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Mission

The mission of the IJISPM - International Journal of Information Systems and Project Management - is the dissemination of new scientific knowledge on information systems management and project management, encouraging further progress in theory and practice.

The IJISPM publishes leading scholarly and practical research articles that aim to advance the information systems management and project management fields of knowledge, featuring state-of-the-art research, theories, approaches, methodologies, techniques, and applications.

The journal serves academics, practitioners, chief information officers, project managers, consultants, and senior executives of organizations, establishing an effective communication channel between them.

Description

The IJISPM offers wide ranging and comprehensive coverage of all aspects of information systems management and project management, seeking contributions that build on established lines of work, as well as on new research streams. Particularly seeking multidisciplinary and interdisciplinary perspectives, and focusing on currently emerging issues, the journal welcomes both pure and applied research that impacts theory and practice.

The journal content provides relevant information to researchers, practitioners, and organizations, and includes original qualitative or qualitative articles, as well as purely conceptual or theoretical articles. Due to the integrative and interdisciplinary nature of information systems and project management, the journal may publish articles from a number of other disciplines, including strategic management, psychology, organizational behavior, sociology, economics, among others. Articles are selected for publication based on their relevance, rigor, clarity, novelty, and contribution to further development and research.

Authors are encouraged to submit articles on information technology governance, information systems planning, information systems design and implementation, information technology outsourcing, project environment, project management life-cycle, project management knowledge areas, criteria and factors for success, social aspects, chief information officer role, chief information officer skills, project manager role, project manager skills, among others.

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- information systems management tools
- management of complex projects
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- project management life-cycle
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- project execution
- project control and monitoring
- project closing
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- project manager role
- project manager skills
- portfolio management
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- tools and techniques
- project evaluation
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Editorial

It is our great pleasure to bring you the sixth number of IJISPM - International Journal of Information Systems and Project Management. The mission of the IJISPM is the dissemination of new scientific knowledge on information systems management and project management, encouraging further progress in theory and practice.

In this issue, readers will find important contributions on information systems project success, project management office roles, and on business benefits of enterprise information systems.

The traditional approach to assess information system (IS) project success is adherence to planning (ATP) – meeting budget, schedule, and requirements targets. Today, scholars agree that ATP is insufficient to adequately assess IS project success, but an agreed-on set of success criteria is still missing. Many works on this topic are based on theoretical considerations rather than empirical inquiries. In their article "Ladder to success – eliciting project managers' perceptions of IS project success criteria", Oleg Pankratz and Dirk Basten analyze practitioners' subjective perspectives by investigating what criteria IS project managers consider relevant for IS project success assessment. The authors interviewed eleven experienced project managers in Germany, applying Repertory Grid and Laddering to minimize potential biases. The results yield eight success criteria, indicating that criteria like process efficiency and stakeholder satisfaction must be considered in addition to ATP. Scholars can use the findings to apply the identified success criteria in future studies. Practitioners gain insights into the expert perspective on project success and might rethink the way of assessing success in their projects.

As Federica Pansini, Mariya Terzieva and Vincenzo Morabitos state in their article "The path towards discovering PMO: an exploratory analysis of the Italian banking sector", the Project Management Office (PMO) provides companies with help to innovate, reaching competitive advantage and growth in the long run, ceteris paribus, and attempts to reduce uncertainty. Even though PMO is a more consolidated practice in some countries, the phenomenon has lately been introduced in Italy, and it is still evolving. Not all organizations and not all individuals clearly understand the potential of PMO, and its role is often limited to simple Project Management in its strict meaning, while areas for improvement are many and varied. In the article is analyzed the status of PMO through a survey conducted inside the Italian banking sector, trying to frame the role of PMO, throwing light on its importance for a company as a whole, and not just for a single project.

Organizations are increasingly implementing Enterprise Information Systems (EIS), and Enterprise Resource Planning (ERP) systems in particular. Despite the notable studies on the advantages of an EIS, many organizations are not satisfied with the benefits or advantages gained. At the same time, it is assumed that such systems with increasing innovations and technological enhancements would generate abundant business advantages, if organizations exploited these opportunities. The third article of this issue, "Developing business advantages from the technological possibilities of enterprise information systems", is authored by Luay Ahmad Anaya. The investigation in this article drew on the sociomateriality perspective, using imbrication notion, and focused on a telecomm case study to examine how organizations can exploit the technological possibilities of an EIS to create business benefits. The study findings suggest that business benefits can be achieved when the EIS as a technical system is interwoven with the organizational work in which both dynamically change in practice (not from the technical features of the system), when the system provides interesting and beneficial technological possibilities that attract organizations, and when the firm has the organizational capabilities to translate these possibilities into real business benefits.

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We would like to take this opportunity to express our gratitude to the distinguished members of the Editorial Board, for their commitment and for sharing their knowledge and experience in supporting the IJISPM.

Finally, we would like to express our gratitude to all the authors who submitted their work, for their insightful visions and valuable contributions.

We hope that you, the readers, find the International Journal of Information Systems and Project Management an interesting and valuable source of information for your continued work.

The Editor-in-Chief,

João Varajão

University of Minho

Portugal

João Varajão is currently professor of information systems and project management at the *University of Minho* and a visiting professor at the *University of Porto Business School*. He is also a researcher of the *Centro Algoritmi* at the *University of Minho*. Born and raised in Portugal, he attended the *University of Minho*, earning his Undergraduate (1995), Masters (1997) and Doctorate (2003) degrees in Technologies and Information Systems. In 2012, he received his Habilitation degree from the *University of Trás-os-Montes e Alto Douro*. His current main research interests are in Information Systems Management and Project Management. Before joining academia, he worked as an IT/IS consultant, project manager, information systems analyst and software developer, for private companies and public institutions. He has supervised more than 50 Masters and Doctoral dissertations in the Information Systems field. He has published over 250 works, including refereed publications, authored books, edited books, as well as book chapters and communications at international conferences. He serves as editor-in-chief, associate editor and member of the editorial board for international journals and has served in numerous committees of international conferences and workshops. He is co-founder of CENTERIS – Conference on ENTERprise Information Systems and of ProjMAN – International Conference on Project MANagement.

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Ladder to success – eliciting project managers' perceptions of IS project success criteria

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Ladder to success – eliciting project managers' perceptions of IS project success criteria

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Abstract:
The traditional approach to assess information system (IS) project success is adherence to planning (ATP) – meeting budget, schedule, and requirements targets. Today, scholars agree that ATP is insufficient to adequately assess IS project success, but an agreed-on set of success criteria is still missing. Many works on this topic are based on theoretical considerations rather than empirical inquiries. We analyze practitioners' subjective perspectives by investigating what criteria IS project managers consider relevant for IS project success assessment. We interview eleven experienced project managers in Germany, applying Repertory Grid and Laddering to minimize potential biases. Our results yield eight success criteria, indicating that criteria like process efficiency and stakeholder satisfaction must be considered in addition to ATP. Scholars can use our findings to apply the identified success criteria in future studies. Practitioners gain insights into the expert perspective on project success and might rethink the way of assessing success in their projects.

Keywords:
information systems; project success criteria; project management; Repertory Grid; laddering.

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1. Introduction

The assessment of information system (IS) project success has a long research tradition (e.g., [1–3]). IS project success is typically assessed by evaluating a project's adherence to planning (ATP), that is, its adherence to budget, adherence to schedule, and conformance with specified requirements [1, 4–6], to measure IS project success in success reports (e.g., [7–9]), and to be used as dependent variable in empirical studies [10–12]. The ATP criteria are widely applied as they are easy to measure and considered to be objective [13, 14].

However, many authors strongly question the sufficiency of ATP alone to adequately measure IS project success (e.g., [1, 4, 5, 15, 16]). Whereas there is agreement that ATP is adequate to assess development process success, its usage to evaluate overall project success is criticized as ATP criteria only cover a limited, that is, short-term perspective [1, 4]. In line with this criticism, scholars propose and argue for alternative or at least additional criteria like process efficiency [6, 17], satisfaction of various stakeholder groups [17, 18], and benefits for strategic company goals [19].

Despite a substantial body of research and many emerged criteria suggestions, there is no agreed-on set of IS project success criteria among researchers and practitioners. One reason for this lack of agreement is said to be that success means different things to different people – it is a matter of perspective (e.g., [3]). Another reason might be that the proposed criteria are in many cases derived from theoretical considerations (e.g., [1, 2, 15, 17, 20, 21]) rather than from analyzing practitioners' subjective perspectives. Whereas theoretical considerations are essential, a substantiated approach to derive success criteria should also incorporate the knowledge of expert practitioners. In this paper, we aim to analyze practitioners' subjective perspectives and focus on one particular stakeholder group, IS project managers, as they have deep insights into projects and are directly involved in success evaluation. Considering that the traditional success assessment using ATP emerged from a project management perspective, we investigate whether project managers themselves consider this approach sufficient to measure success; if not, other stakeholders are likely not to do so as well. We thus formulate our research question as follows: *What criteria do IS project managers consider relevant for IS project success assessment?*

We conduct an empirical qualitative study among experienced IS project managers. Simply asking practitioners what success criteria they consider relevant (e.g., by questionnaires or interviews) bears the risk of respondents being influenced by current success evaluation regulations in their organizations. In this case, they are likely to refer to the status quo instead of their desired state. Therefore, we apply a knowledge-eliciting technique called Repertory Grid (henceforth: RepGrid; cf. [22]) and its extension, Laddering [23]. RepGrid has been shown to elicit personal knowledge while minimizing researcher bias, and Laddering allows for investigating aspects in question without asking for them directly. The latter advantage is important to counteract a possible status-quo bias mentioned above.

We contribute to research and practice by providing in-depth insights into success perceptions of IS project managers which might concur, contradict, or complement existing considerations on IS project success criteria. Researchers can use our results by applying the identified success criteria in future studies (e.g., investigating IS project success rates). Practitioners gain insights into the expert perspective and might rethink their way of assessing IS project success. We provide a new perspective on this widely explored research domain by applying suitable knowledge-eliciting techniques in an innovative manner.

The paper proceeds as follows. In section 2, we provide the theoretical background on IS project success measurement and fundamentals of RepGrid and Laddering. Subsequently, we use section 3 to describe our research approach explaining the design of RepGrid and Laddering in our context. Afterwards, we present (section 4) and discuss (section 5) our results, substantiated with quotes from our interviews. We conclude with limitations and implications for future research and project management in section 6.

2. Theoretical background

2.1 IS project success

A project in general is "a temporary endeavor undertaken to create a unique product, service, or result" [24, p. 5]. Information systems "can be defined technically as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization" [25, p. 46]. An IS project can thus be seen as a temporary and unique endeavor with the objective to develop, extend, or adapt an IS.

Like the difference between an IS and a project in which an IS is developed, a conceptual distinction needs to be made at this point between IS success and IS project success. The former concept refers to the success of an IS as a product, the latter relates to the success of the unique and temporary endeavor to create an IS. Probably the most noted framework for IS success is the model suggested by DeLone and McLean [26]. The updated version of this framework [27] includes six interdependent criteria that constitute IS success: information quality; system quality; service quality; use/intention to use; user satisfaction; and net benefits. Assessing product success might be part of or overlap with assessing project success – in fact, many researchers consider the (IS) project success concept to consist of the two major components process and product success [17, 28–32]. Thus, an equalization of IS success and IS project success from the outset would be fundamentally inadequate. First, IS success does not account for the success of the development *process*, which is essential in any IS project. Second and assuming that product success *is* the second component of project success, simply adopting IS success criteria as part of IS project success is questionable since potential deviations are excluded from consideration. For example, since the perspective on the matter might differ (product as a whole *vs.* product as part of a project), success assessments might be undertaken at different points in time. Accordingly, in one of his works, DeLone himself applies a set of nine IS *project* success criteria [33], only four of which correspond to criteria from the updated DeLone and McLean model. Yet other researchers focusing on IS project success do not refer to this model at all [30, 34, 35]. Overall, given this conceptual distinction between IS success and IS project success, we focus on the challenge of assessing the latter in this paper.

As (IS) projects are typically defined with regard to cost, schedule, and requirements [36], their success is traditionally assessed in terms of ATP, that is, adherence to budget, adherence to schedule, and conformance with specified requirements [1, 17]. While agreement exists concerning adherence to budget and schedule, there seems to be disunity regarding conformance to requirements. First, there is a variety of denotations for it. Examples include requirements [30, 34], quality [1], performance [15], specification [35], and scope [4]. Second, some authors explicitly differentiate between meeting functional and non-functional requirements (e.g., Agarwal and Rathod [4] differentiate between functionality and quality as components of scope) while others do not (e.g., [1]). Functional requirements represent features of a developed product whereas non-functional requirements are quality requirements like usability or performance [13].

Furthermore, numerous authors strongly question the sufficiency of ATP as sole criterion to measure IS project success (e.g., [1, 4, 5, 15, 16]) for the following reasons. First, ATP does not account for long-term customer benefits [1, 4]. Projects initiated for profit reasons should be assessed according to related criteria [16]. Second, estimates underlying project plans are often inaccurate [37] due to the lack of methods to adequately estimate budget and schedule [4]. Third, project plans are often biased due to negotiations or political actions [38]. Finally, project success is seen as matter of perspective [3], and ATP probably does not suit the perspectives of all stakeholders. As a consequence, a variety of further criteria have been proposed over the past decades. Examples include process efficiency (e.g., [6, 17]) and stakeholder satisfaction (e.g., [17, 18]). Overall, while there is agreement on the multi-dimensionality of IS project success (e.g., [4, 20]) and on the importance of ATP as part of it, researchers still lack mutual understanding of the complete picture of IS project success. This incomplete puzzle of IS project success criteria is illustrated in Fig. 1.

Regarding process efficiency as one of the suggested further criteria, it is worth noticing that this criterion has at times been equated with ATP [16, 20, 39]. We emphasize that this equalization is inadequate. For instance, a project can be performed highly efficiently but still not meet its plans if these were unrealistic in the first place. As pointed out above,

scholars argue that effort estimates underlying project plans are often incorrect [37] due to a lack of reliable estimation methods [4]. Additionally, empirical findings confirm the difference between ATP and process efficiency [40].

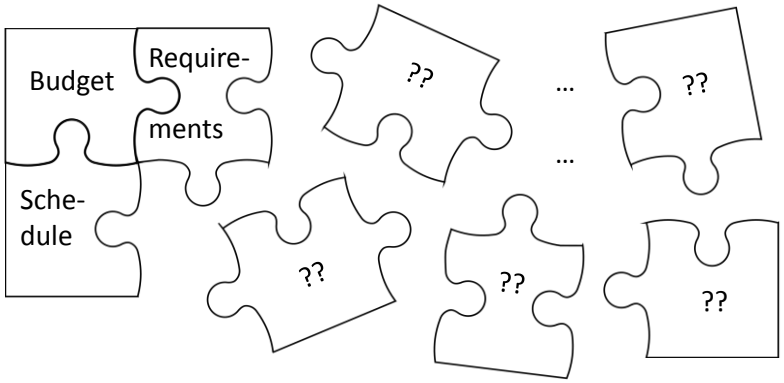

Fig. 1. Incomplete puzzle of IS project success criteria

The satisfaction of various stakeholders is another commonly proposed success criterion. Common stakeholder groups include the customer (as organization), the end-users, the contractor (as organization), and the project team [2, 13]. Here again, no agreement regarding the role of stakeholder satisfaction prevails in research. For instance, Nelson [30] equals the satisfaction of all stakeholders to project success, whereas Baccarini [17] considers the satisfaction of stakeholder groups to be among other sub-criteria of project success. Yet other researchers place particular emphasis on the importance of customer satisfaction [41, 42].

Another interesting aspect refers to the point in time at which success of a project is assessed [3, 17, 43]. Whereas assessments directly after project completion are required for managerial implications like evaluation of the project manager, other criteria like strategic benefits for the contracting organization [19] and end-user system acceptance [44] are only evaluable in later stages of the information system's life cycle. Therefore, considerations whether or not to include such criteria in project success assessment depend not only on the criteria's content but also on the point in time of the assessment.

We contribute to existing research and shed light on the described puzzle of IS project success by taking an innovative empirical perspective. Using RepGrid and Laddering, we investigate IS project managers' perceptions of IS project success criteria and hope to gain valuable insights while minimizing researcher and status-quo biases.

2.2 Repertory grid technique and laddering

RepGrid is an interview technique based on the personal construct theory (PCT), both developed by the clinical psychologist George Kelly [45]. Kelly claims that all people have a mental model of reality and use it to interpret events and make decisions. This subjective model of an objective reality consists of elements and constructs. Originated in the clinical setting, elements in Kelly's PCT were people; however, depending on study purpose and context, elements can be any objects of people's thoughts like items, functional departments, or IS projects [46]. Constructs are elements' qualities which people use to differentiate among elements, for example human qualities like kindness, physical attributes like color, or evaluating qualities like usefulness [46]. Furthermore, constructs possess several important qualities themselves [47]. First, they are bipolar in nature – people "never affirm anything without simultaneously denying something" [47]. Therefore, constructs have an emergent and a contrast pole, for instance tall – small (people); innovative – outdated (technology); innovative – established (technology). As the two latter examples demonstrate, the

contrast pole is essential for capturing the whole meaning of a construct. Second, constructs are hierarchically related to each other – the personal construct system of each individual is a unique hierarchical structure of super- and subordinate constructs. Third, Fransella et al. [47] stress that constructs are not to be equated with their verbal labels. Constructs exist in people's minds whereas their labels are means to describe and communicate constructs. This distinction is crucial as different people often put the same labels on different things and vice versa. In fact, Shaw and Gaines [48] distinguish between four possible semantic constellations: consensus (same terminology for same concepts); correspondence (different terminology for same concepts); conflict (same terminology for different concepts); and contrast (different terminology for different concepts). Being aware of potential semantic ambiguities and addressing them in an adequate way (e.g., by Laddering as described below) is crucial for the validity of a qualitative study. A comprehensive description of PCT can be found in Kelly [45] or Fransella et al. [47].

