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The ERP post-implementation stage: a knowledge transfer challenge

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Abstract:
This paper examines the knowledge transfer process in ERP post-implementation projects, and specifically between the ERP project teams and the IT support team. Case studies were conducted in three large organizations and data was collected via semi-structured interviews. Descriptive and graphical representations were used to analyze knowledge transfer processes for each case and a cross-case analysis was performed. Results from this exploratory study shed light on the relation between the ERP evolution structure and the use of knowledge transfer mechanisms based on different types of knowledge (functional and technical). This paper highlights the necessity of relying on both formal and informal knowledge transfer mechanisms to cover recurring and ad hoc exchanges between the different stakeholders responsible for the evolution of an ERP. The paper also highlights the impact of the ERP integrator and its different inclusion strategies that are critical for the knowledge being shared by the ERP project stakeholders.

Keywords:
ERP; project management; knowledge transfer; post-implementation.

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1. Introduction

Enterprise Resource Planning (ERP) systems are now a widely used commodity, present in more than 75% of North American manufacturing firms and 60% of service firms [1]. Projects to implement these integrated systems have their share of challenges as they require major investments, and success is far from being assured. Recent statistics show that over 50% of projects experience cost overruns and over 60% have schedule overruns [2]; these numbers have hardly changed since 15 years ago, when 70% of ERP implementations were considered to be failures or negative experiences [3].

These bad experiences can be explained by several factors, but one that stands out is the time and effort required to fine-tune the ERP system. Most organizations consider the initial implementation of the ERP to be the final activity rather than just one stage in the life cycle of the system. In order to reap the benefits of an ERP implementation, several concerns linked to the evolution of the systems must be taken into account [4]. The process of evolution, which consists of multiple iterations of revisions, reimplementations or upgrades [5], ultimately focuses on making sure the ERP is aligned with the organization's current and future business needs [4]. Corrective actions may be seen as continuing the initial implementation of the ERP [6], and many organizations implement their ERP progressively [7]. Different levels of effort are needed to keep the ERP running and upgrade it according to the implementation plan.

Wenrich and Ahmad [8] state that several activities included in ERP evolution must be managed as separate development projects in order to be successful, but they also emphasize that a permanent support structure must be maintained to cover the ERP users' operational needs. In this context, projects are used to manage major changes of the ERP system, while support activities maintain the implemented functionalities. Thus, the knowledge produced by the different project teams is essential for the support team to maintain the new ERP functionalities and also serves as a base of knowledge for subsequent projects. The challenge for organizations is rooted in the temporary nature of projects, which means that structures and mechanisms to transfer knowledge are needed in order to maximize the use of an ERP system [9].

The objective of this paper is to understand how organizations transfer knowledge between the ERP project teams and the ERP support team to steer the evolution of an ERP in an organization. More specifically, it investigates the following questions:

- How is the ERP evolution structure configured?
- What knowledge transfer mechanisms are used?
- What other aspects may influence knowledge transfer in this context?

The next section reviews the literature on the main themes of this study. It is followed in section 3 by the methodology used to conduct the research project; the findings are presented in section 4. In conclusion, section 5 discusses the study's limits and highlights the paper's main contributions.

2. Literature review

2.1 Enterprise Resource Planning (ERP) systems

Several definitions of an ERP are available in the literature [1,5]. In a nutshell, an ERP is a software system designed to support organizations in managing the processes or components of their businesses. The ERP automates business processes and collects transactional business information, giving real-time information visibility to the multiple users dispersed throughout the organization. The literature on ERP systems has increased significantly in the last few years [10,11]. Although the majority of publications focus on the implementation stage, interest has now shifted to the post-implementation stage [10] to some extent.

This study focuses on one of the under-investigated topics associated with the post-implementation stage – ERP system optimization – which begins when the ERP becomes available to the final users, and ends when the system is no longer used [12]. Researchers who have investigated the post-implementation stage agree that the literature on the subject is sparse [5,8,13,14]. The themes studied by these researchers include ERP maintenance activities [4,15,16], which are defined by the maintenance strategies applied [5]; knowledge transfer between the development team and the final users [17]; and knowledge management planning and continuous improvement in ERP implementations [9,14,18,19].

