, direct contact with the project manager, etc.)
8. In your opinion, do you think that the knowledge sharing methodology currently used by your team is the most appropriate?
9. In your opinion, what improvements can be applied to the methodology currently used?



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