RepGrid was developed by Kelly [45] to explore people's personal construct systems. In qualitative studies like ours, it consists of comparing elements and identifying similarities and/or differences between them to elicit constructs. To this end, several design alternatives exist. Applying the method of triads for instance, the researcher selects three elements and asks the respondent to think of a characteristic in which two of them are similar but different from the third. With dyads, two elements are chosen for comparison and the respondent is asked to identify a difference between them. Whereas Kelly's original method of triads was based on his theory how constructs are first formed, Fransella et al. [47] argue that there is no reason to use three elements when eliciting constructs that are already established in one's personal construct system. In fact, triads are more cognitively exhausting and should be used with care in complex domains. An extensive overview of numerous design alternatives of RepGrid and according applications is given in Tan and Hunter [22].

One of RepGrid's advantages is that it explores how participants construct their model of reality while other survey instruments mostly seek to confirm what the researcher assumes [49]. Thus, RepGrid focuses on the respondents and their experience, thus minimizing researcher bias. RepGrid has been widely and effectively applied in qualitative studies in IS research. Amongst others, Tan and Gallupe [50] used it for examining business and IT thinking; Napier et al. [51] applied it to explore the skills of successful IT project managers; and Siau et al. [52] took advantage of RepGrid to investigate characteristics of team members.

Laddering is an extension to RepGrid, developed by Hinkle [53] to account for the hierarchical relations between personal constructs. In the process of Laddering, the interviewer asks additional questions regarding each identified construct and can move in different directions [23]:

- Downwards, eliciting explanations and members of classes (by asking questions like "How could you tell that something was X?" or "Can you give me examples of X?");
- Upwards, eliciting information about higher-level constructs ("Why would you prefer X?");
- Sideways, eliciting further constructs at the same hierarchical level ("Can you think of more aspects like X?").

Downwards Laddering counteracts potential semantic ambiguities by clarifying meaning whereas Upwards Laddering uncovers underlying hierarchical relations between constructs and quickly leads to top-level constructs, which represent personal core beliefs of the respondents. Both Downwards and Upwards Laddering were crucial in our inquiry. Sideways Laddering can be applied to help the interviewees identify further constructs; it was not used in our study as our respondents had no difficulty in thinking of new constructs.

3. Research approach

We interviewed eleven experienced IS project managers, two females and nine males. Our informants worked in IT service departments of three large German organizations in the industries logistics, IT consulting, and insurance. Interviews, conducted in 2008 and 2009, were recorded and transcribed afterwards. All respondents worked on application development projects on behalf of a contractor, with an average of 14.3 years in IS development. Table 1 lists our respondents (all names have been altered to ensure confidentiality).

Table 1. Respondents' demographics

Name	Job title	Industry	Experience in IS development (years)	Participated in IS projects (quantity)
Frank	IT project manager	Logistics	22	20
Thomas	IT project manager	Logistics	20	30
Stephen	Senior project manager	Logistics	15	50
Michael	IT project manager	Logistics	15	30
Torben	Senior project manager	Logistics	18	75
Stacie	IT project manager	Logistics	5.5	8
Bernd	Manager	IT Consulting	10	15
Katarina	IT project manager	Logistics	10.5	40
Christian	Head of application development	Insurance	20	75
Marcus	Manager	IT Consulting	11.5	15
David	Senior Manager	IT Consulting	11	20

We investigated the subjective views of our respondents on relevant IS project success criteria. As mentioned earlier, asking about the success criteria directly bears the risk of project managers being biased by the current success assessment practice in their organization. To counteract this bias, we chose an indirect approach by starting with project success factors and deriving success criteria in the process. Whereas success criteria are measures by which success is judged, success factors are aspects contributing to project success [54]. Since Upwards Laddering leads to personal core beliefs at top-construct levels, we are confident that our respondents revealed their subjective views rather than prescribed answers about status quo when arriving at the top levels (criteria) of project success. The process of applying RepGrid and Laddering to derive success criteria was as follows (cf. also Fig. 2).

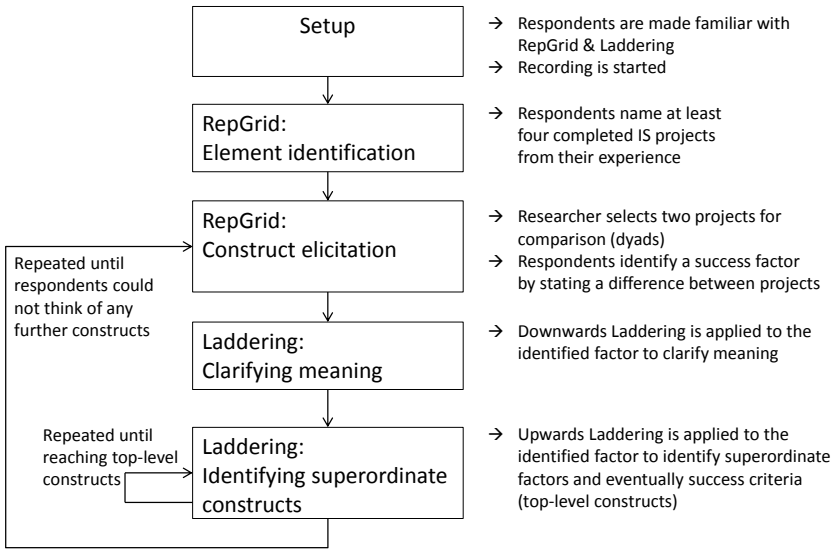

Fig. 2. Interview methodology

Each project manager named at least four of her/his completed IS projects that contained all typical software-developing phases and were commissioned by a customer. We chose the method of dyads (two projects) for project

comparison as we consider project management to be a complex and cognitively challenging domain. We asked our respondents to sort all identified projects by their success and chose the most and the least successful projects for comparison first. This allowed us an 'easy' start with many constructs for the first pair of projects. We identified project success *factors* by asking: "Projects can differ in various factors which contribute to project success, for example, human, organizational, technical, methodical factors, general conditions etc. In terms of what such factor do these two projects differ?" (in the following referred to as leading question). We clarified to our respondents that they were not restricted to any particular area and should mention any factor considered relevant. The possible factor categories in our leading question were used as contextual cues [22] and showed our respondents that they can and should think as broadly as possible. Following our data-driven research approach, we have taken particular care not to plant any answers but to let all information emerge from the interviewees. After our respondents stated a difference between projects, the interviewer asked for the contrast pole of the construct to capture its whole meaning. Once a factor was identified, we used Downwards Laddering to ensure a clear understanding. We then applied Upwards Laddering by asking "Why does [factor pole positively related to success] contribute to project success?" This question yielded hierarchically superordinate constructs, which were used as basis for Upwards Laddering again. We iterated until top-level constructs (direct sub-constructs of project success and personal core constructs of our respondents) were reached, that is, until respondents answered along the lines of "…this factor leads to X, resulting in project success". In doing so, we identified IS project success criteria (X in above example) without asking for them directly, thus counteracting status-quo bias. This approach resulted in numerous ladders from the original constructs to project success.

We repeated this procedure until respondents could not think of further constructs (as starting points of new ladders). Afterwards, we sent all transcripts to the interviewees to ensure communicative validity [55]. Two respondents made slight changes concerning single words. All but one perceived RepGrid to be a pleasant and motivating questioning technique. Subsequently, two researchers (interviewer plus one) analyzed collected data with the objective to identify IS project success criteria. We accomplished this by first scrutinizing the respondents' statements in detail and extracting all aspects that represented success, that is, constructs at the top level in respondents' ladders. Subsequently, these extracted aspects were consolidated into a set of distinct and clearly defined success criteria. The following example (cf. also Fig. 3) illustrates the crucial role of Downwards and Upwards Laddering in our approach.

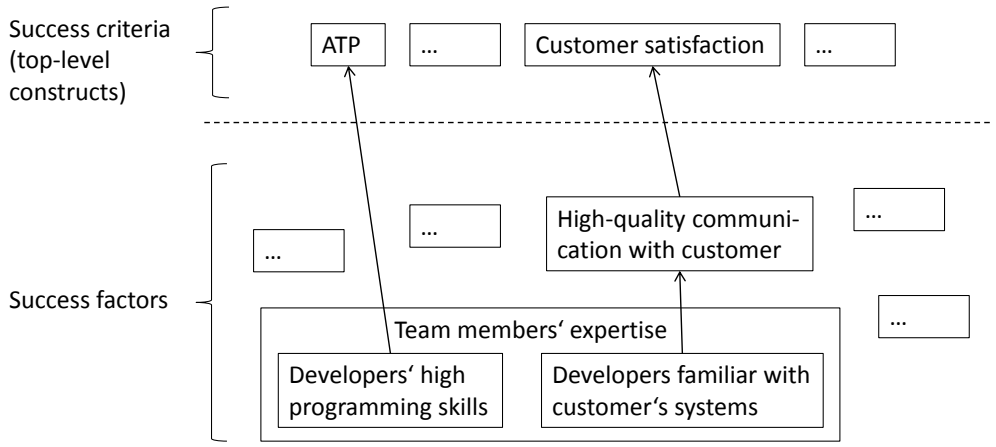

Fig. 3. Laddering example

Several respondents named expertise of contractor's team members to be a construct, that is, a success factor for IS project. Downwards Laddering revealed that different respondents used this terminology for different types of expertise (cf. "conflict" in the description of semantic constellations in section 2.2). For instance, one kind of expertise referred to developers' general programming skills and another to their familiarity with the customer's existing systems (e.g., from

earlier releases). Upwards Laddering revealed that the first kind of expertise contributed to meeting time, budget, and requirements targets of the project (ATP, top-level construct). The second, however, raised the quality level of communication with the customer, which in turn led to higher customer satisfaction (top-level construct). Thus, we were able to identify the success criteria ATP and customer satisfaction from these two ladders.

4. Results

In this section, we give insights into the identified IS project success criteria from the perspective of project managers by providing quotations, followed by an overview and definitions of the criteria (cf. Table 2 and Fig. 4).

Our respondents numerously mentioned the traditional ATP criteria, that is, meeting schedule, budget, and requirements as important for success evaluation. The following extract from one of the interviews demonstrates how, starting with the success factor (marked in bold) emerged from our leading question, we applied Laddering and established that adhering to plans plays an important role in the respondent's view of success:

Stephen: *In this project, the* ***structure was considerably better****. Clear responsibilities.* [Contrast pole:] *Not structured, chaotic, random.*

Interviewer: *How do you recognize that structure is good, beside clear responsibilities?* [Downwards Laddering]

Stephen: *Clear goals, defined timelines, defined quality objectives and stakeholders' responsibilities, clear definitions of tasks, work packages.*

Interviewer: *Why does clear, good structure contribute to project success?* [Upwards Laddering]

Stephen: *Because one notices earlier if something goes wrong and can take countermeasures to get back on track.*

Interviewer: *And why does this contribute to project success?* [Upwards Laddering]

Stephen: *Because then I can better achieve the objectives according to plans, that is, if I notice that I deviate somewhere, I can say: ok, here is a deviation, but it is alright, it has to be this way and I achieve my goals anyway. Or I can say: no, this deviation is unwanted, be it with regards to content, time, cost, quality or whatever. I have to take countermeasures in some form.*

Similarly, the following examples (Stacie, Michael, and Torben) show how we identified ATP criteria after one or several steps of Upwards Laddering:

Stacie: ***Clearly defined requirements.*** [Contrast pole:] *Incomplete requirements. […]*

Interviewer: *Why do clearly defined requirements contribute to success?* [Upwards Laddering]

Stacie: *If requirements are clearly defined, the developers can easily determine what they have to do to implement those requirements. And they can provide exact statements how long it will take and how much it will cost. One can better see the overall picture, the effects that requirements have on the development*.

Interviewer: *And why does this contribute to success?* [Upwards Laddering]

Stacie: *It leads to meeting budget and schedule targets at the end of the day and that the customer gets exactly what he wanted.*

Michael: ***Motivated project manager.*** [Contrast pole:] *Demotivated project manager. […]*

Interviewer: *Why does it contribute to project success?* [Upwards Laddering]

Michael: *An important aspect is that the project is technically interesting. If it is, then I am satisfied. It is important for me to enjoy the project. […] Then I am interested in customer's goals and can lead the project to commercial and technical success.*

Interviewer: *What do you mean by commercial success?*

Michael: *Staying within budget.*

Interviewer: *That is, staying within budget is important for you to consider a project successful?*

Michael: *Yes, meeting budget and schedule, and in addition delivering good quality. If this is the case, I am very satisfied with the project.*

Torben: ***Choosing qualified team members.*** [Contrast pole:] *Using available project resources. […]*

Interviewer: *Why does it contribute to project success?* [Upwards Laddering]

Torben: *If I can use qualified employees who possess the skills that are necessary for the project, it is more likely that the work is done meeting quality, time, and budget targets.*

Sometimes, individual ATP criteria were mentioned separately, according to the currently examined ladder, like product quality in the following interview extract:

Michael: ***Decision competence.*** [Contrast pole:] *Lack of decision competence. […]*

Interviewer: *Why does decision competence contribute to project success?* [Upwards Laddering]

Michael: *On an emotional level: You feel like there is progress in the project. It is possible that, in retrospect, some wrong decisions were made, but without decisions nothing is happening and it is in general demotivating, as people want to do something.*

Interviewer: *That is, decision competence leads to motivation?*

Michael: *Yes*.

Interviewer: *Motivation of all project members?*

Michael: *Yes.*

Interviewer: *Why does higher motivation of project members contribute to project success?* [Upwards Laddering]

Michael: *Because people have joy at work, participate actively and with pleasure, which eventually leads to better product quality.*

The next extracts are just a few examples of ATP criteria being mentioned by our respondents. However, we were able to identify efficiency of the development process as a stand-alone criterion as exemplary shown by the following two quotations:

Torben: ***Clearly defined responsibilities.*** [Contrast pole:] *Undefined responsibilities.*

Interviewer: *How do you recognize that responsibilities are clearly defined?* [Downwards Laddering]

Torben: *There is a description of roles, or there was a clarification of roles.*

Interviewer: *Why do clearly defined responsibilities contribute to project success?* [Upwards Laddering]

Torben: *Decisions are made faster and clearer, and division of labor is also clearer. This makes it all efficient and prevents redundant work.*

Interviewer: *And why does that contribute to success?* [Upwards Laddering]

Torben: *I need fewer resources to achieve the results.*

Later in the interview, Torben revisited process efficiency in another ladder by describing that team members are more efficient when they concentrate on one task rather than, for instance, being deployed in various projects. He explained that people need time to arrive at their most efficient work mode and that such decelerations can be avoided by staying focused on one project:

Torben: ***Project members work on this project only.*** [Contrast pole:] *Project members have other tasks, beyond the project.*

Interviewer: *Why is it important for project success?* [Upwards Laddering]

Torben: *It is the efficiency criterion again. Everyone needs setup times to focus on a project, to concentrate on a task on which one was working earlier, to get in the flow again.*

In addition to identifying process efficiency as an independent criterion, we collected extensive evidence for the satisfaction of various stakeholders as important IS project success criteria beyond ATP. Some respondents specifically emphasized stakeholder satisfaction, like David in the following extract:

David: *[ATP] is not everything that defines success. As a project manager, I am certainly motivated to achieve it, that is, meet the project's requirements, and that in the specified time and budget. But is it everything that defines success for me? No. It is, of course, also important to me that all stakeholders are satisfied […] and want to work on the next project with me. And if I accomplish it – people are satisfied, want to do something alike again, the customers are satisfied – that is the ideal success.*

Accordingly, stakeholder satisfaction was often mentioned in the Laddering process. If satisfaction of all stakeholders was said to be important without further distinction like in the following example, we accounted for it in our analysis in the identified stakeholder groups (i.e., customer and contractor organization).