The ERP literature does not make a clear distinction between support, maintenance and evolution activities, which enhances the interest of this particular study. Several authors [8,20] consider that all activities executed in the post-implementation phase are maintenance activities, regardless of the type of initiative (project or support). Hence, certain activities are defined as support by some authors, but are assigned to evolution by others [10]. Empirical research has identified several activities considered to fall under evolution, such as deploying new functionalities, optimizing existing tools, upgrading to a new version and implementing in other sites (subsidiaries) of the organization. Such activities may be perceived as projects according to the definition provided below (see section 2.2). In fact, as we saw, Wenrich and Ahmad [8] mentioned that certain ERP maintenance activities need to be managed as projects in order to be successfully completed. For the purpose of this paper, evolution consists of support activities (a permanent structure) and projects (temporary structures).

The literature also notes that different types of knowledge are critical in implementing ERP systems, notably technical and functional knowledge. Expertise and experience linked to the system's functionalities and configuration and technical knowledge are normally obtained from external resources, while functional knowledge and business process knowledge are found within the organization [4].

These two types of knowledge must be combined during ERP projects if the system is to be correctly adjusted to the organization's business processes [21]. The IT experts own the technical knowledge while the expert users hold the functional knowledge. Furthermore, these two types of knowledge are divergent but must be made to converge [21]. In other words, an ERP application requires functional knowledge to ensure a good alignment with the business needs defined, and it also needs technical knowledge to respect the limitations of the software.

Gable et al. [5] list several types of ERP knowledge such as business processes, ERP configuration, organizational design, organizational culture, IT architecture and infrastructure, project management and its resources. For the purposes of this research, ERP configuration, IT architecture and infrastructure are considered technical knowledge, while the other kinds are all considered functional knowledge.

2.2 Project *management*

Research on project management is constantly changing; this field, which was mainly controlled by professionals in the 1970s and 1980s, has produced rigorous, high-quality research over the last 20 years [22]. Smyth and Morris [23] mention the lack of theory in the field of project management, which is explained by its multidisciplinary nature. A project is defined as "a temporary group activity designed to produce a unique product, service or result" [24]. Managing a project is therefore "the application of knowledge, skills and techniques to execute projects effectively and efficiently" [24]. The focus is, however, slowly changing; the execution of a project (notably with Atkinson's [25] "iron triangle" of time, cost and quality) is giving way to the knowledge transfer (learning) perspective often put forth in recent project management publications [26]. This perspective stipulates that "during the project, knowledge must be transferred, integrated, created, and exploited to create new organizational value" [26, p. S4].

A project consists of different stages, which are often represented by different steps of a project life cycle including a closing phase. The Project Management Institute (PMI) body of knowledge (PMBoK) typically proposes four distinct stages: project initiation, planning and design, execution, and closing [27]. Other authors suggest different terminologies for the life cycle stages of a project [28,29,30].

Lundin and Söderholm [31] present an interesting terminology for the different stages of a project life cycle: action-based entrepreneurialism; fragmentation for commitment-building; planned isolation; and institutionalized termination. This study focuses on the institutionalized termination stage, in which the temporary organization (project) is coupled with the permanent organization (maintenance).

This coupling involves a transfer (or bridge) between the members of the project teams and the organization in order to create a link between the different projects and the organization's operations [31]. In this particular study of ERP evolution, the bridge to be analyzed involves the transfer between ERP project and ERP support team.

2.3 Knowledge transfer and knowledge management

Knowledge is a "dynamic human process of justifying personal belief toward the truth" [32]. Knowledge is dynamic as it develops interactions between individuals [32] and is context-specific (time and place). Several authors have categorized knowledge into two types: explicit and tacit [32,33]. Explicit knowledge may be articulated in formal language and is easy to codify, transfer or store, while tacit knowledge is personal and difficult to codify as it is sculpted in the actions, procedures, routines, values and emotions of the individuals involved.