Stephen: ***Financial scope****, which was more* ***defined*** *in this project.* [Contrast pole:] *Unclear budget situation. […]*

Interviewer: *Why does a defined financial scope contribute to project success?* [Upwards Laddering]

Stephen: *We are a numbers-driven company. And we measure ourselves in numbers and results. If it is clearly defined: this is the task, this is the emerging effort, and this is my budget for it, then I know exactly where I stand. In contrast to: Let's just begin, the money will turn up somehow. And you have to produce specific results with it. So in the process you never know: Am I still in scope or not? Can I spend more or not? This leads to dissatisfaction within the project, as nobody knows: where do we actually stand?*

Interviewer: *Whose dissatisfaction?*

Stephen: *Of all project stakeholders.*

However, the satisfaction of one specific stakeholder group – the customer organization – was mentioned and emphasized particularly often. For example, Torben stated that good knowledge of customer systems and processes, leading to other factors along the ladder (dialog with customer on a higher qualitative level, more precisely captured customer requirements etc.), ultimately results in customer satisfaction:

Torben: ***Project members familiar with customer systems and processes.*** [Contrast pole:] *No knowledge of customer systems and processes. […] Knowing customer systems and processes, I can enter into a dialog with the customers differently, and better capture their requirements and wishes, than if I have no knowledge and have to start from scratch. Customers do not automatically tell you everything worth knowing. And particularly regarding this knowledge about customers' systems and processes, this relationship on a personal, human level – due to the familiarity – supports project success. Since they feel understood and comfortable, and therefore are also easier to satisfy. In contrast to working with someone new, who they do not know and understand.*

In the following example, Torben elaborated on the effect of placing too much emphasis on keeping the formal requirements of the development process (correct labels of versions, documents etc.), thus neglecting the actual product. In his remarks, Torben mentioned how low product quality led to customer dissatisfaction, which in turn made him consider this project unsuccessful:

Torben: ***Appropriate formal approach.*** [Contrast pole:] *Overvaluation of formalities.*

Interviewer: *How do you recognize that formalities are overvalued?* [Downwards Laddering, here applied to the contrast pole]

Torben: *The quality managers were in control here. They demanded that every document has its correct name in the footer, in the acceptance state, in every version. And that all documents are located in the right place, that the right people approved them etc.*

Interviewer: *Why does the overvaluation of formalities reduce project success?* [Upwards Laddering, here starting with the contrast pole]

Torben: *Because it diverts the focus away from delivering a high-quality product. […] It causes that they* [employees] *focus on ensuring that all version numbers are correct. Whereas developing the best product is about conceptual issues. And having developed the best product is not of interest for anyone* [in case of overvalued formalities]. *It possibly comes to light at the end, when people realize that the product is not that good. If we pass the acceptance process and several hundred test cases are marked green, the job was done formally correct; however, the customer is not satisfied. So it should be a success, which it actually is not.*

Similarly, Stacie considered a project unsuccessful despite meeting the ATP criteria. She clarified that in her perception the project was unsuccessful due to the unsatisfied customer even though she or the contractor organization as a whole could not have done anything differently to prevent it:

Stacie: *In this project* [A], *the customer was more or less forced to undertake the development. So there* [project B] *we had a customer-driven development and here* [project A] *we had a development that emerged from the company situation. That was the difference. Here* [project A], *the owner of the application did not actually want the development, had to accept it and pay a great deal of money […]. Then the situation arose where time, quality, and budget were met but the customer was not satisfied anyway, as from his perspective he spent money that was not necessary to spend.*

Interviewer: *Sounds like the customer was not to be satisfied in this situation? As the project was conducted well and the three mentioned criteria were met, but customer was not satisfied, regardless of the project performance?*

Stacie: *Yes.*

Interviewer: *So from your perspective, this project* [A] *was unsuccessful although you could not do anything about it?*

Stacie: *Exactly.*

In turn, the satisfaction of the contractor organization was also considered important by several respondents. The following quotes from two different interviews (Michael and Marcus) exemplify the importance of this criterion, which can be seen as the correspondent part to customer satisfaction:

Michael: *In this project, it was annoying that we had a customer who changed his mind weekly. First he wanted to be treated as a novice, so we said ok, you get an assistant, we help you – like the assistant in Microsoft Office. Next week he said that he did not want to be treated as a child and that he is the expert. This was very unsatisfactory. With these fluctuating requirements, this unreliability of the customer, planning was impossible, which was very dissatisfying.*

Marcus: *Let's phrase it like this. Project management and the customer should be happy. […] You can say, the business customer should be happy, but the project management should also be happy, because the people should be happy.*

Finally, several respondents stressed the importance of considering the end-users and whether they actually use the developed product for assessing the success of a project. Here again, it was noticeable that this criterion was considered a necessary condition by our respondents to deem a project successful:

Christian: **[User]** ***Training and deployment of new system***. [Contrast pole:] *No training, no deployment phase. […] This is about the people who use the system. You have end-users, here clerks, they have to work with the topic. And this is not to be underestimated, since an application, that is, a project, is only successful if what you developed is in use. […] I cannot ignore the user groups.*

Later in the interview, Christian clarified that he considers a project unsuccessful if it produced what was requested in specified time and budget, but the system was not used in the customer organization.

In total, our approach yielded eight IS project success criteria. They are listed in Table 2 along with their definitions, number of different respondents who mentioned them, and overall frequency of occurrence (respondents often mentioned same criteria in different ladders).

Table 2. Identified IS project success criteria

	Success criterion	Definition	Number of respondents	Frequency of occurrence
1	Adherence to budget	Conformance between planned and actual development cost	11	46
2	Adherence to schedule	Conformance between planned and actual development time	11	46
3	Meeting functional requirements	Conformance between specified functional requirements and their actual realization	7	22
4	Meeting non-functional requirements	Conformance between specified non-functional requirements and their actual realization	10	26
5	Process efficiency	Ratio of objective achievement to expended effort (budget, particularly human resources)	6	14
6	Customer satisfaction	Customer organization's stakeholders are satisfied with the project	7	23
7	Contractor satisfaction	Contractor organization's stakeholders are satisfied with the project	4	6
8	System is used by customer	Developed system is deployed and used by end-users after project completion	3	3

The first four are the traditional ATP criteria. We separated meeting functional and non-functional requirements as these criteria were frequently stated in different ladders. Overall, ATP criteria were mentioned frequently and by many respondents. Process efficiency was stated as an independent (from ATP) aspect fourteen times and by six different respondents. The following two criteria reflect the satisfaction of the customer and contractor organization, respectively. The former was mentioned by seven different respondents and even more frequently than meeting functional requirements. The last criterion, stated once by three respondents, indicates whether the developed system is actually deployed and used at the customer organization. Accordingly, from the (combined) perspective of our eleven project managers, the metaphorical puzzle of IS project success criteria (cf. also section 2.1) looks like illustrated in Fig. 4.

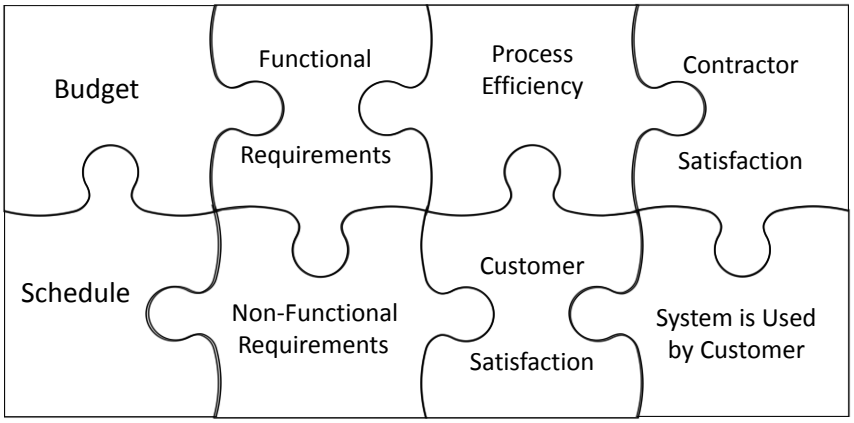

Fig. 4. Project managers' view of IS project success criteria

5. Discussion

Our results indicate that ATP plays an important role in project managers' view of IS project success, which is in line with the notion in literature. The disunity among scholars regarding separation of the third ATP criterion (requirements) is also reflected in our results. Some respondents considered meeting requirements to be an entity, whereas others clearly differentiated between functional and non-functional requirements, partly even mentioning them separately in different ladders. As Michael stated: *Another important criterion of the product quality is stability and robustness. The first goal is to fulfill the functionality. However, nowadays many people criticize that software is working, but is not stable, robust, and prone to errors*. In our opinion, the appropriate level of detail for the requirements criterion depends on the context. If, for instance, the impact of success factors on different success criteria is of interest, functional and non-functional requirements should be considered separately as the according impacts on them might differ. From the project management perspective, a unified view on these concepts seems suitable as they together represent project scope.

However, while confirming its importance, our results clearly show that ATP is not sufficient to cover IS project success. Four other criteria emerged in our analysis. First, our results indicate that process efficiency should be considered separately from ATP. As described in section 2.1, the contrary is often present in literature. Only in case of perfectly realistic planning, meeting the resulting ideal plans is equivalent to an efficient process. In practice though, plans are not realistic for several reasons. In the interview, Bernd put it this way: *Estimates are based on experience, mean values etc., it is methodical. However, these mean values have the unpleasant feature never to apply in the concrete situation. […] If a project manager tells you, a project was once planned and it all proved right to the day, that is not the case and far from reality. Planning is a continuous process, to be adjusted over and over again according to the situation. There are change processes, the project scope changes. Every day you know more than the day before.*

[…] The plans are always wrong and the task of project management is to continuously make them less wrong. This emphasizes the importance of assessing process efficiency beside ATP.

Taking matters a step further, one could wonder whether or why ATP is relevant at all if process efficiency is being considered. Imagine a project that misses its budget and schedule targets despite being conducted as efficiently as possible. Obviously, the plans were not realistic – so should not process efficiency be the determining criterion and the project considered successful in this case? However, developing accurate plans (and meeting them) is one of the main project management challenges and the degree of mastering that challenge is reflected in the assessment of project success. Bernd added in this regard: *These* [ATP criteria] *are also aspects that directly affect my evaluation, my performance assessment. Delivering projects in time and in budget, these are my career goals right now. If I achieve that, it positively affects my salary.* This means that currently existing organizational mechanisms (i.e., employee assessment, not project success measurement) have an impact on Bernd's subjective perception of project success. Furthermore, project plans affect expectations of project stakeholders [56, 57] and therefore other success criteria. For instance, the customer is likely to be less satisfied with the project if its costs exceed the planned budget, even if the estimated budget was unrealistic in the first place. Accordingly, both ATP and process efficiency should be used for success assessment (as indicated by our results).

Our findings stress the need to include stakeholder satisfaction in IS project success assessments. In fact, stakeholder satisfaction was often equaled to the overall success by our respondents (cf. also [30]). As David stated: *People are satisfied, want to do something alike again, the customers are satisfied – that is the ideal success* (cf. also section 4). This suggests considering the satisfaction of individual stakeholder groups as direct sub-criteria of project success. In particular, the satisfaction of the customer organization was emphasized repeatedly. While the qualitative nature of our study does not allow for statistically significant quantitative statements, it is interesting that customer satisfaction was mentioned even more frequently than the well-established ATP criterion – meeting functional requirements (cf. Table 2). As regards the relation between ATP and customer satisfaction, our data indicates that meeting ATP criteria contributes to satisfaction of customers (as well as other stakeholders): *In time: in budget; and quality. These are essential, as quality has very much to do with customer satisfaction. In time and in budget, too, but not as much* (Bernd). However, our respondents described many cases where they considered a project failed due to customer dissatisfaction despite meeting the plans (e.g., cf. Stacie's quote in section 4). Analogously, projects were considered successful if the customer was satisfied in spite of unfulfilled plans: *Daily, discussing a change or any other issue, there are situations like: We have alternatives 1, 2, and 3, these are the respective costs of the alternatives, which one do you want? And the participants* [customers] *decide and know: We decided that, it will cost more, but we get more in return, we all like it very much, we are satisfied, and this was a good decision. Afterwards, nobody asks whether it cost one million more and was therefore a failure. Instead, one knows: We invested more, but got great value for it* (Bernd). These insights suggest that, while being influenced by ATP, customer satisfaction is actually more important than ATP and a necessary criterion for a successful project in the view of contractors' project managers. This finding is not surprising as customer satisfaction is decisive for contractor reputation and follow-up projects.

The second stakeholder sub-group is the overall contractor organization, including the team members, contractors' management, and the project managers themselves. According to our respondents, the satisfaction of this group is also an important success criterion. A project that exceeds customer expectations, but results in substantial losses for the contractor, is less likely to be considered a success by the latter (disregarding other possible benefits). As Bernd put it: *If the customer is satisfied, the project is a success from his perspective. From ours, too, usually; but exceptions are possible, like in this project. It was very successful for the customer, but has to be seen with mixed feelings from our side. Successful in a lot of respects, but for example unsuccessful regarding economic concerns.* Our results indicate that contractor satisfaction is influenced by customer satisfaction, but also by other aspects (e.g., ATP, process efficiency).

Our last criterion accounts for the end-users by indicating whether they actually use the developed system after deployment. The end-users are a sub-group of the customer organization that is often emphasized in literature (cf. section 2.1). Following Lyytinen and Hirschheim [58], we assume that customer satisfaction is related to the usage

of the system. However, both criteria should be used for success evaluations; for example, it is possible that customer management is not satisfied with the project course or the product but the end-users still use the developed system. This long-term criterion is only applicable a certain period of time after project completion, which might be the main reason why it was comparatively rarely mentioned by our respondents. As many projects have been completed shortly before our interviews, our respondents might have applied a short-term perspective and thus neglected this and other long-term criteria (e.g., meeting customer's strategic goals). However, we consider reassessing project success later by including such long-term criteria to be important as they might be decisive and influence other criteria. Wilson and Howcroft [59] point out that the perception of project success or failure can change in course of system usage although the system is not changed. For instance, customers might be satisfied with the project course right after completion but change this perception radically if end-users do not adopt the deployed system.

Overall, our identified criteria seem interrelated rather than being disassociated aspects on the same hierarchical level. For example, our interviews indicate that process efficiency contributes to fulfilling time and budget targets, and both process efficiency and ATP have a positive effect on contractor and customer satisfaction. Customer satisfaction in turn seems to be related to system usage and to contractor satisfaction. However, since our research approach aimed at identifying a broad set of criteria, we intentionally do not dig deeper into the hierarchical relationships between the identified IS project success criteria at this point.

An interesting aspect that emerged in the interviews was that our respondents described variations of success criteria or factors depending on the project situation. For example, Bernd pointed out: *This is an important factor, but I cannot describe its effect in general. Highly skilled experts, that is, having the right people on the right spot, is the more important the smaller a project is. The bigger a project is and the longer it lasts, the more important is the right mix of people.* Regarding the importance of staying within budget for project success, Katarina explained: *It depends on whether this is a time-and-material project. In case of a fixed-price project, we will probably reject customer's requests, however eager the customer may be. If it is a time-and-material project, we can make a change request of it.* These insights indicate that project success is a concept that is not to be seen in the same manner in different situations, which is in line with the growing research stream advocating the contingency approach in project management (e.g., [3, 60]). In the context of IS project success measurement, this view suggests that the relevance of success criteria varies depending on so-called contingency variables like project characteristics, point in time of assessment, or stakeholder perspective. In the present study, we took the perspective of project managers and aimed to identify all success criteria considered relevant from this particular point of view. Within this specific group, the relevance of the identified criteria may still vary depending on further contingency variables like project size or complexity. While out of scope in this paper, we invite further research to gain more detailed insights into criteria variations among particular stakeholder groups.

6. Conclusion

In this study, we investigated project managers' views on IS project success criteria. In order to minimize potential biases, we did not ask for success criteria directly but applied RepGrid and Laddering to derive the criteria. Our results indicate that traditional adherence-to-planning criteria are important but not sufficient for IS project success assessment. Process efficiency and satisfaction of stakeholders, foremost the customer, must also be considered. The actual usage of the system by end-users is an important aspect to be included in the long-term assessment.

6.1 Limitations

One limitation of our study is the sample size, which limits the generalizability of the results. However, the qualitative nature of our study suits the objective to gain in-depths insights into the practitioners' perception of IS project success criteria.

Another limitation is our focus on the view of project managers. Keeping the importance of success assessors' perspectives in mind, further studies are required to explore other stakeholder perspectives and compare them to our

results. Considering that the traditional success assessment using ATP emerged from a project management perspective and that, according to our results, project managers consider success criteria beyond ATP to be relevant, it is reasonable to assume that other stakeholders as well (e.g., end-users, developers) attach importance to other project success criteria.

6.2 Implications for researchers

Studies in the research stream focusing on identification and analysis of IS project success factors require a valid and reliable operationalization of IS project success as dependent variable. Such a dependent variable enables the comparability of different studies and avoids misleading interpretations. Considering that the often-applied ATP perspective is regarded to be insufficient, additional or alternative criteria must be scrutinized. Future research is thus in need of detailed analyses of the success criteria identified in our study, especially with regard to construct operationalization. Our findings contribute to research by illuminating practitioners' perspectives in an innovative manner. Researchers can use our results to develop a substantiated set of success criteria in future studies. Furthermore, our results serve as basis for investigating possible interdependencies between success criteria. For example, it appears likely that both ATP and the end-users' actual usage of the system are related to customer satisfaction, which in turn is likely to affect the satisfaction of the contractor. Finally, having identified a substantiated set of criteria that should be used to assess IS project success is the starting point for research to develop an approach for measuring these criteria. We believe that it is especially important to scrutinize the measurability of process efficiency in IS projects as this is still an unsolved challenge.

6.3 Implications for practitioners

Practitioners gain insights into the expert perspective on project success and might rethink their way of assessing success of their IS projects. Companies depend on a valid measurement of IS project success as otherwise proper project evaluations are not feasible. As projects need to exhibit benefits to justify their cost, companies may draw misleading conclusions for future projects if benefits are evaluated inaccurately. Our findings show that in the view of IS project managers, time has come for organizations to follow the insights in research by expanding the stance of adherence to planning as single criterion for success assessment.

References

[1] R. Atkinson, "Project Management: Cost, Time and Quality, Two Best Guesses and a Phenomenon, Its Time to Accept other Success Criteria," *International Journal of Project Management*, vol. 17, no. 6, pp. 337-342, 1999.

[2] B. N. Baker, D. C. Murphy, and D. Fisher, "Factors Affecting Project Success," in *Project Management Handbook*, D. I. Cleland and W. R. King, Eds, New York: John Wiley & Sons, 1988, pp. 902-919.

[3] L. A. Ika, "Project Success as a Topic in Project Management Journals," *Project Management Journal*, vol. 40, no. 4, pp. 6-19, 2009.

[4] N. Agarwal and U. Rathod, "Defining 'Success' for Software Projects: An Exploratory Revelation," *International Journal of Project Management*, vol. 24, no. 4, pp. 358-370, 2006.

[5] K. Judgev and R. Müller, "A Retrospective Look at Our Evolving Understanding of Project Success," *Project Management Journal*, vol. 36, no. 4, pp. 19-31, 2005.

[6] G. Thomas and W. Fernández, "Success in IT Projects: A Matter of Definition," *International Journal of Project Management*, vol. 26, no. 7, pp. 733-742, 2008.

[7] C. Sauer and C. Cuthbertson, "The State of IT Project Management in the UK 2002-2003," Oxford, 2003.

[8] R. Sonnekus and L. Labuschagne, "The Prosperus Report 2003: IT Project Management Maturity versus Project Success in South Africa," Johannesburg, 2003.

[9] The Standish Group International, "CHAOS Summary 2009. The 10 laws of CHAOS," 2009.

[10] C. Deephouse, T. Mukhopadhyay, D. R. Goldenson, and M. I. Kellner, "Software Processes and Project Performance," *Journal of Management Information Systems*, vol. 12, no. 3, pp. 187-205, 1996.

[11] J. J. Jiang, G. Klein, and M. Shepherd, "The Materiality of Information System Planning Maturity to Project Performance," *Journal of the Association for Information Systems*, vol. 2, no. 5, pp. 1-23, 2001.

[12] K.-S. Na, J. T. Simpson, X. Li, T. Singh, and K.-Y. Kim, "Software Development Risk and Project Performance Measurement: Evidence in Korea," *Journal of Systems and Software*, vol. 80, no. 4, pp. 596-605, 2007.

[13] D. Joosten, D. Basten, and W. Mellis. "Measurement of Information System Project Success in German Organizations," *International Journal of Information Technology Project Management*, in press.

[14] J. K. Pinto and D. Slevin, "Critical Success Factors Across the Project Life Cycle," *Project Management Journal*, vol. 19, no. 3, pp. 67-75, 1988.

[15] J. K. Pinto, "The Elements of Project Success," in *Field Guide To Project Management*, D. I. Cleland, Ed, Hoboken: Wiley, pp. 14-27, 2004.

[16] A. J. Shenhar, D. Dvir, O. Levy, and A. C. Maltz, "Project Success: A Multidimensional Strategic Concept," *Long Range Planning*, vol. 34, no. 6, pp. 699-725, 2001.

[17] D. Baccarini, "The Logical Framework Method for Defining Project Success," *Project Management Journal*, vol. 30, no. 4, pp. 25-32, 1999.

[18] J. T. Karlsen, J. Andersen, L. S. Birkely, and E. Ødegård, "What Characterizes Successful IT Projects," *International Journal of Information Technology & Decision Making*, vol. 4, no. 4, pp. 525-540, 2005.

[19] D. I. Cleland, "Measuring Success: The Owner's Viewpoint," in *Proceedings of the 18th Annual Seminar/Symposium*, Project Management Institute, Ed, Upper Darby: Project Management Institute, pp. 6-12, 1986.

[20] A. M. Aladwani, "An Integrated Performance Model of Information Systems Projects," *Journal of Management Information Systems*, vol. 19, no. 1, pp. 185-210, 2002.

[21] M. Cuellar, "Assessing Project Success: Moving Beyond the Triple Constraint," in *International Research Workshop on IT Project Management*, St. Louis, USA, pp. 19-28, 2010.

[22] F. B. Tan and M. G. Hunter, "The Repertory Grid Technique: A Method for the Study of Cognition in Information Systems," *MIS Quarterly*, vol. 26, no. 1, pp. 39-57, 2002.

[23] G. Rugg, M. Eva, A. Mahmood, N. Rehman, S. Andrews, and S. Davies, "Eliciting Information about Organizational Culture via Laddering," *Information Systems Journal*, vol. 12, no. 3, pp. 215-229, 2002.

[24] Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*, 4th ed. Newton Square: Project Management Institute, 2008.

[25] K. C. Laudon and J. P. Laudon, *Management Information Systems. Managing the Digital Firm*, 11th ed. Upper Saddle River: Pearson, 2009.

[26] W. H. DeLone and E. R. McLean, "Information System Success: The Quest for the Dependent Variable," *Information Systems Research*, vol. 3, no. 1, pp. 60-95, 1992.

[27] W. H. DeLone and E. R. McLean, "The DeLone and McLean Model of Information Systems Success: A Ten-Year Update," *Journal of Management Information Systems*, vol. 19, no. 4, pp. 9-30, 2003.

[28] A. Collins and D. Baccarini, "Project Success - A Survey," *Journal of Construction Research*, vol. 5, no. 2, pp. 211-231, 2004.

[29] J. G. Cooprider and J. C. Henderson, "Technology-process Fit: Perspectives on Achieving Prototyping Effectiveness," *Journal of Management Information Systems*, vol. 7, no. 3, pp. 67-87, 1991.

[30] R. Nelson, "Project Retrospectives: Evaluating Project Success, Failure, and Everything in between," *MIS Quarterly Executive*, vol. 4, no. 3, pp. 361-372, 2005.

[31] S. Nidumolu, "The Effect of Coordination and Uncertainty on Software Project Performance: Residual Performance Risk as an Intervening Variable," *Information Systems Research*, vol. 6, no. 3, pp. 191-219, 1995.

[32] B. H. Wixom and H. J. Watson, "An Empirical Investigation of the Factors Affecting Data Warehousing Success," *MIS Quarterly*, vol. 25, no. 1, pp. 17-41, 2001.

[33] J. A. Espinosa, W. DeLone, and G. Lee, "Global Boundaries, Task Processes and IS Project Success: A Field Study," *Information Technology & People*, vol. 19, no. 4, pp. 345-370, 2006.

[34] J. D. Procaccino and J. M. Verner, "Software Project Managers and Project Success: An Exploratory Study," *Journal of Systems and Software*, vol. 79, no. 11, pp. 1541-1551, 2006.

[35] J. Wateridge, "How can IS/IT Projects be Measured for Success?," *International Journal of Project Management*, vol. 16, no. 1, pp. 59-63, 1998.

[36] J. M. Nicholas and H. Steyn, *Project Management for Business, Engineering, and Technology: Principles and Practice*, 4th ed. New York: Routledge, 2012.

[37] D. Basten and W. Mellis, "A Current Assessment of Software Development Effort Estimation," In *Proceedings of the 5th ACM/IEEE International Symposium on Empirical Software Engineering and Measurement*, Banff, Canada, 2011, pp. 235–244.

[38] A. L. Lederer, R. Mirani, B. S. Neo, C. Pollard, J. Prasad, and K. Ramamurthy, "Information System Cost Estimating: A Management Perspective," *MIS Quarterly*, vol. 14, no. 2, pp. 159-176, 1990.

[39] P. Crawford and P. Bryce, "Project Monitoring and Evaluation: A Method for Enhancing the Efficiency and Effectiveness of Aid Project Implementation," *International Journal of Project Management*, vol. 21, no. 5, pp. 363-373, 2003.

[40] D. Basten, D. Joosten, and W. Mellis, "Managers' Perceptions of Information System Project Success," *Journal of Computer Information Systems*, vol. 52, no. 2, pp. 12-21, 2012.

[41] T. A. DeCotiis and L. Dyer, "The Dimensions and Determinants of Project Performance," *Industrial Marketing Management*, vol. 6, no. 5, pp. 370-378, 1977.

[42] O. Pankratz and C. Loebbecke, "Project Managers' Perception of IS Project Success Factors - A Repertory Grid Investigation," in *Proceedings of the 19th European Conference on Information Systems*, Helsinki, Finland, 2011.

[43] J. K. Pinto and D. Slevin, "Project Success: Definitions and Measurement Techniques," *Project Management Journal*, vol. 19, no. 1, pp. 67-72, 1988.

[44] Y. H. Kwak, J. Park, B. Y. Chung, and S. Ghosh, "Understanding End-Users' Acceptance of Enterprise Resource Planning (ERP) System in Project-Based Sectors," *IEEE Transactions on Engineering Management*, vol. 59, no. 2, pp. 266-277, 2012.

[45] G. A. Kelly, *The Psychology of Personal Constructs*. New York: Norton, 1955.

[46] M. Smith, "A Repertory Grid Analysis of Supervisory Jobs," *Applied Psychology*, vol. 35, no. 4, pp. 501-511, 1986.

[47] F. Fransella, R. Bell, and D. Bannister, *A Manual for Repertory Grid Technique*, 2nd ed. Chichester, West Sussex, England: John Wiley & Sons, 2004.

[48] M. L. Shaw and B. R. Gaines, "Comparing Conceptual Structures: Consensus, Conflict, Correspondence and Contrast," *Knowledge Acquisition*, vol. 1, no. 4, pp. 341-363, 1989.

[49] A. M. Curtis, T. M. Wells, P. B. Lowry, and T. Higbee, "An Overview and Tutorial of the Repertory Grid Technique in Information Systems Research," *Communications of the Association for Information Systems*, vol. 23, no. 3, pp. 37-62, 2008.

[50] F. Tan and R. Gallupe, "Aligning Business and Information Systems Thinking: A Cognitive Approach," *IEEE Transactions on Engineering Management*, vol. 53, no. 2, pp. 223-237, 2006.

[51] N. P. Napier, M. Keil, and F. B. Tan, "IT Project Managers' Construction of Successful Project Management Practice: A Repertory Grid Investigation," *Information Systems Journal*, vol. 19, no. 3, pp. 255-282, 2009.

[52] K. Siau, X. Tan, and H. Sheng, "Important Characteristics of Software Development Team Members: An Empirical Investigation using Repertory Grid," *Information Systems Journal*, vol. 20, no. 6, pp. 563-580, 2010.

[53] D. N. Hinkle, *The Change of Personal Constructs from the Viewpoint of a Theory of Construct Implications. PhD Dissertation*. Ohio: Ohio State University, 1965.

[54] T. Cooke-Davies, "The "real" Success Factors on Projects," *International Journal of Project Management*, vol. 20, no. 3, pp. 185-190, 2002.

[55] U. Flick, *An Introduction to Qualitative Research*, 4th ed. Los Angeles: Sage, 2009.

[56] S. Petter, "Managing User Expectations on Software Projects: Lessons from the Trenches," *International Journal of Project Management*, vol. 26, no. 7, pp. 700-712, 2008.

[57] R. Somers, "Measuring Success, Managing Expectations," *Public Management*, vol. 83, no. 3, pp. 18-21, 2001.

[58] K. Lyytinen and R. Hirschheim, "Information Systems Failures - A Survey and Classification of the Empirical Literature," in *Oxford Surveys in Information Technology*, P. Zorkoczy, Ed, New York: Oxford University Press, pp. 257-309, 1987.

[59] M. Wilson and D. Howcroft, "Re-Conceptualising Failure: Social Shaping Meets IS Research," *European Journal of Information Systems*, vol. 11, no. 4, pp. 236-250, 2002.

[60] D. Dvir, S. Lipovetsky, A. J. Shenhar, and A. Tishler, "In Search of Project Classification: A Non-Universal Approach to Project Success Factors," *Research Policy*, vol. 27, no. 9, pp. 915-935, 1998.

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The path towards discovering PMO: an exploratory analysis of the Italian banking sector

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Abstract:
Directly acting on Project Management practices, PMO provides companies with help to innovate, reaching competitive advantage and growth in the long run, ceteris paribus, and attempts to reduce uncertainty. Even though PMO is a more consolidated practice in some countries, the phenomenon has lately been introduced in Italy, and it is still evolving. Not all organizations and not all individuals clearly understand the potential of PMO, and its role is often limited to simple Project Management in its strict meaning, while areas for improvement are many and varied. The paper analyses the status of PMO through a survey conducted inside the Italian banking sector, trying to frame the role of PMO, throwing light on its importance for a company as a whole, and not just for a single project. A discussion of the results and future work concludes the paper.

Keywords:
PMO; uncertainty; innovation; Italy; implementation; impacts; benefits; cultural change management.

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1. Introduction

As a consequence of digitalization of business, projects have increasingly become essential elements for organizations, and nowadays they are considered the shortest way to innovate within a company's framework [1], [2]: a project allows the management of time, resources and cost in a more effective way, permitting at the same time research and development of new products and procedures, better quality outcomes and better risk allocation between related parts. Organizations need to - beat the competition [4] and survive in the long run, and that is possible only through progress, which is the consequence of innovation. Even though a project has been identified as an efficient vehicle to maintain success and continuous growth through time [2], the equation does not always work [1]. There are unknown variables that could arise during a project's lifecycle, such as information asymmetry and imperfect knowledge, on which Project Managers could only partially intervene. The acknowledgment of such bounded rationality is always implicitly taken into consideration in every project feasibility analysis. Generally speaking, when it comes to a project, there is also another kind of element to which the Project Manager and team should pay close attention: *uncertainty*. This is a typical and common ingredient in the Project Management recipe book, as suggested by Atkinson, Crawford and Ward [5]. But uncertainty should not be considered only as a negative feature, since it often operates as a challenging incentive to improve the way of working and the quality of outcomes. Considering this dichotomy, uncertainty could be managed approaching it as a risk or as an opportunity: in this way individuals will not perceive risks only in a negative way, and threats will be easier seen as chances with the help of a different approach. Some stakeholders might not accept uncertainty, and they might be disappointed by project outcome (even in case of success), since involving different parts usually means involving different objectives [2]. That is why managing uncertainty should be considered unavoidable when it comes to projects. Although the choice to work by projects has become a rather common behavior for organizations [1], taken for granted in most cases, uncertainty remains a raw nerve, and it could affect even the most consolidated project, since it may come from diverse sources [2]. Every single step must be evaluated, but, since the Project Manager is not a hero, and since time, knowledge and resources are limited, too much control might lead to a state of analysis-paralysis, with a negative effect on efficiency; strictness does not always fit with uncertainty management [2]. However, organizations need a standardized approach, not only to increase the percentage of project successes but also to generate synergies [1], best practices [2] and reduction of repetition, instilling Project Management knowledge into team members [6], [7]. This kind of approach helps organizations to manage risks and ultimately to contain uncertainty as much as possible [5]. The appropriate figure that fits this role is the Project Management Office (PMO). Taking these issues into account the paper investigates the main PMO intervention areas emerging from academic literature, aiming to identify challenges and benefits for their implementation in situations which are actually innovators or else early adopters of this relevant resource for businesses. Consequently, an exploratory analysis on Italian banking sector is discussed.

This paper is structured as follows: first, the role of a PMO is defined throughout an analysis of contributions from literature; in the second section, which is the focus of the research, the case study and its methodology is introduced, followed by the findings regarding PMO areas of intervention and cultural change management. Finally, discussion and conclusions summarize the evidence emerging from interviews, giving a series of take ways.

1.1 Background and motivations

Recognized in literature as a recent but important phenomenon [2], [3], [4], [8], the PMO is a member of a dedicated business unit, often called the Project Management Office, which coordinates and centralizes information and data through specific tools and procedures, improving the management of projects and supporting Project Managers and team members in order to increase the percentage of delivery and the quality of performances [1]. Benefits and results are achievable mainly in the long run [9]: PMO should be seen not much as a solution for emergencies, but rather as a structural change to implement carefully. In a previous study [16], we also defined PMO as an organizational unit dedicated to providing Project Management support, whose strategic role is to enhance performance and organizational improvement by introducing a Project Management methodology and tools designed to: i) ensure the achievement of project goals; and ii) take advantage of the potential synergies between the various initiatives at a company level [17].

The introduction of PMOs could guarantee a number of benefits [6], [8], including shorter production cycles, meeting deadlines, cost reduction, higher quality, learning from experience and knowledge reuse.

The objectives of a project, if properly defined, are the primary aspects that determine its success. The same rule should be applied for starting a PMO. Thus, defining the project requirements and needs is a winning starting point; however PMO is not a ready formula to be applied equally to all projects and in all organizational contexts. For a successful start organizations must make a series of choices before inaugurating the new organizational unit:

- *What*: which PMO services to be chosen and what is the right degree of complexity for those services?
- *Where*: at what organizational level?
- *How* to implement the organizational unit?
- *Who* to involve: internal or external resources, with what professional profile?

Answering these questions, and taking into account the characteristics of concrete projects, organizational culture and necessary skills, means creating the right formula for a PMO that adds value. Projects missing deadlines and running late, difficulties in managing complexity, repeating mistakes and unforeseen risks resulting in high costs, are typical "symptoms" that indicate the need for an organizational unit in support of Project Management. Sometimes experience shows that these problems are rooted in everyday phenomena that are being neglected:

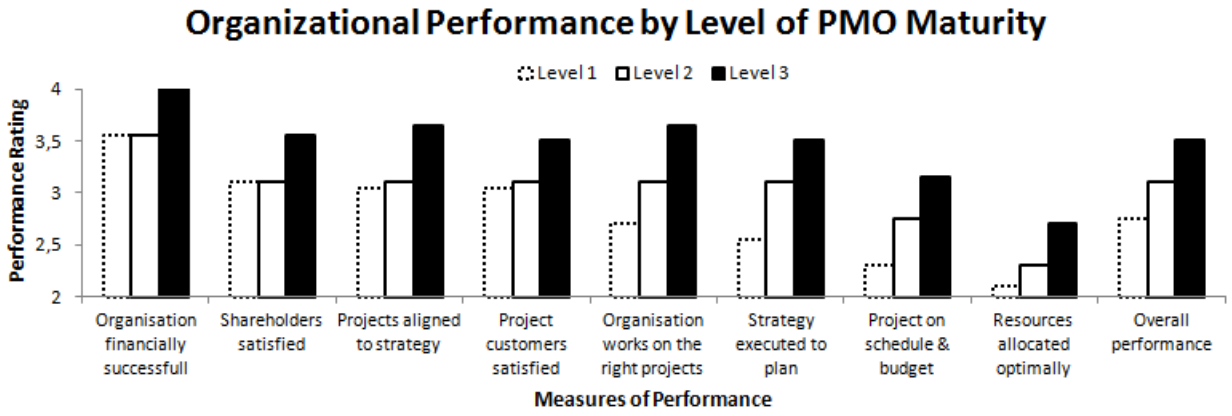
- Project Manager with strong technical skills and knowledge of the industry, who has qualities of team management but with no Project Management skills;
- Project Manager who does not have time to follow and continuously supervise all the projects;
- Synergies between different projects are not being exploited;
- The organizational procedures are costly in terms of time.