Knowledge management (KM) is defined as the "process of capturing the collective expertise of the organization from different sources (i.e. databases, paper, people) and utilizing that knowledge base to leverage the organization" [34, p. 298]. Several authors present their perspective of knowledge management and its processes, especially through life cycle stages [34,35]. In this study, we chose to adopt Sedera and Gable's [34] four phases. The first phase – knowledge creation – embodies everything that is linked to the knowledge creation process, either developed through internal resources or obtained externally via specialists. The second phase – knowledge retention – consists in maintaining knowledge in a referential form in order to allow this knowledge to last over time. The third phase – knowledge transfer – implies the use of informal and formal transfer channels to enable the distribution of knowledge within an organization. Finally, the last phase – knowledge application – is the use of the knowledge by one or more individuals who received the knowledge during the transfer.

Knowledge transfer is therefore a subcomponent of knowledge management [34]. Knowledge transfer is only possible with formal and informal mechanisms that integrate, interpret and share knowledge anchored in individuals or groups of individuals [36].

The literature review allowed us to identify four categories of formal transfer mechanisms: (i) personnel movement; (ii) use of tools; (iii) role assignment; and (iv) training. Personnel movement simply consists in transferring an employee to another department or division [37]. It improves the employee's communication abilities and enables a stronger network to be developed within the organization [37]. The use of tools, the second category of mechanisms, involves information technologies, rules, procedures, reports and manuals used by employees in the organization [38]. In the third category, certain mechanisms call on individuals to take on particular roles, such as *knowledge broker* or *power user* [17]. Finally, training allows for the transfer of designated knowledge to one or more specific resources [39].

Ajmal and Koskinen [40] point out that the vast majority of knowledge is not stored in computers or other electronic devices but exists only in individuals' brains. Personal interaction is therefore very important in organizations. Although organizations try to formalize these interactions, many of them are conducted informally. Such interactions between two individuals (one-on-one) or within a group [41], along with social networks [42], are the most common informal mechanisms for transferring knowledge.

Some authors have explored the factors that affect the selection of knowledge transfer mechanisms. For instance, Chai et al. [38] indicate that the choice of the mechanism depends on the nature (tacit or explicit) of the knowledge being transferred, and of the dependence of the knowledge on its context. Jasimuddin [41] asserts that the selection of the transfer mechanism depends on three elements: the status of the actors involved in the transfer; relational aspects; and

the actors' social ties and proximity. Many studies on knowledge transfer exist in the literature, but there are very few on the mechanisms used to transfer knowledge [41,43].

2.4 Summary of the literature review and analysis framework

The literature and practices related to ERPs recognize that a permanent structure is required to address the continuous user needs in an organization. Hence, firms must integrate temporary evolution initiatives while supporting the overall ERP solution. McGinnis and Huang [9] indicate that the success of project teams is based on the knowledge of the current ERP environment, along with the evolution and support activities related to the system. They also mention that to efficiently support users, the ERP support group needs to understand the nature of the decisions related to the ERP evolution initiative, and the reasons explaining these decisions. The adoption of a project management mode to conduct certain evolution initiatives makes knowledge management more difficult, as the project team is usually dissolved when the project ends [44].

The existing literature on knowledge transfer in ERP projects mainly focuses on the implementation and posits very specific implementation stages [45] that are not transferable to the post-implementation stage. As such, for ERP project teams, a more general approach, which includes conceptualization, development, testing and deployment (as illustrated in Fig. 1) is more appropriate.

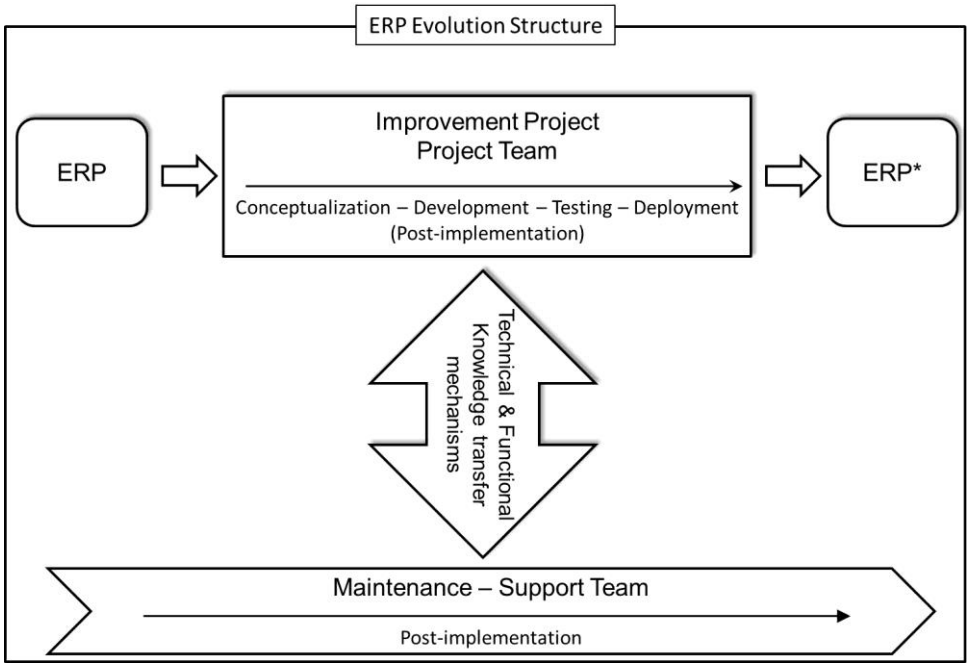


Fig. 1. Analysis framework

The analysis framework (Fig. 1) presents both the support team and the project teams that are involved in developing the ERP. The study looks into the mechanisms for transfer between these two groups. The challenge of integrating management activities related to ERP systems exists primarily at the knowledge management level. On one hand, there is a need for current knowledge to be transferred to projects. In return, knowledge must be transferred by project managers and their teams to the support group so they can continuously support the users.

With both functional and technical knowledge being crucial in an ERP context [19], and with knowledge management being a critical process for the life expectancy of the ERP, mechanisms are required to transfer the necessary knowledge [9]; these mechanisms are the focus of this study.

3. Methodological approach

A case study approach was chosen for this study as it enables researchers to retain the holistic, meaningful characteristics of real-life events [46]. As mentioned above, there is relatively little literature on knowledge transfer mechanisms between project teams and support teams in IT, which justifies the methodological approach chosen [47]. Furthermore, the distinction between the phenomenon and the context is not clearly delimited [47], which also calls for a case study approach. Since the unit of analysis is the organization, the case study approach is appropriate to collect the data for this level of analysis.

A five-step methodology was followed. First, organizations and respondents were selected. Sampling was done at the organizational level and also at the respondent level. Selection criteria were used to ensure the quality of the information provided and validate the subsequent research results [48].

Second, data collection was conducted via semi-structured interviews [49] and document analysis to ensure triangulation of the data [46]. Semi-structured interviews allow respondents to talk, in their own language, about a subject defined at the start [49]. The interviewer orients respondents with reformulated questions to ensure that all the topics of the interview are covered. The interviewer also observes and actively listens when conducting the interview as he or she must not only take into account what the respondents say but also how they say it and what they feel when saying it [50]. The number of interviews was established according to semantic saturation and theoretical data saturation [49]. Semantic saturation is obtained when the additional interviews conducted do not add any new descriptors to prior interviews [49]. Theoretical data saturation is achieved when each descriptor in an interview is placed within a theory or a model, obtained either by the author or by the literature [49]. All interviews were recorded and transcribed.