The benefits of implementing a PMO, in many cases, however, are not immediately perceived or are undervalued. The introduction of a new professional or organizational unit dedicated to Project Management is often seen only as an expensive option that slows down business processes, and initially results in change implemented mostly at a basic level.

Taking the above issues into account, Fig. 1 shows figures from a study conducted in 2007-2008 by the Center for Business Practice, which questioned the effectiveness of PMO on the basis of its maturity [15] (in terms of the total amount of time of PMO's presence in an organizational framework). Even a few years ago, the scenario was clear: - different levels of PMO maturity correspond to different performances, and evidence highlights how a mature PMO could better help organizations in several ways, from a managerial point of view to a more complex strategic impact, even in financial terms. But the measure that surprises the most is indeed the allocation of resources: according to the research, a more mature PMO could fill the gap in this delicate field: its contribution in reconciling and motivating resources toward a common goal should ensure a decrease in capacity management threats, and throughout the implementation of Project Management practices (first and foremost, stakeholder analysis and RAM matrix), PMO might help the Project Manager to properly identify the resources and the activities to be assigned to each of them. Above all, this measure of performance better explains the "human side" of Project Management discipline, a side that, more than others, needs a deeper and more prudent approach.

A good team should not be allowed to replicate tasks, or overlap their activities with others. In an ideal world, a consolidated PMO gathers all the activities under its control, thanks to its wide view over the project portfolio. But often the border between theory and practice is evanescent, and the two things in the long term or the real development of project's phases could no longer adhere. That is why the level of performance rating is lower than the others, but anyway, keeping in mind all these considerations, the contribution of PMO in this sense remains substantial, especially taking into account the starting level rate. Generally speaking, the overall rating of performance is higher with a more mature PMO. The effort of the team is more focused thanks to "additional" help, and ultimately the benefits are extended to the whole organization.

Fig. 1. Organizational Performance by Level of PMO Maturity



Maturity is not the only feature that marks different levels of PMO: it is possible to gather diverse literature contributions [1], [2], [7], [8], [10], [11], [12], and identify three categories of PMO:

- *Basic PMO*: a single resource, committed to a project or a stream of similar projects to support and assist the Project Manager and team members. He possesses strong knowledge of Project Management practices and procedures;
- *Advanced PMO*: several resources placed in a specific business unit, with authority over Project Managers and team members and responsibility for them in terms of career, training, activities and tasks; furthermore, the PMO has complete visibility of the organization's projects portfolio and analyzes information and data, often through specific dedicated tools. Monitoring and controlling procedures may help increase the organization's awareness of problems or negative trends;
- *Intermediate PMO*: several resources placed in a specific business unit, with the main purpose of gathering, consolidating, re-elaborating but especially standardizing information for each project and for the entire projects portfolio; this unit could also produce statistics and trend analysis for internal and external stakeholders.

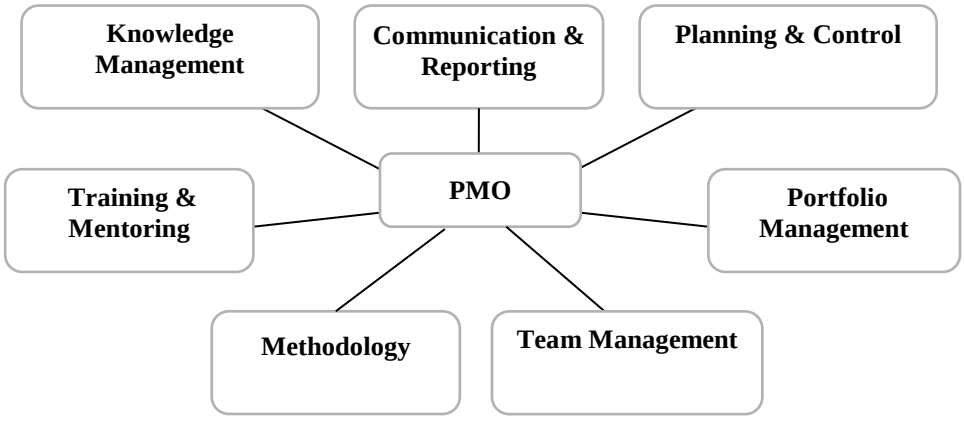
These categories of PMO should not be considered as independent and separate elements, but they could (and should, indeed) coexist in the organization, and according to Hobbs [9] this statement is not always taken for granted. The uniqueness of this role should be related to the importance of documentation and standardized procedures: a peculiarity that allows the recognition synergies among projects [1] and permits development of best practices ready to be re-used, generating several benefits for the organization [6], [8], for instance time and costs saving, growth of efficiency and effectiveness, improving quality and precision of delivering. All these benefits could be translated into productivity enhancement, and stronger willingness to innovate, that in the long run means gaining competitive advantage [1], [2]. Not too much emphasis should be put on documents, but rather on the idea of PMO as a guarantor of an appropriate methodology and as a data-clearing house of historical information [2], [3], [7], often hard to recollect and very dangerous in terms of uncertainty, if forgotten [2]. Documents are only an adjunct arising from implementing uniformed procedures in the right way, with particular attention on the organization's history and physiological components [1]. In this way uncertainty could be better contained, taking advantage of experience and practices already tested [5]. It is worth noting that with right approach, it is possible to guide people in order to help them to overcome obstacles and improve change management process. That is why a solid organizational culture should be seen as the backbone in every organization. These considerations are indeed fundamental and must be taken into account whenever a company decides to establish a PMO area within its framework [5]. It should be remembered that Project

Management discipline considers also behavioral aspects, since each activity might be influenced by emotional biases. These issues should be considered during the reading of the following section.

1.2 PMO services and intervention areas

Different authors have tried to propose models to classify the major services offered by a Project Management Office, distinguishing, for example, between *Enterprise Services - Oriented* and *Project - Focused* [18] to focus attention on the possibility of implementing PMO at different organizational levels. Another model proposed in [16] is composed of the following seven areas of services in which the PMO operates in order to ensure the success of projects, adding value to existing processes or creating new ones (Fig. 2): Methodology; Training & Mentoring; Knowledge Management; Planning & Control; Communication & Reporting; Team Management; and Portfolio Management. It is important to remember that in each case the PMO, as an organizational unit, will play a role in some or all of these services, and, according to the needs of the case, every area of activity may have a different degree of maturity.

Fig. 2. Areas of PMO Services. Adapted from [16]



Thus, according to Fig. 2 and considering the state of the art contributions [2], [8], [10], [11], it is possible to identify a set of key macro-areas of PMO intervention, that are *Project Portfolio Management*, *Knowledge Transfer and Learning*, *Communication Management*, and *Team Management*:

- *Project Portfolio Management*: absorbing the most of the PMO working time, and enforcing its responsibility toward the organization, this macro-activity is based upon the identification of best practices and procedures inherent to Project Management discipline [14], to be applied either for a single project or for a program of similar projects; the PMO plans time and deadlines, coordinates resources and stakeholders, with particular attention to risks and changes to be implemented. PMO helps the organization to reach important achievements and satisfy its needs [2], at the same time improving the quality of outcomes and recognizing synergies [1], keeping a high degree of precision and reliability;
- *Knowledge Transfer and Learning*: a PMO could use its competencies and know-how in the Project Management field to enrich organizational expertise and offer support and assistance to Project Managers and team members [3], [6]. Sometimes companies find it useful to involve PMO in training courses, especially when the role is carried out by external resources, since different experiences and backgrounds could facilitate knowledge transfer (for example, Pemsel and Wiewiora identified PMO as a knowledge-broker [7]);

- *Communication Management*: the PMO calls team members and Project Managers to Project Review meetings in order to check working progress, according to people's availability. PMO also helps the team to address tasks to accountable resources. Furthermore, he manages relationships with internal and external stakeholders, trying to reconcile all the interests of involved parties with project requirements through the help of analysts. Moreover, he distributes notices and official project documentation to team members and stakeholders, and where possible he tries to centralize communications;
- *Team Management*: in addition to the previous point, PMO is interested in the psychological and behavioral aspects of project groups. Project Management is a discipline that involves an emotive side, since it is above all a matter of relationships and attitudes. PMO will intervene if necessary to motivate individuals as much as possible, avoiding conflicts and facilitating communication inside and outside the team. It is important to notice that risk could originate from these variables and from a lack of consensus, which should never be ignored, especially when it comes to managing change and resistance [3].

The rate of implementation in the Italian banking sector is further discussed in the following Section.

2. Case Study: a focus on Italian banking sector

2.1 Italian entrepreneurial landscape: a short overview of PMO implementation trends

In Italy, even though multinational companies are distributed throughout the territory - especially in the northern area of the country, the entrepreneurial landscape is mainly defined by a multitude of small and medium enterprises (SMEs) and family-run businesses; this configuration justifies the tardy introduction of a PMO role, despite its recognized benefits and its wide development in the rest of the world during the last twenty years [1], [2]. It is possible to discuss further the reason for such restrained behavior:

- In a typical Italian SME, the project portfolio often contains a limited number of projects, or a high number of small projects, apparently easy to conduct and without significant risks;
- The Management could consider it inappropriate to re-think the organizational structure in order to introduce a new unit, also because it could be perceived as an expensive and effort-consuming action [9];
- The Management could also be tempted to allocate projects resources already involved on other roles and tasks, and they may be certainly experienced, definitely with strong technical competences, but absolutely inadequate to organize activities, supervise them, and at the same time reconcile all involved parts in a Project Management's perspective [6];
- Another important reason for the rejection of PMO could be attributed to Italians typical entrepreneurial attitude: a strong creativity-driven approach and a lack of strictness in methodology that does not properly sit with PMO's practices;
- Due to a lack of a real pattern and a great variety of PMOs, as Aubry and others have already stated [3], [8], organizations tend to introduce PMO without a proper awareness of what this might mean for groups and structure.

Nevertheless, lately the professional figure of PMO has been gradually introduced in some Italian environments, and Italian organizations have generally preferred less invasive solutions, such as basic PMO, rather than advanced or intermediate.

2.2 A focus on Italian banking sector and IT area: research methodology

The Italian banking sector is interesting from a Project Management point of view considering the key role that PMOs and Project Management practices in IT area, that, especially in banking sector, requires the generation of diverse categories of projects, making the implementation of PMO mandatory, even in a country where its practice is actually emerging in most industries; this is why the choice of interviewers has fallen on IT areas. For the case study, six banks

have been selected from the chart of the first 15 Italian banking companies listed in the Stock Exchange (Chart updated on February, 2012). The analysis and data discussed are partially based upon a Master of Science thesis [14] as well as on field experiences of the authors; moreover, it has been done by a triangulation of quantitative and qualitative methods. Regarding the qualitative part, analysis and direct observations made by the authors have been re-elaborated in a reflective way, in different sessions along the entirety 2013. The sample is made up by 12 people, 2 for each bank, and each one works as a PMO, with different grades of seniority. Companies are very different in terms of size, history, services, as shown in the table 1, that summarizes the main features.

Basic PMO has been identified with letter A; Advanced PMO with letter B, and Intermediate PMO with letter C. The size of projects has been suggested by interviews, considering the average time, effort and cost of past projects. Qualitative interviews were carried out by telephone, and each interview lasted one hour (see Appendix A. for details about questionnaires). The sample should not be considered completely representative of Italian situation, although it gives a reliable picture of the implementation progress of Project Management methodology in environments with different cultural and structural backgrounds.

Table 1. Profile of respondent banks

Banks in the sample	**Bank 1**	**Bank 2**	**Bank 3**	**Bank 4**	**Bank 5**	**Bank 6**
Establishment	2008	1910	1871	2007	1998	1977
Bank Size (# employees)	< 1000	> 5000	> 3000	> 20000	> 100000	> 100000
Multi-country	No	Yes	No	Yes	Yes	Yes
Projects Size	Small-Medium	Small-Medium	Small	Medium	Medium-Large	Medium-Large
PMO Presence	Type A, C	-	Type A, C	Type A, C	Type A	Type A, C
PMO Job Experience :						
1st resource	> 3 years	> 3 years	> 3 years	> 3 years	< 2 years	< 2 years
2nd resource	≤ 1 year	> 2 years	< 2 years	≥ 1 year	≥ 2 years	≥ 1 year
Predisposition to change	Very High	Low	Low-Medium	Medium	Low-Medium	High
PMO Maturity	> 3 years	-	≥ 1 year	> 2 years	> 2 years	> 3 years

It is worth noting that, in this model, PMO maturity means the average duration of PMO presence in an organization (in years), which slightly differs from the definition of maturity used for example in Pinto, Cota and Levin analysis [8]. In this sense, it is possible to observe that PMO maturity in Italian organizations, at least at the time of the interviews (2012), is still in a developing phase from a temporal point of view, and that is mostly due to recent introduction in organizational contexts. One of the main findings stated in the PMO Maturity Cube [8], is that different PMO maturity levels correspond to different PMO categories; even though maturity is not intended with the same meaning, it is possible to agree with that statement, since from the interviews it emerges that, in an organizational framework different categories of PMO could coexist, and others might be later implemented.

2.3 A focus on Italian banking sector and IT area: evidence from interviews

First of all, it is important to highlight the presence of a recognized PMO in the analyzed sample. In 83% of cases, basic PMO is implemented, and intermediate PMO is observed in 67% of cases. At the time of the interviews (2012), advanced PMO was in a preliminary shape in one of the analyzed cases, and still not officially formalized. Future research could better judge its implementation and evolution through time, since probably this will be the next step for the banks where basic and intermediate PMO has been already implemented.

A similar distribution clearly reflects the previous considerations: Project Management practices have been recently introduced in Italy, and companies are still prudent when it comes to re-organizations, utmost consuming in terms of cost and effort. A basic PMO is an easier way to insert resources skilled in managing projects and supporting Project Leaders without upsetting the organizational balance. Whereas a basic PMO reality is more mature, it is more likely to find also a specific unit for PMO. In fact, as confirmed above, real benefits are recognizable mainly in the long run [9], and after a trial-period, companies would probably find it convenient to enrich their organizational structure with a dedicated unit. In Fig. 3, banks from the analyzed sample are distributed on the basis of their degree of PMO Maturity, matched with their lifetime: considering that the introduction of PMO has been recently implemented, and not all of the observed banks have decided to adopt PMO as a solution for Project Management and communication problems, the presented situation clearly shows that Italy lags behind if compared with other countries.

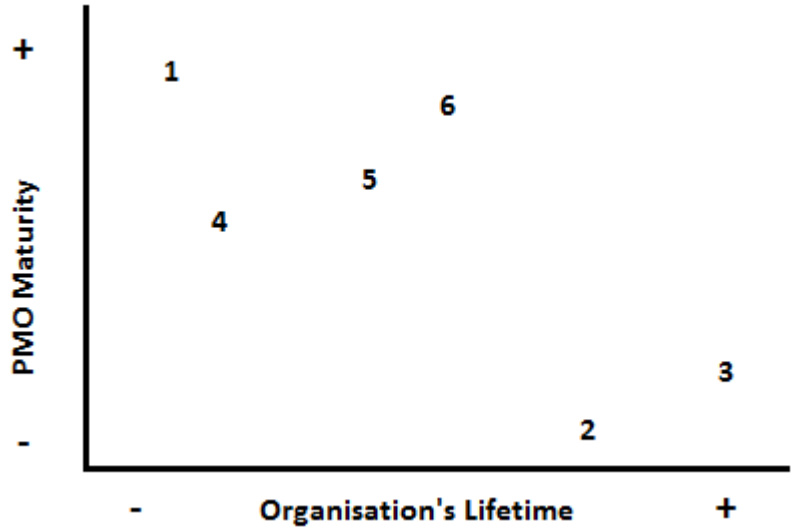


Fig. 3. Banks positioning

Notwithstanding that, the scenery is slowly changing, Fig. 3 may suggest that probably in the next years an increasing number of Italian organizations, at least Italian banks, will be aligned with PMO standards.

2.4 A focus on Italian banking sector and IT area: findings

Which are the main areas of intervention for a PMO? Table 2 illustrates the participation of PMO role within analyzed banks for each of the macro-areas identified and discussed in Section 1.2.

Table 2. PMO Areas of Intervention

PMO Intervention Areas	**Project Portfolio Management**	**Knowledge Transfer and Learning**	**Communication Management**	**Team Management**
Percentage	62%	33%	61%	56%

For *Project Portfolio Management*, in the Italian sample, in 62% of the observed cases this kind of activity is practiced, with more or less success. Its implementation depends on physiological factors related to organizational structure and policies, and not least on cultural aspects, for example a sort of rejection of a potentially rigid methodology, peculiar for PMO role. The percentage should be higher, since this would be the reason that incites companies to opt for a PMO, but often an organization may not be ready to host a similar role, even in case of perceived requirement. A preventive analysis should be conducted, in order to prepare adequately resources and organizational structure, and avoid wasted effort.

Considering *Knowledge Transfer and Learning*, in the analyzed companies, the area is actually developed only in 33% of cases. It is very complicated to reach this point, since it implies a tangible maturity in implementation of the PMO, which is not observable in Italy, except for progressive organizations (1/3 of cases). Recognizing the PMO as a focal point for learning might not be so immediate for team members: in Italian culture there is a sort of skepticism towards figures identified as experts in Project Management, seen as a discipline within everyone's reach, in which experience is the main facet considered for collecting knowledge. There is substantial room for improvement here.

Focusing now on *Communication Management*, in the Italian sample that has been analyzed, 61% of cases benefit from data diffusion. The percentage is still too low, considering that it should be one of the focal points for PMO activity, together with Project Management practices. Since this field goes hand in hand with Project Portfolio Management, considerations could be the same guessed for those activities, even if in certain cases the non-observance of practices could depend on inappropriateness of available tools and instruments, as well on PMO individual communication capability. Regarding the last point, clear guidelines could help to partially overcome the lack of confidence, and strong experience might fill the gap. In other cases, organizations shall furnish all the tools needed to allow communication management, whereas missing.

Finally, in 56% of the observed cases, PMO is compliant with its role in *Team Management*. This macro-area is probably the thorniest aspect to face for a PMO, since he should mainly rely on his empathic and personal capability. But experience is a valid help as well: a higher level of PMO maturity could bring effectiveness to team management, since a resource could become familiar with other people and could avoid conflicts in advance. In fact, team management is observed mostly in Italian organizations with intermediate PMO, in other words in situations of consolidated practices.

3. Discussion

It has already been identified that introducing competencies and a proper methodology related to the Project Management field could ensure time and cost saving, as well as increases in the quality of outcomes and experience of team members, making the re-use of knowledge possible [14]. All the activities mentioned above, if well executed, contribute to managing project risks, increasing the percentage of timely delivery, targeted budgeting and quality requirements [1], [2]. But, is PMO enough to avoid uncertainty and project failures and ensure competitive advantages and innovation? Its contribution has an effect in the long run, provided that suggested expedients have been adopted in time [9]. According to the case study, Italian organizations do not always adopt the model as a whole, and there is definitely room for improvement. The first weakness that emerges from the analysis is the lack of standardized procedures. According to interviewees only one bank has aligned all its Project Documentation to corporate standards, centralizing information thanks to the PMO unit.

A second point of interest concerns communication: PMO, where present, works efficiently, despite some problems due to diffidence; only time and cultural changes could break down resistance, as well as the experience of PMO and resources and their ability to avoid conflicts. It is also important to leverage another point: PMO is still not completely recognized as a useful support for learning. The evidence is directly correlated to the observed lack of training in Project Management field: in fact, not all companies provide continuing education courses either for internal or external resources, to the detriment of risk prevention and management, efficiency and quality of outcomes [6].

Talking about Project Risk Management activities, all interviewees have declared that procedures are not officially formalized, and often actions are down to Project Manager and team member experience and good sense. Individuals mostly address the risk as it appears, and sometimes identifying and managing a risk, before it becomes an issue, can be

very challenging. PMO has great leeway in this sense, and by acting promptly delays in delivering, missing information and risks might be avoided (the separation of a project in different sub-activities, each managed by different groups, could cause problems during the final phase, since parts might be not aligned or in conflict), granting a proper definition of project scope, compliance with corporate policies and standards and information sharing between stakeholders. According to interviewees, every bank tries however to prevent risks, and the most common way of facing it is by retention. That means that a risk frequently stays within organizational framework, and with a good *a priori* analysis, the Project Manager and team members should be able to manage it successfully. So prevention is fundamental, especially in the IT sector, because of the criticality of treated information. In organizations with a stronger PMO unit, the role is not merely confined to a project in itself, but is perceived as a plus for gaining success and growth in the long run, and in that way a PMO works for the whole company, not just for the project stream, adding value and contributing to achieving competitive advantages [2]. PMO could also help companies to mitigate risks, through disaster recovery methodologies, very frequently used in IT areas, and through monitoring and control of tasks and documentation. A low percentage of companies in the sample prefer to transfer risks (33%) while others choose insurances (17%).
With reference to the Italian analyzed sample, it seems that newer organizations are more inclined to implement a PMO unit, as shown in the Fig. 3: their framework could be structured in order to host new areas and in order to place side by side new units in case of changes. New companies are more predisposed to work by projects; furthermore, in the observed case, in companies recently started workers are younger, less hostile to changes, and more inclined to innovation; this is a common trend also abroad, as Dai and Wells already observed [2]. Despite this, the condition is necessary but not sufficient to ensure a correct implementation of PMO: for instance, in the analyzed sample, despite a recent merger and consequent creation of a new financial group, one of the banks still cannot count on Project Management methodologies and instruments, since the Management has not recognized its advantages. One of the companies analyzed in this study is older than the others, deeply traditional and with a strong local presence; it has a different background and different structural features, and it is interesting to note how the innovative pressure during recent years has led to strong changes, among which is the introduction of a PMO unit. Nonetheless, procedures are still not standardized and well defined, and some internal resources have demonstrated hostility toward PMOs, and it is surely due to a cultural legacy, badly managed in the re-organization.
Another important fact that emerges from the observed sample is that in SMEs the role of PMO is often underrated: the small size of a company could falsify the idea of control on project activities, and PMO could be perceived as unnecessary [3], [8], and in effect is not considered in one of the observed cases. Sometimes internal resources are not able to frame the role of PMO, and ultimately this could be related to cultural problems; very often individuals see PMO in a negative way, as an inspector, and not as a mediator or a facilitator. Anyway, where cultural problems have been managed in advance, resources now ask the PMO for support, and he operates as an important connection between stakeholders, easing the project execution phase and sharing information and knowledge.

3.1 Cultural changes

PMO is a role on which companies can rely in order to avoid risk [5], but it must be carefully introduced into the organizational framework, since employees could misjudge its intervention, especially long time workers [3]. People might feel threatened or frustrated because of re-organizations; moreover, an increase in controlling procedures could generate stress or loss of motivation [5]. It is necessary to prepare individuals for changes, above all future team members and Project Managers, explaining tasks and next steps, without insisting on control and judgment. Some recommendations to follow before introducing PMO in a structure are shown below:

- Definition of specific tasks that PMO will cover and his competencies;
- Definition of re-organizational schedule and timetable;
- Monitoring of PMO integration processes;
- Prompt intervention in case of conflicts or critical situation;
- Careful listening at complains from employees/PMO;
- Continuous dialog and comparisons between involved parts.

Following this advice, the risk of rejection could be prevented, and PMO should start to generate benefits. It is worth remembering that PMO is not an emergency solution, but rather a permanent support, effective in the long run [9]. Another improvement could come from an evaluation mechanism among the project team. This is a typical Anglo-Saxon instrument, not in the least used in Italy. It consists of a final judgment of internal and external resources, in anonymous form. It could be useful in order to enhance project effort and quality. Resources with higher grades will be reallocated to new team group for other collaborations, and will be incentivized with bonuses or rewards in terms of career, while others with lower grades could be provided with training courses, to fill their lack of competencies and enhance their knowledge. Every interviewee in the sample answered positively to this question: even if Italian workers are not so used to meritocratic practices, people responded well to the proposal, recognizing its usefulness.

3.2 Expected benefits

It is worth remembering that PMO should be considered as an investment, therefore it needs time to give a return, as said before. In the long run, an organization will realize a series of benefits deriving from the implementation of PMO [1], [2], [5], [8], for example:

- Proactive project risks/issues management;
- Better evaluations in terms of time and budget;
- Increase in effectiveness and efficiency in Project Management;
- Increase in output quality;
- Increased percentage of success in project activities;
- Better coordination and control of tasks and resources;
- Availability and circulation of information;
- Creation of a data-clearing house of information and project best-practices. This could be useful also in case of re-organizations, making handovers easier;
- Implementation of Project Management competencies and know-how within the organization;
- Increase in transparency due to information sharing;
- Increased predisposition to change and innovation;
- Identification of synergies between activities and projects;
- Gap fulfillment, especially during feasibility analysis, due to increased attention and awareness;
- Better definition of project priority and possibility of negotiations in order to manage urgencies.

4. Conclusion

This paper has investigated the main PMO intervention areas emerging from academic literature, aiming to identify challenges and benefits for their implementation in context which are actually innovators or else early adopters of this relevant resource for businesses. To this end an exploratory analysis of the Italian banking sector has been discussed. Examining in depth all the information that emerged from interviews, it is easy to understand that PMO needs particular conditions to work properly [6], [9]. These conditions can be related to organizational structure; flexible framework; matrix structured disposition; project based view; resources; organizational culture; willingness to innovate; ability to work in dynamic environments; low opposition to change; predisposition to working in team; proactive attitude. In the end, it is worth remembering that the success of a project (in terms of final outcome and of processes) always represents an increase in confidence and in safety toward competitors, and this could become a discriminating factor for the stability of a company in its field [1]. That is why, nowadays, companies shouldn't forget to give the right attention to PMO, an essential figure in project based organizations [1]. Implementing PMO within an organizational framework is a project in itself [3], so a company, before deciding to go in a similar direction, should review its Project Management attitude and be prepared for cultural changes. The main topic explored in this paper is how the PMO can create value for the organization across various service groups. An important lesson to take home is that, in order to maximize the

benefits of Project Management support, organizations should seek a custom match among the different possible combinations of PMO services.

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References

[1] M. Aubry, B. Hobbs and D. Thuillier, "A new framework for understanding organizational Project Management through the PMO," International Journal of Project Management, vol. 25, no. 4, pp. 328-336, May, 2007.

[2] C. X. Dai, W. and G. Wells, "An exploration of project management office features and their relationship to project performance," International Journal of Project Management, vol. 22, no. 7, pp. 523–532, October, 2004.

[3] M. Aubry, "Project management offices in transition," International Journal of Project Management, vol. 28, no. 8, pp. 766–778, December, 2010.

[4] B. Hobbs, M. Aubry and D. Thuillier, "The project management office as an organisational innovation," International Journal of Project Management, vol. 26, no. 5, pp. 547–555, July, 2008.

[5] R. Atkinson, L. Crawford and S. Ward, "Fundamental uncertainties in projects and the scope of project management," International Journal of Project Management, vol. 24, no. 8, pp. 687–698, November, 2006.

[6] J. Rodney Turner, A., E. Keegan and L. Crawford, "Delivering Improved Project Management Maturity Through Experiential Learning," International Project Management Journal, vol. 8, no. 1, pp. 72-81, 2002.

[7] S. Pemsel and A. Wiewiora, "Project management office a knowledge broker in project-based organisations," International Journal of Project Management, vol. 31, no. 1, pp. 31–42, January, 2013.

[8] A. Pinto, M. Cota and G. Levin (2012), *The PMO Maturity Cube, a Project Management Office Maturity Model* [Online]. Available: http://www.pmi.org

[9] B. Hobbs (2007), *The multi-project PMO. A global Analysis of the current state of practice* [Online]. Available: http://www.pmi.org

[10] K. Artto, I. Kulvik, J. Poskela and V. Turkulainen, "The integrative role of the project management office in the front end of innovation," International Journal of Project Management, vol. 29, no. 4, pp. 408–421, May, 2011.

[11] S. Pellegrinelli and L. Garagna, "Towards a conceptualisation of PMOs as agents and subjects of change and renewal," International Journal of Project Management, vol. 27, no. 7, pp. 649–656, October, 2009.

[12] M. Aubry, B. Hobbs and D. Thuillier, "Organisational project management: An historical approach to the study of PMOs," International Journal of Project Management, vol. 26, no. 1, pp. 38–43, January, 2008.

[13] F. Pansini, "The role of the Project Management Officer: cases from Italian banking sector," M.S. thesis, Department of Management and Technology, Bocconi University, Milan, Italy, 2012.

[14] R. Atkinson, "Project management: cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria," International Journal of Project Management, vol. 17, no. 6, pp. 337-342, December, 1999.

[15] AA.VV., *The State Of The PMO 2007-2008: A benchmark of current business practices*, 1st ed., USA: CBP Research Report, Center for Business Practices.

[16] V. Morabito (ed.), *Project management office. Da leva organizzativa a driver di competitività*, 1st ed., Milan, Italy, *EGEA*, 2013.

[17] B. Hobbs, (2007). *The multi-project PMO: A global analysis of the current state of practice* [Online]. Available: http://www.pmi.org/Knowledge-Center/Knowledge-Shelf/Project-Management-Offices.aspx

[18] F. Rad Parviz and Ginger Levin, *The Advanced Project Management Office: A Comprehensive Look at Function and Implementation*, 1st ed., USA: CRC Press, 2002.

Appendix A. Questionnaire

The list of questions used for interviews is below. It is important to specify that the interviews were given in the basis of qualitative approach; thus, often it was not necessary to ask specific questions, and frequently the interviewees shared information spontaneously. At the same time, it has not always been possible for interviewees to reply to all the questions, since actual PMO have different shapes and features in each organization.

A.1. Questions

- Which category of PMO is implemented in the Organization (none, basic, intermediate, advanced)?
- Is currently in place any initiative in order to implement a new category of PMO?
- Since when PMO has been established in your Organization?
- How long have you worked as PMO in your Organization?
- How could you consider the average size of projects developed in your Organization?
- Are in place some criteria to define the degree of importance and effects of projects? If yes, could you please describe them?
- Does the PMO use specific tools or instruments for its activities? If yes, could you list them?
- How is the project team assembled and how is the Project Manager chosen?
- How does the team identify the internal and external involved stakeholders and their tasks?
- Is the PMO responsible for the documentation of the project?
- What standard criteria does the Organization set for the project documentation?
- Does the PMO share documentation with stakeholders? In which way?
- Who plans periodical meetings?
- Does the team make a preventive analysis of project's risks and opportunities? In which way?
- Is there any official documentation related to project risk management?
- Does the team decide which risk treatment should be adopted? If yes, in which way?
- Does the team review periodically risks and opportunities? If yes, does the team use standard procedures?
- Could you indicate strengths and weaknesses of project management procedures in your Organization?
- Would you please give some suggestions in order to improve processes and procedures?
- Would you find a final peer evaluation between team members useful for project performance control?
- Do you think that your Organization is a dynamic environment, with predisposition to change?
- Does the Organization offer Project Management trainings and courses to its employees or to external consultants?
- If you answered "yes" to the previous question: have you ever participated? If yes, do you find them useful? If no, would you find useful to participate?
- Have you ever shared your Project Management knowledge in an official way with your Organization?

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Developing business advantages from the technological possibilities of enterprise information systems

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Developing business advantages from the technological possibilities of enterprise information systems

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Abstract:
Organizations are increasingly implementing Enterprise Information Systems (EIS), and Enterprise Resource Planning (ERP) systems in particular. Despite the notable studies on the advantages of an EIS, many organizations are not satisfied with the benefits or advantages gained. At the same time, it is assumed that such systems with increasing innovations and technological enhancements would generate abundant business advantages, if organizations exploited these opportunities. The investigation in this work drew on the sociomateriality perspective, using imbrication notion, and focused on a telecomm case study to examine how organizations can exploit the technological possibilities of an EIS to create business benefits. The study findings suggest that business benefits can be achieved when the EIS as a technical system is interwoven with the organizational work in which both dynamically change in practice (not from the technical features of the system), when the system provides interesting and beneficial technological possibilities that attract organizations, and when the firm has the organizational capabilities to translate these possibilities into real business benefits.

Keywords:
enterprise information systems (EIS); enterprise resource planning (ERP); sociomateriality; imbrication, technological possibilities.

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1. Introduction

Nowadays, business work is highly dependent on the advanced technology and, in many cases, it is difficult to accomplish the business work without information technology [1]. Organizations are increasingly adopting Enterprise Information Systems (EIS), even if implementing the system is challenging and expensive, because they are looking for greater advantages and benefits that are usually not obtainable in smaller systems [2],[3]. Many organizations that have implemented such systems have revealed that the realized benefits from these systems did not meet the organizations' expectations [3], [4]. Actually, there are several studies that have been conducted on the benefits of enterprise systems and provided rich insights (e.g. [5]-[11]).

A review of numerous studies shows that some adopted a variance model [5], [6]. For example, Gattiker and Goodhue [6] used organizational information processing theory to show that high interdependence among organizational subunits can lead to more benefits from an EIS. However, other studies drew their research upon process-based investigations based on social theories. For example, Staehr et al. [8] used structuration theory to understand the business consequences of ERP use. Staehr [9] also used structuration theory to review the benefits of ERP systems, especially to extend the benefits classification model suggested by Shang and Seddon [7]. In a later study, Staehr [10] used structuration theory to study the role of top management in achieving benefits from ERP systems. Most recently, Staehr et al. [11] applied process theory to study the factors that affect the benefit realization from ERP systems after implementation.

Orlikowski and others (e.g. [12]-[15]) argued that studies that use the variance model or information system studies that use traditional social theories, based on emergent process investigations, are not sufficient to study the modern applications of the technology in organizational life, because they do not clearly show the role of technology. It has also been argued that investigations in information systems field should provide its identity to offer compelling explanations for the importance of technology, and not viewing information systems studies as an extension of the reference disciplines like social or management studies that are more focused on the social aspects [12],[16].