In the data analysis step, a narrative and graphical representations of the process were created, and a mixed interpretation strategy was used to analyze each case individually [51]. Following the individual analysis, cross-case data analysis was conducted to identify similarities and differences in the process and to develop a process model that will help understand the knowledge transfer process applied by the organizations in question [52].

Finally, a panel was conducted with key representatives of each company involved to validate and understand the results of the research [52].

3.1 Profile of the organizations and respondents

Three organizations from the public/para-public sector were chosen to participate to this study. With over 30,000 employees, Organization A, a large municipal agency, implemented its ERP in 2006. Since 2010, three initiatives have been developed to add advanced procurement functionalities, a human resource module and a payroll component (all from the same enterprise application). Organization B, which employs 9,000 people, is active in the field of transportation and has gradually implemented several ERP modules (all from the same enterprise application) over the last 13 years. Finally, Organization C, with 22,000 employees, is a utility. It began implementing an ERP in 1999 and has since continued gradually to include new modules in several of its operational divisions. Its evolution strategy involved software from different enterprise applications, as some specialized functionalities were not available from the original one.

At each of these organizations, interviews were conducted with three different employee profiles (IT support managers, IT project managers and ERP internal customers). The interviews lasted approximately 75 minutes. A total of 12 interviews were conducted in the three organizations (four in each).

4. Findings

Following the research design, comparison analyses were conducted between the selected organizations. The findings are presented in three blocks, related to the main research questions (see section 1): ERP evolution structure (section 4.1); knowledge transfer mechanisms (section 4.2); and other aspects that influence knowledge transfer (section 4.3).

4.1 ERP evolution structure

The ERP evolution structures of the three organizations were compared and analyzed with respect to two specific organizational aspects: centralization and localization of resources.

Centralization

With regard to centralization, the strategies of organizations A and B have involved pooling resources in a single team to cover both ERP projects and ERP support (see Fig. 2). Both organizations identified the same advantages, as this structure has improved their activities, particularly in terms of knowledge transfer. As the IT manager at Organization A said, "One, it's a proven concept in our organization, and two, splitting resources into two groups would raise costs with additional resources required, and less efficiency, I am convinced." The IT manager in Organization B mentioned the importance of continuity: "This hybrid zone where two teams back up the knowledge is an advantage, as if one leaves for retirement or for another reason, a team is able to compensate, and this has happened in both ways in the past." In Organization C, a different strategy was applied: the ERP project teams are separate from the ERP support team (see Fig. 2). People at Organization C consider that this structure improves the specialization of the resources and increases the employee retention level. The impact of this structure involves information duplication and the creation of more knowledge transfer processes to compensate for the resources' lack of proximity. The analysis of the structural integration of the project and the support resources in these three organizations reveals this element to be an important factor in the ERP knowledge transfer as it facilitates the exchange of information among the members of the group.

Localization of resources

Although organizations A and B have both implemented centralized support groups, the localization of their employees is quite different (see Fig. 2). The results also show the criticality of distinguishing technical resources from functional resources, and therefore technical knowledge from functional knowledge. The integration of these two types of knowledge is critical to the success of an ERP implementation, as noted by Baskerville et al. [21]. For Organization A, the technical and functional resources are located in an ERP expertise center (part of the IT department). The pooling of all resources in one place allows knowledge sharing among multiple functional experts, which is not completely the case for Organization B. The technical resources in Organization B are grouped in an ERP expertise center (part of the IT department), while functional experts are located in each of the business units. In fact, for certain business units functional areas of Organization B, both project and support knowledge are covered by only one person, who covers IT and operational responsibilities. In this case, the availability of the employee for knowledge transfer activities to the other functional and technical resources is very limited, and the organization faces risky knowledge management issues, which will be discussed in section 4.2.

The data gathered during the interviews showed that Organization B has chosen this set up to ensure better interactions and collaboration between IT support and internal customers, while Organization A aims for better integration between the different ERP modules. The head of the support team from Organization A explains: "It is meant to be integrated (ERP). It is like living in a condominium: although you live in separate apartments, you have to run it as one… Decisions from a particular domain have an impact on others…"

Our findings, summarized in Table 1, are coherent with the centralization and structural integration dimensions presented by Chen and Huang [53]. Gallagher et al. [19] also described this dilemma of having to choose between a centralized, a decentralized or a hybrid structure for functional resources after an ERP implementation. Another

implication of localizing the functional resources in the business units is related to the distribution of ERP knowledge among the functional experts. In sum, it demonstrates that certain structural configurations may complicate the transfer of knowledge. For instance, according to our findings, the number of interactions between groups and their physical proximity has an impact on the knowledge transfer process.

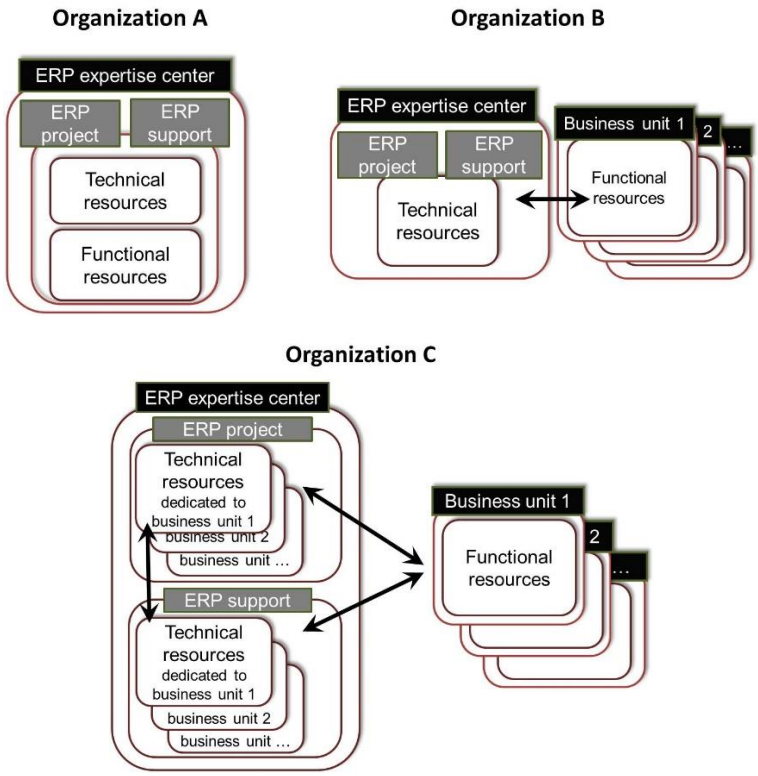
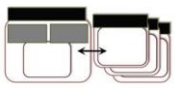
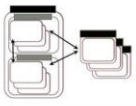


Fig. 2. ERP evolution structures identified in the three organizations (A, B and C)

Table 1. Comparison of the evolution structures

	Organization A	Organization B	Organization C
			
ERP Evolution Structure	Centralized	Hybrid	Hybrid
Resource Integration	Technical and functional resources integrated	Technical and functional resources physically separated	Technical and functional resources physically separated
IT Resource Assignment	Shared between project & support	Shared between project & support	Split between project & support

4.2 Knowledge transfer mechanisms

Following our analysis framework, the use of knowledge transfer mechanisms was compared by type of knowledge (technical and functional) and orientation (from project to support and vice versa). The results are discussed and summarized in Table 2.

Formal transfer mechanisms used for functional knowledge

As shown in Table 2, our findings show a similar pattern in the use of transfer mechanisms for functional knowledge. All organizations exploit the movement of employees as their primary mechanism of functional knowledge transfer (see Table 2). The richness and complexity of the contextual information is the main reason for the use of this strategy, which takes three different forms:

- Complete assignment, where the support resources are assigned full-time to the project;
- Shared assignment, where resources work part-time for both the support teams and the project teams; and
- Hand-offs, where the knowledge transfer is fully conducted when the project goes live.