Accordingly, an investigation of the underlying theoretical bases adopted in many studies raises a question about the extent that these studies can clearly explain all types of benefits and the extent these studies adequately emphasized the technological facet of the EIS in business advantages or in the reorganization. Some of these studies were based on research perspectives or theories that deal with technology as an exogenous and autonomous driver for business impacts [5], [6]; other studies dealt with technology based on the social actions and interpretations within a process [8]-[11]. These studies may underestimate the role of EIS in reorganization, or may have had difficulty exploring and explaining all kinds of potential benefits from enterprise systems, especially the unintended benefits that emerge in the practice based on the possibilities and opportunities that the technology offers. For example, the benefits that emerge in the practice from system integration with other technologies such as mobile services, or the email system, or any other emerging benefits that the technology offers and the social agency exploits, and put abundant efforts to make them real business benefits like the benefits gained from the accumulated data.

Using a contemporary view of technology in organizations, this work shows that real business advantages emerge in the practice through the interwoven agencies that represent the two sides, social and technology. Therefore, to understand how some benefits can be realized by organizations whereas other benefits are not apparent to all organizations requires paying attention to the use of technology and practice, but not only in the social agency. In doing so, this paper suggests a model that can provide rich insights for exploiting instances of the potential possibilities of enterprise systems, and show how they become real benefits after being implemented. Thus, the research question that motivates this work is: how can an organization exploit the technological possibilities of the enterprise information systems to create business advantages after the system is implemented?

To answer this research question, we attempt to articulate a conceptual framework based on a discussion of sociomateriality, relationality, and imbrication, and based on arguments derived from extant literature, mainly Leonardi

[1]. We applied data from a telecommunication company that implemented an ERP system to provide insights for the articulated framework.

The rest of this paper is composed as follows: Section 2 explores the role of technology in different theoretical perspectives in information systems research. Section 3 discusses the sociomateriality. A conceptual model to view enterprise systems based on sociomateriality is introduced in Section 4. Section 5 presents the data to support the constructed model, followed by a discussion in Section 6. Conclusions are in Section 7.

2. Technology in different theoretical perspectives

Information systems (IS) scholars develop research based on different theoretical foundations. As illustrated by Orlikowski [14], at the outset, researchers in the information systems field drew on theories that dealt with technology as a material playing a role, and viewed technology as an exogenous and relatively autonomous driver of organizational change. Thus, technology has considerable and predictable impacts on various human and organizational outcomes; an example of these theories is contingency theory [14]. Then information systems scholars challenged this notion. Many scholars adopted emergent process that assumes technology is a material artifact socially defined and produced by the people who engage in this technology [14]. This stream adopted the socio-technical system perspective, focusing on the ongoing dynamic interaction between people and organizations from one side, and technology from the other side, over time in an institutional context. These interactions, therefore, were understood in the context of an emergent process. Such theories are process theory, socio-technical, structuration, and institutional theories among others [13], [14]. However, within this same research stream, there are different conceptualizations among different theories. For example, in process theory the structure or the agency was a human agent doing things (events or activities) at some point in time within a context; thus, the focus is on the actors and events. In structuration theory, according to Orlikowski's [17] view, human agents draw on and shape structure (rules and resources) in practice; thus, the focus is on the technologies-in-practice shaped by human agents [15].

Arguably, the second stream, which adopts the emergent process perspective, has also been challenged, according to Orlikowski [14]. Scholars have argued that the emergent process perspective underestimates the huge capabilities and affordances of technology that can affect organizational work [14]. For example, structuration theory or even process theory focuses on the social as agent and ignore the technological capabilities that can form the agency, whereas institutional theory ignores the agency [14], [15], [18]. Furthermore, studies that adopt the emergent process perspective show how technologies can serve as an occasion for social reorganization but not how the material technologies might, in part, constitute the reorganization [19]. This standpoint makes many scholars look for new ways to theorize how technology can provide widely applicable insights to shape organizations and their practices and routines (e.g. [12], [20]). This perspective differs from other traditional information systems perspectives, because, as illustrated by Hassan and Hovorka [16], "sociomateriality does not make a black box out of the IT artefact or any other material element. In fact, it makes the material a key focus such that it will be possible to theorize and elaborate on its significance and interaction with other elements in different contexts".

In contrast, Mutch [21] criticized the sociomateriality perspective, although he acknowledged the importance of bringing the materiality aspect to organization studies. He contended that sociomateriality, which refers to agential realism (e.g. [22]), which is grounded in science studies, is not appropriate for studying the combination of the social and the material that is pertinent to organizational life, which is related to social studies. He also raised problems that, perhaps, face information systems scholars in practice, when they endeavored to theorize based on this perspective. He argues that if the empirical work does not reflect the ontological constitution between the technology and the organization, the traditional socio-technical approach can usually provide more plausible explanations for the empirical world. Mutch [21] also argued that in strong sociomateriality scholars, most likely, lose the ability to draw on fundamental concepts in the socio-technical approach such as roles or structure which are difficult to separate from practice, because the sociological analysis is not present. Most importantly, Mutch [21] believed that sociomateriality is

not applicable to studying enterprise systems that are large, data-intensive systems, because when drawing on such a notion scholars are not specific about the technology, and perhaps, they neglect the broad social context.

Responding to Mutch [21], Scott and Orlikowski [23] stressed that although sociomateriality is inspired by agential realism, sociomateriality does not focus on the physical properties of the materiality but assumes the properties and boundaries are inherent. Therefore, the constitutional ontology is opposed to viewing materiality as an object separate from the social aspect, which suggests conceptual and analytical tools for viewing the world and making sense of its existence in new ways. Furthermore, a reasonable critique about the application of sociomateriality concepts in some works "cannot constitute credible evidence against the original" [23]. In response to Mutch's criticism of the application of sociomateriality to studies focusing on enterprise systems, Scott and Orlikowski [23] believed a larger body of evidence would be needed before having such articulation, as sociomateriality is in its infancy. In the same regard, Leonardi [24] also responded to Mutch. Leonardi considered sociomateriality a promising theoretical perspective, and he confirmed that sociomateriality is influenced by agential realism, but now sociomateriality, as a theoretical perspective, is broader than agential realism. Leonardi, also, argued that critical realism, which Mutch suggested differs from agential realism, and he suggested for scholars to decide which approach to choose based on their empirical work.

Accordingly, this work on sociomateriality aims to contribute on this debate, by drawing on sociomateriality to study enterprise system implementation. In particular, we suggest a model that can provide high level of understanding about the technological possibilities that enterprise systems offer. The sociomateriality perspective is described in more detail in the following section.

3. Sociomateriality perspective

Sociomateriality, as a way of theorizing research, is a new perspective or a new research stream [12]. Sociomateriality can also be viewed as a meta-theory that provides a high level of abstract understanding about the phenomenon under investigation, to exhibit a way of thinking about the world, and not as an empirically testable explanation of social behavior [15]. However, sociomateriality assumes that organizations, people, and technology are not self-contained entities but are mutually constituted and entangled [12]. This ontological constitution, which underlies agential realism, rejects any kind of separation between the social and the material, therefore, the quest is for their existence. In this view, the technological system is a technical component that has material properties organized with the social life, and they shape each other. Each one changes the other through interactions. The technological system in this case is an integral component of the social life, not an incidental or intermittent aspect of organizational life [12]. However, when an organization implements a new technological artifact, and deals with it as a response to specific organizational needs in certain circumstances, then the firm loses sight of "how every organizational practice is always bound with materiality" [12]. This means that focusing on specific organizational needs and on the expected advantages of an information system makes organizations lose the huge opportunities that can emerge from the adopted technological system.

Within sociomateriality, different tents hold different levels of the ontological constitution between the social and material parts; based on that, different terms are used in each tent. Entanglement is mainly suggested in studies by Orlikowski, Scott, and others (e.g. [12]-[14]). Orlikowski described entanglement as "how to take seriously the recursive intertwining of humans and technology in practice" [12]. Different terms are introduced in this view such as entanglement, sociomaterial assemblage, and inseparable constitution. There is also imbrication, which is mainly suggested in studies by Leonardi, Barley, and others (e.g. [1], [20]) focusing on "the entwining of the material and the social" [20]. Many terms are used in this view, such as imbrication and interwoven agencies. However, Leonardi's view, imbrication, allows for some kinds of separateness, because the two agencies are interwoven as originally they are separated, whereas Orlikowski's view, entanglement, does not allow for separateness because the two aspects, human and technology, are mutually constitutive. Authors such as Bratteteig and Verne [25] apply imbrication to suggest disentanglement to give space between the social aspect and technology to reconfigure the agency and improve it. This view, which comes from the design perspective, has been challenged by Kautz and Jensen [26] and by Leonardi and Rodriguez-Lluesma [27]. Kautz and Jensen [26] stressed, "As tempting as it may be to think that entanglements can be

disentangled into imbrications, this is misleading. Imbrications do not need to be 'disentangled', they do not need 'disentanglement' because imbrications are not 'tangled'. They are interlocked and, as such, they need careful unlocking, disconnecting, and separation."

4. Constructing a model to view enterprise systems based on the sociomateriality perspective

The literature argues that the enterprise system is not only a technical system but also a socio-technological artifact working in a social or an organizational context, and entails the engagement of many social actors [28], [29]. In addition, an EIS interacts with the social processes within organizations, and organizational factors shape the use of these systems [30]. Furthermore, such systems have serious implications for organizations, as they can form many organizational roles and practices [31], [32]. However, according to these conceptions, the enterprise system can be theorized based on the sociomaterial perspective. For example, Wagner and colleagues suggested that the enterprise system is part of the organizational life, and they mutually constitute each other [32]. Sociomateriality, here, is important to theorize upon, because it consists of two aspects: social and material. On one side, sociomateriality emphasizes that all materiality is social because it is created through social processes, and it is interpreted and used in social contexts. On the other side, all social actions are possible because of some materiality [1]. Accordingly, a technological information system like an EIS is a technical system that can offer material possibilities and act as a fundamental component in a social context to shape and be shaped by the organizational life.

In this regard, sociomateriality focuses on finding ways or patterns to bring to the foreground from everyday work practices to expand management knowledge in organizations, and to show a clear picture through the materiality of an information system [13]. Thus, these methods can make researchers aware of the system uses and the meanings of these uses for different people, to reveal the importance of the system in their daily work. Accordingly, investigators analyze how people appreciate the benefits that can emerge from the implemented enterprise systems. These uses and meanings are related to the system's benefits, because "[h]ow users choose to adopt and use these systems on an ongoing basis can significantly impact the organizational benefits associated with them" [30]. Thus, sociomateriality as a theoretical stance can exhibit a clear understanding about the potential benefits of an EIS from its capability of exploring the two parties that constitute the implementation of these systems: the organization, humans with work routines representing the social side, and the EIS representing the material side. In this regard, Leonardi and Rodriguez-Lluesma [27] agreed with Suchman [33], when she stated that "the technology acquires its meaning when embedded in social practice and, therefore, in relation to the agent(s) involved and other material elements". They stressed the relational view that entails not dissolving the difference between the social and the technology. Accordingly, to perceive the potential advantages of the enterprise system, the traditional view that theorizes the enterprise system should be abandoned since it has deterministic effects. However, this work suggests engaging in investigations to view the enterprise system implementation based on relationality formation between the main two sides organization and the technology.

4.1. Technological possibilities and organizational capabilities

Entities, whether technological or human, have no inherent properties, but what matters is how they are interconnected [13]. In sociomateriality, technologies have material properties that can provide different possibilities, giving humans the capacity to act upon and exploit the huge capabilities of these technologies [13]. These material properties are not static, but are multiple and dynamic over time [19]. In the later work there are examples of these material properties for technologies such as programmability, senseability, and communicability [34]. Thus, in some cases, humans and materials interweave to create or change business routines, whereas in other cases, the human and material components weave together to develop or modify technologies [1]. This interwoven relationship gives the constructed sociomaterial structure, which consists of both sides, the capability to act according to the relevant agency. Agency is considered by Orlikowski [12] the capacity realized through the associations of actors (human and nonhuman). However, Leonardi [24] considered agency a matter of intra-acting, or enactment, so it is not something someone has. Therefore, in

Orlikowski's view (entanglement), the relational is ontological between the social and the materiality, while the relationality is representational in Leonardi view (imbrication) [26].

However, according to Leonardi's view, people have agency, and technologies also have agency; both are enacted, but inevitably people decide how to respond to specific technologies [1]. This relational formation can be explained as "people who have goals and the capacity to achieve them (human agency) confront a technology that does specific things that are not completely in their control (material agency)" [1]. Saying that material agency means that nonhumans experience things does not mean revoking human contributions; people can adapt and appropriate what nonhumans do [1]. Drawing on that, an organization with its people including the routines represent social agency imbricated with the enterprise system that represents material agency. These two agencies, social and material, are illustrated in Fig. 1.

Accordingly, the potential benefits from EIS emerge when people interweave with the system in practice to generate various uses of the system, and when the EIS enables an organization to do what can be practically accomplished over time. Thus, the benefits generated from EIS are not inherent in the systems' material properties but emerge from how people experience their agency to change and adapt the systems for their needs. It is also based on how the material agency gives humans the opportunity to find new uses for the system, such as developing new practices or changing existing routines. To maintain relationality, Leonardi [1] suggests imbrication between technologies and organizational routines that require flexible technologies and flexible routines.

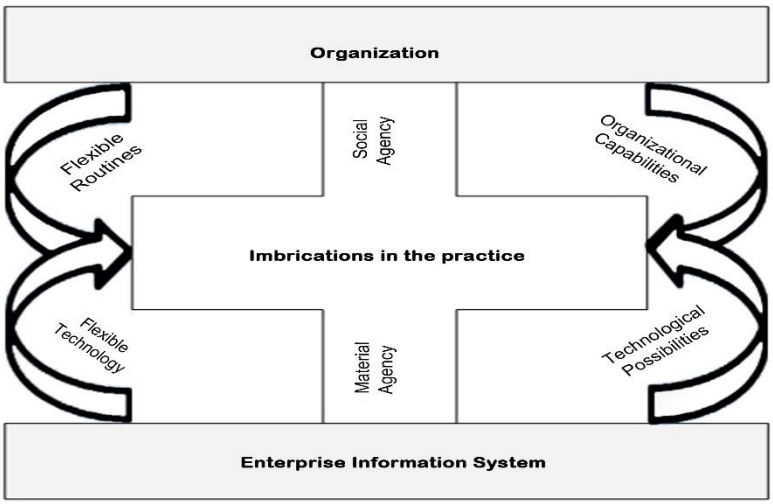

Fig. 1. Imbrication of the enterprise system model

4.2 Flexible technologies and flexible routines

4.2.1 Flexible technologies

It is assumed that the perceived net benefits from an EIS depend on how the system is used [36]. Within an organization, different groups of people are interested in different benefits; therefore, people use the system differently, and the system should be modified according to the group's needs [30]. For example, to ensure that these needs are embedded in the system, the implementation team needs to configure thousands of tables in a complex structural database [11]. These adaptations affect many system modules and functionalities to meet the organization's needs [11]. Thus, when the system becomes more flexible, its materiality offers wide possibilities, it will be more able to reflect the organization's needs and suggest new forms for use, and then it will be able to provide extreme benefits for the

organization. Conversely, when the system has difficulty addressing the organization's needs, people may not use it effectively. Thus, the benefits are minimal. According to the suggested model (Fig. 1), a technologically flexible EIS will enable the material agency that does many things to effectively imbricate with the social agency that has goals, and act to achieve these goals and to provide the maximum benefits through these material possibilities.

Accordingly, EIS should be flexible technologies (Fig. 1) to meet ever-changing business requirements and to effectively change the technology to respond to these requirements and needs. Here, the technological changes, when they are applied, are viewed as a response from the system that has materiality that can translate the organizational needs, which is the social component, to real business advantages within an imbrication process.

4.2.2 Flexible routines

It has been argued that organizations should change their business routines and business processes to realize the benefits from enterprise systems [37]. Wagner et al. [32] called for negotiated practices. It has also been suggested that many business processes or modules must be integrated with the core system, which is the financial module in the case of the ERP. In this way, organizations can obtain greater benefits from the enterprise systems, when the system integrates many business functions across the organization [5]. It is assumed that the changes in the social or organizational side are more extensive, and could influence wide areas inside and outside the organization. Staehr et al. [11] stated, "Although all IS projects involve some degree of organizational change, ERP implementation and use can be differentiated by the capacity to involve extensive changes across a number of functional areas in an organization." Davenport [38] identified examples of organizational change that can be introduced by the enterprise systems, such as a change in structure (e.g., shared services), changes to work practices right across the organization, and changes that affect external parties such as customers and suppliers [11]. However, business benefits accumulate when organizations change business practices or routines and when the enterprise system integrates many business functions across the organization. To do so, the business routines that represent the business logic should be flexible, because new forms should replace existing practices. Based on the suggested model, an organization that has flexible routines will enable social agency, which acts to achieve its interests and goals, to effectively imbricate with the material agency that does wide things, and can offer great possibilities to help the organization achieve the maximum benefits from the material possibilities.

Therefore, in Fig. 1, the organizational routines should be flexible to interweave with the EIS to produce new combinations or possibilities for the organization's work. This flexibility can allow organizations to introduce new routines or to change existing ones based on the possibilities of the enterprise system.