The IT manager of Organization A gives an example of this complexity: "It's easy for a programmer or a configurator to read the programming lines to understand what the program does. But what is more difficult is to get the background information on why the program is what it is. When change requests arrive, they are very rarely related to a change in the program. It is a user need that is requested. Therefore, you have to understand what is in place, the link with the business need, and how you can make it happen... And it is all of that knowledge, and your understanding of the business needs and business solutions that must be disclosed to the support resources."

Training is another mechanism used by organizations B and C. As explained in section 4.3, the ERP integrator's responsibilities are very important in ERP projects. Therefore, the knowledge transfer in the implementation phase is reduced, and a training mechanism at the end of a project compensates for that deficiency.

Table 2. Main formal mechanisms according to knowledge and transfer types

Type of Knowledge	Transfer Type	Organization A	Organization B	Organization C
Technical	*Project* ***to*** *Support*	• Documentation	• Documentation	• Documentation
	Support ***to*** *Project*	• Not applicable	• Not applicable	• Not applicable
Functional	*Project* ***to*** *Support*	• Staff movement • One -on-one Interaction	• Staff movement • Training provided by the consultant	• Staff movement • Training provided by the consultant
	Support ***to*** *Project*	• Staff movement	• Staff movement	• Staff movement

Formal transfer mechanisms used for technical knowledge

All three organizations use tools, more specifically documents, as their prime mechanism for capturing and transferring technical knowledge. The centralization of the IT resources in organizations A and B also allow the movement of employees to complement the knowledge transfer. Organization C's current evolution structure seems to be an obstacle

for the personnel movement mechanism. Some of the stakeholders interviewed complained about this gap in their knowledge transfer process; for example, a system analyst at Organization C commented: "The support resources lack some of the knowledge acquired by the project team and remain dependent on the project team long after the project is completed." The relationship between the two groups seemed tense. On the one hand, the support team had the impression that the project teams were delivering prematurely, without a proper knowledge transfer, in order to get rid of their responsibility for fixing the remaining anomalies. On the other hand, the project teams complain of being bombarded by requests from the support team for tasks they were not responsible for. Furthermore, this context has a negative impact on the relations between the IT department and its internal clients, who have to deal with two separate entities depending on whether the functionality in question is still the project team's responsibility or has been transferred to the support team. As an IT manager from Organization C reported: "Having two sources of support duplicates information and increases the risk of knowledge loss." In addition, our results show that role assignment mechanisms are not used to transfer technical knowledge; this mechanism is mainly used for knowledge transfer between the IT organization and the internal customer.

Informal transfer mechanisms

In the three organizations analyzed, the two informal mechanisms used, one-on-one interactions and social networks, are complementary, since interactions are mostly conducted within the individuals' social network, as can be seen by the following quotation from a team leader in Organization A: "When we are in production mode and our friend or colleague is in project mode, as soon as there is a major change, hey, we raise our hand and we tell him."

Other mechanisms are also used to complement the movement of employees. For instance, organizations A and B use one-on-one interactions, but in different ways. In Organization A, the functional resources distributed between projects and support activities organize regular meetings to discuss the different activities for which they are responsible. In Organization B, the project methodology includes multiple quality assurance activities in which the support team members are invited to participate.

To complement formal mechanisms put in place by the organization, organizations A and B use informal mechanisms to share more information and to make knowledge transfer more efficient. It is another story at Organization C, which uses informal mechanisms to compensate for the inefficiencies of its formal mechanisms. As one of its business managers put it: "it's ad hoc, really… you've got a problem, well, come and see me. It's always you've got a problem, come and see me…so you really learn from trial and error… yes, trial and error." Comments gathered from the respondents in Organization C emphasized the importance of the social networks of the employees in vital positions for the evolution of the ERP. For example, the head of the accounting system worked for six years in the IT department and three years as a business analyst before obtaining his current position. His network serves him well as he is now the intermediary between the IT department and his business unit. As such, inter-department communications are more efficient when employees communicate with people in their former departments [37]. In Organization C, the efficiency of knowledge transfers clearly depends on the social networks in place. The loss of one or more employees could have terrible consequences for knowledge transfer

Relational aspects may not be as critical for organizations A and B, but they are important for the knowledge transfer process in these organizations too. The relationship between the source (who shares the knowledge) and the recipient (who receives the knowledge) has a great influence on knowledge transfers in an organization [54]. According to our findings, this relationship has a greater influence on knowledge transfer when informal mechanisms are used, as compared to formal mechanisms. A resource will certainly be more inclined to share knowledge with a recipient with whom he or she has a good relationship. However, a formal mechanism can offset the lack of motivation to share knowledge if a weaker relationship exists.

In sum, the analysis of organizations A and B basically shows that they are in line with the transfer mechanisms presented in the literature. They mainly use formal transfer mechanisms and use informal individual mechanisms (e.g., personal contacts and networks, ad hoc meetings, etc.) only in exceptional non-recurring situations. This finding is coherent with Boh's [36] conclusions that individual informal mechanisms should be used only for unique situations,

while formal mechanisms should be used for recurring information. However, the formal transfer mechanisms are not sufficient in Organization C, as there is little personnel movement to spread technical knowledge and no other formal mechanism to compensate for that lack. However, given that informal mechanisms are widely used, Organization C is still able to run the system and execute change requests on the ERP.

4.3 The role of ERP integrator in the knowledge transfer process

The last objective of this research was to identify other aspects that may influence knowledge transfer in a post-implementation ERP context. Only one aspect was identified in this research: the ERP integrator's role. In most ERP projects, an integrator (external consultant) may participate in the project in different ways. Specific specialized knowledge of an ERP system may be developed by an internal team, but often comes first from the external consultant. Knowledge transfer is therefore critical to the long-term viability of the system.

In Organization A, the integrators' role was moderate, mostly during ERP support activities where they acted as trainers and transferred their knowledge. In Organization B, the inclusion of integrators was low; their services were mainly provided during the project with a mixed team of internal and external resources. Knowledge transfer to the support team was conducted at the end of the project. Finally, in Organization C, the integrator was highly involved in the ERP activities and was even responsible for some projects within the organization. The impact of the different integrator inclusion strategies is important for the knowledge being shared by the project stakeholders. In Organization C, significant efforts must be deployed to retain knowledge about the project, but the transfer mechanisms are not always used appropriately to capture all of the critical information. In Organization B, minimal efforts are made to retain the information from the integrators, but substantial work is done to transfer the knowledge from the project team to the support staff.

5. Contribution and future research

The results of this study should be interpreted in light of certain limitations. First, although a qualitative approach proved to be efficient to address the study's research questions, it limited the number of organizations included in the study and prevents us from making any broad generalizations. Second, although the organizations are from different areas of activity, they are all large public-sector organizations located in the same geographical region. This limitation prevented the study of cultural aspects related to sectorial and regional factors. Third, although the number of respondents was adequate, 12 for the three organizations, a larger number would probably have permitted further analysis and provided additional insights.

However, these limitations are offset to some extent by the research design and by the detailed qualitative analysis, which enabled the study to achieve the research objectives and provided a preliminary understanding of the knowledge transfer process between ERP projects and IT support. It generated new insights into the context of ERP evolution and shed some light on the role of the ERP evolution structure and the use of knowledge transfer mechanisms based on different types of knowledge (functional and technical). As mentioned earlier, our research focuses only on public-sector organizations, leaving room for further exploration in the private sector. An interesting potential future research initiative would be to use a quantitative approach with a larger number of respondents in order to generalize the results obtained in this study.

For business managers, our paper confirms the importance of establishing a proper ERP evolution structure to facilitate knowledge transfer within the organization. It also shows the necessity of relying on both formal and informal knowledge transfer mechanisms to cover recurring and ad hoc exchanges between the different stakeholders responsible for the evolution of an ERP.

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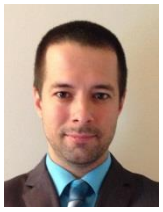

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