Now the question that can be raised is, which types of changes, technological or organizational, have priority? Using the sociomateriality perspective, "[b]y themselves, neither human nor material agencies are empirically important. But when they become imbricated—interlocked in particular sequences—they together produce, sustain, or change either routines or technologies" [1]. This formation also interweaves the technological development and the system adaptations, with the organizational changes and the process reorganizing; so they are no longer separate or distinct processes across the overall implementation phases [39].

5. Insights from practice

5.1 The case study

In our study, a company called B Mobile was investigated. The company, a leading provider of mobile telecommunication services in the Middle East, started operating in 1999. The company built consistent growth in the customer base, starting from 1 million in 2007 to about 2 million subscribers in 2010. By end of 2012, the company had about 2.5 million subscribers. B Mobile has an extensive network of 29 stores, more than 1,000 major and primary distributers, and hundreds of outlets in different areas. By the end of 2012, 950 employees worked in different locations. The company started implementing an Enterprise Resource Planning System (ERP) early in 2007, and the system was

ready for use in September 2007. This system has been viewed as essential, and company management considered it indispensable for doing the company's internal administrative work, which had increased over time. It was difficult to deal with the huge amount of the work generated by the large number of external parties: customers, suppliers, and distributers, without an enterprise system that manage all the financial and administrative issues for the company. The study investigations were conducted in July and August 2013, targeting different interviewees working at different business functions to represent different voices, but it was important to recruit interviewees worked in the system's implementation that had been conducted in 2007.
Table 1 provides details about the case informants, their business roles, and interview duration.

Table 1. List of interviewees with their roles and duration

Interviewee code	Role	Interview duration in minutes
B1	Head of Financial Department & Internal Project Manager (Company side)	70
B2	Reconciliation & Account Receivable Section Head	90
B3	Fixed Assets & Inventory Section Head	90
B4	Accounts Payable Supervisor	60
B5	General Accounting Section Head	50

5.2 Findings

5.2.1 Interwoven relation

Initially, the company had expectations based on its needs and requirements. These expectations mainly focused on implementing a comprehensive system that covers all business functions that can provide efficient and consistent data. The company was also interested in an ERP system to help the staff handle the increasing daily work in less processing time and with a minimum level of human error. Two years after the system was implemented, the company staff realized that these expectations, to large extent, had translated into real business benefits. When the company informants were asked about their level of satisfaction with the benefits, all reported that they were at least 70% satisfied from the system outcomes. The interviews revealed that the people were satisfied not only with the system implementation. The enterprise system became a comprehensive organizational practice that entailed a robust relation, and it became difficult to detach the system from their daily work. The head of the finance department (B1) said, "I cannot imagine the company without the system, because the system brings international and world-class business practices to the company, so now we can say we have a modern operation management and this is because of the system's implementation". In addition, the fixed assets and inventory section head (B3) mentioned, "The system solved the paper work problems, alone, I was using about five boxes of paper weekly, but now the whole department about 30 employees use this amount of paper". Further, the general accounting section head (B5) said, "It is easier for me to stay at home if I have to do the current work based on the old system and based on the old way of organizing". He also said, "The system is not complementary to our work, but it is a primary part of it". The reconciliation and account receivable section head (B2) said, "The system becomes part of the company, and if we remove it from the company that means we change our way for doing our work". Another informant said, "If you imagine how we were working before, you would know how much the system helped us and changed our work, and because of this I cannot imagine my daily work or imagine the company work without the system". During various different visits to the company, it was easy to observe that the staff offices did not perform much manual work, and there were no manual accounting booklets, for example. That means the system replaced the old manual work with new electronic practices.

5.2.2 Technological possibilities

The company informants were also satisfied because they realized many unexpected benefits. These benefits helped them do their work more productively and efficiently. An example is the use of mobile technologies to do and follow part of the business work using the ERP system. The company managers said that many times, for different reasons, accessing their offices was difficult. This challenge created delays in their work; the processes in the enterprise systems are integrated and served many business functions. A process such as the procure-to-pay cycle was fully implemented. That means the process would take care of procurement, stock control, finance, and budget, so their work depended on each other. The head of the finance department (B1) said, "When it became difficult to reach the company office, and I came into the office the next day, I might find a significant number of the system transactions that were pending and required approval". After the system was upgraded, the email system could be accessed with mobile phones to review, approve, or disapprove certain transactions. The email system and a mobile device could now be used to review warning messages that showed if an employee used the system to do something different from what was defined for him or her. This benefit was very important for people who work from home or attend many meetings outside the company. Company personnel had been unaware of these benefits in 2007 when the company started the implementation; however, after several years, employees knew about these advantages. These technological possibilities provided unexpected benefits.

5.2.3 Organizational capabilities

Investigating what the company did to ensure successful implementation and successful cultivation of the system advantages showed that management was very supportive of the system implementation, and worked hard to ensure successful implementation and exploitation of the system features that could create real benefits for the company. Further, the company had a strong, long-term partnership with the consulting company that implemented the system. The company also appointed many people experienced in ERP implementation, during and after the implementation. Furthermore, system logic was dominant in the organization, which means the company replaced many practices with new practices. For example, the system provided restrictions when people attempted to delete an invoice or settle an invoice in a currency different from the original currency, which had been acceptable before the system was implemented. Additionally, the budget process was completely changed. Instead of giving the head of the budget section the authority to approve a purchase order, the system now automatically generates approval if there is enough money in the budget for the department that had submitted the purchase order.

6. Discussion

In this work, we suggested analyzing the data based on the constructed model that adopts the imbrication notion [1]. In the case suggested by Scott and Orlikowski in consequent works [40], [41] on TripAdvisor, the authors used entanglement. However, we maintain that it is difficult to describe TripAdvisor as a social travel community without describing the technological part that constitutes the site's core business. In the enterprise systems implementation case, the system is very important, and it became difficult to imagine that a company that has huge engagements like outlets, customers, suppliers, etc., does not have an enterprise system. A company of that size could function without an enterprise system but would be less efficient. Thus, we examined how the technology agency is imbricated with the social agency to generate substantial advantages for the business. The focus was on the imbricated agencies that were interwoven and ontologically interlocked, but not entangled. Entanglement may create difficulties in analyzing ERP implementation, since it entails inseparable constitution between the social and material, which was not easy to capture in the empirical work of this study. This work examined the ERP implementation in a company, accomplished when two separate objects, the company that implemented the system (social aspect) and a technological artifact that can offer material possibilities, enact together. Before the implementation, these two aspects were separate. After the implementation, and when people started using the system, the two agencies became imbricated in the practice, which becomes difficult to talk about their business work after the implementation without mentioning the enterprise system, or even imagine their business with its complexity without an ERP system. As defined by Leonardi [1], "To imbricate

means to arrange distinct elements in overlapping patterns so that they function interdependently". On the other hand, entanglement may not be appropriate for studying this ERP implementation as Orlikowski believed in the ontology of inseparability, and acknowledged that from the beginning the social and the technology are entangled, so they exist together. Orlikowski [14] cited other scholars to express the ontology of inseparability: "Thus, the social and the technical are posited to be 'ontologically inseparable from the start' (Introna, 2007, p. 1) [42] and, as Suchman (2007, p. 257) [33] notes, 'the starting place comprises configurations of always already interrelated, reiterated sociomaterial practices'. On this view, capacities for action are seen to be enacted in practice and the focus is on constitutive entanglements (e.g., configurations, networks, associations, mangles, assemblages, etc.) of humans and technologies". Entanglement, based on Orlikowski's view, explains the ontological existence, human and technology, and rejects the ability to view humans and technology as distinct elements. In this regard, if an organization already has an ERP, and years later decided to replace it with other system, how could we analyze this empirical situation using entanglement, which rejects inseparability? However, imbrication, which assumes distinct elements are interwoven together, accepts careful unlocking, disconnecting, and insightful separation [26].

The study provided empirical evidence of an ERP implementation, of the model in Fig. 1, and an explanation for this model. This work shows that enterprise systems generate advanced business advantages, and provide a high value to organizations for the investment, through the following aspects: first, when the enterprise system becomes imbricated with the work, so they work together to achieve the organization's objectives by shaping each other (imbrication); second, when the system offers technological possibilities that attract the organization (material agency); and third, when the organization have capabilities that ensure successful exploitation (social agency). Details of these aspects are explained below:

- The advantages of EIS can be enriched when the enterprise system becomes imbricated or interwoven with the organization. From this study finding, it is clear that the company considers the system an important part of doing the business work, and the company staff stressed that they cannot imagine their business work without the enterprise system. The study showed that the company staff acknowledged the importance decreasing manual work, which was confirmed with observations of staff offices. The enterprise system converted all of the manual work into computerized practices, and this work became part of the EIS. Here, the enterprise system became not only a financial system but also a comprehensive organizational practice comprising all the details of the business work, and organized it in an effective and efficient practice. That means, one cannot talk or describe the current business work after implementing the ERP without referring to the system, which made the business work, that is, the organizational aspect acts upon social agency, interwoven with the technicality of the enterprise system (the materiality aspect). Therefore, the enterprise system, which was originally an IT product, became imbricated or interwoven with the organizational life, and became part of everyday practices. This formation supports many studies that theorized, based upon the sociomaterial perspective, that the information system is part of the organizational life and they shape each other, and is not an incidental or intermittent aspect of the organizational life [1],[12]-[14],[24],[32];
- The advantages of EIS form when the technological possibilities create an interesting use or a business advantage for the firm, and the firm has an interest in that advantage and values it. In this aspect, the study showed how unintended benefits emerged when the enterprise system provided the possibility to do part of the work with the email system and mobile devices. The company did not deal with the enterprise system as a response to organizational needs, because the need for incorporating mobile devices was not part of the requirements when the company started the implementation, but emerged after the implementation. This conceptualization is in line with other studies [1],[43] that assumed that the possibility for action is not pre-defined but depends on the context that helps achieve this possibility. This study also confirmed suggestions by Majchrzak and Markus [44] that assumed using the system does not mean exploiting all the potential of the technology, but organizations can exploit the potential of technology over time. However, this kind of exploitation would not be achieved without flexible technology, which was apparent with the flexibility of the system that allowed programming within the system and

integration between the enterprise system and the email system. Email messages were treated as transactions with the system. In addition, through programming the company developed appropriate validation rules when they were needed. This study also confirmed that the real benefits are not inherent in the physical features of the system, but in the materiality of the technology that can provide beneficial use [1]. However, configuring a complex system like an EIS with default values, or based on the consultant's habits in the system's implementation, will not provide distinctive features that can be obtained from the system possibilities. As a result, organizations will lose flexibility in their technology and, in turn, will not achieve huge benefits from the systems;

- The advantages of EIS could be achieved when the organization became capable of taking benefits from the technological possibilities. Thus, to integrate the system with another system, or with another device, the company used the benefit of experienced IT people who were available in the company, had the expertise, and were aware of many system features, and the management allocated funds to provide mobile devices for the company staff. Furthermore, the decision to approve a financial transaction on a mobile device, and budget items, required a strong management that considered the business routines flexible. These organizational capabilities are relational aspects through which the company exploited potential benefits of the enterprise system. Leonardi [1] argued that such relational aspects are not available in all organizations, and thus, some organizations can achieve the potential of the technology, whereas others face difficulties.

7. Conclusion

This paper discussed the sociomateriality perspective to provide an improved understanding for exploiting the potential benefits of an EIS. Sociomaterial structure or the imbrication between the enterprise system and the organization helps organizational work become an integral part of the materiality of the technical system. This structure allows researchers to understand how the EIS can shape organizations' work and be shaped by social adaptations, according to the organizational needs and the system possibilities. The relationality notion illustrates how the benefits from enterprise systems are not inherent in the systems' material properties, but based on the dynamic relationship between the people who experience their agency changing and adapting the enterprise systems for their needs, and the materiality of the system. This materiality provides new opportunities to develop new practices or to change existing routines. However, to answer the study question, the potential benefits of EIS can be exploited or realized when the EIS as a technical system is imbricated with the organizational work in which both dynamically change in the practice (not from the technical features of the system), when the system provides interesting and beneficial technological possibilities that the organization values, and when the firm has the organizational capabilities that enable it to translate these possibilities into real business benefits. Finally, this work used a single case study; therefore, in future research, a multiple-case study should collect a wide range of data to validate the research model. In addition, further empirical research should investigate the relationality factors that make some organizations more able than others to achieve the potential benefits of ERP systems or other enterprise information systems.

References

[1] P. Leonardi, "When flexible routines meet flexible technologies: affordance, constraint, and the imbrication of human and material agencies," *MIS Quarterly*, vol. 35, no.1, pp. 147-167, 2011.
[2] P. Seddon, C. Calvert and S. Yang, "A multi-project model of key factors affecting organizational benefits from enterprise systems," *MIS Quarterly*, vol. 34, no. 2, pp. 305-328, 2010.
[3] Panorama-Consulting, "2012 ERP report: a Panorama Consulting solutions research report," 2012.
[4] M. Al-Mashari and M. Zairi, "Information and business process inequality the case of SAP R/3 implementation," *The Electronic Journal of Information Systems in Developing Countries*, vol. 2, no. 4, pp. 1-15, 2000.
[5] T. Davenport, J. Harris and S. Cantrell, "Enterprise systems and ongoing process change," *Business Process Management Journal*, vol. 10, no. 1, pp. 16-26, 2004.

[6] T. Gattiker and D. Goodhue, "Understanding the local-level costs and benefits of ERP through organizational information processing theory," *Information & Management*, vol. 41, no. 4, pp. 431-443, 2004.
[7] S. Shang and P. B. Seddon, "A comprehensive framework for classifying the benefits of ERP systems," in the *Americas Conference on Information Systems*, Long Beach, USA, pp. 1005-1014, 2000.
[8] L. Staehr, G. Shanks and P. Seddon, "Understanding the business consequences of ERP use," in *European Conference on Information Systems*, Gothenburg, Sweden, 2006.
[9] L. Staehr, "Assessing business benefits from ERP systems: an improved ERP benefits framework," in the *ICIS Proceedings*, Montreal, Canada, paper 36, 2007.
[10] L. Staehr, "Understanding the role of managerial agency in achieving business benefits from ERP systems," *Information Systems Journal*, vol. 20, no. 3, pp. 213-238, 2010.
[11] L. Staehr, G. Shanks and P. B. Seddon, "An explanatory framework for achieving business benefits from ERP systems," *Journal of the Association for Information Systems*, vol. 13, no. 6, pp. 424-465, 2012.
[12] W. Orlikowski, "Sociomaterial practices: exploring technology at work," *Organization Studies*, vol. 28, no. 9, pp. 1435-1448, 2007.
[13] W. J. Orlikowski and S. V. Scott, "10 sociomateriality: challenging the separation of technology, work and organization," *The Academy of Management Annals*, vol. 2, no. 1, pp. 433-474, 2008.
[14] W. J. Orlikowski, "The sociomateriality of organisational life: considering technology in management research," *Cambridge Journal of Economics*, vol. 34, no. 1, pp. 125-141, 2010.
[15] B. Mueller, P. Raeth, S. Faraj, K. Kautz, D. Robey and U. Schultze, "On the methodological and philosophical challenges of sociomaterial theorizing: an overview of competing conceptualizations," in *the International Conference on Information Systems*, Atlanta, United States of America, pp. 845-852, 2012.
[16] N. R. Hassan and D. S. Hovorka, "Sociomateriality and IS Identity", in *the ACIS*, Sydney, Australia, 2011.
[17] W. J. Orlikowski, "Using technology and constituting structures: a practice lens for studying technology in organizations," *Organization Science*, vol. 11, no. 4, pp. 404-428, 2000.
[18] O. Volkoff, D. M. Strong and M. B. Elmes, "Technological embeddedness and organizational change," *Organization Science*, vol. 18, no. 5, pp. 832-848, 2007.
[19] M. Barrett, E. Oborn, W. J. Orlikowski and J. Yates, "Reconfiguring boundary relations: robotic innovations in pharmacy work," *Organization Science*, vol. 23, no. 5, pp. 1448-1466, 2012.
[20] P. Leonardi and S. Barley, "Materiality and change: challenges to building better theory about technology and organizing," *Information and Organization*, vol. 18, no. 3, pp. 159-176, 2008.
[21] A. Mutch, "Sociomateriality — Taking the wrong turning?," *Information and Organization*, vol. 23, no. 1, pp. 28-40, 2013.
[22] K. Barad, "Posthumanist performativity: toward an understanding of how matter comes to matter," *Signs: Journal of Women in Culture and Society*, vol. 28, no. 3, pp. 801-831, 2003.
[23] S. V. Scott and W. J. Orlikowski, "Sociomateriality — taking the wrong turning? A response to Mutch," *Information and Organization*, vol. 23, no. 1, pp. 77-80, 2013.
[24] P. M. Leonardi, "Theoretical foundations for the study of sociomateriality," *Information and Organization*, vol. 23, no. 1, pp. 59-76, 2013.
[25] T. Bratteteig and G. Verne, "Conditions for autonomy in the information society," *Scandinavian Journal of Information Systems*, vol. 24, no. 2, pp. 51-78, 2012.
[26] K. Kautz and T. B. Jensen, "Debating sociomateriality: entanglements, imbrications, disentangling, and agential cuts," *Scandinavian Journal of Information Systems*, vol. 24, no. 2, pp. 89-96, 2012.
[27] P. M. Leonardi and C. Rodriguez-Lluesma, "Sociomateriality as a lens for design," *Scandinavian Journal of Information Systems*, vol. 24, no. 2, pp. 79-88, 2012.
[28] P. Devadoss and S. Pan, "Enterprise systems use: towards a structurational analysis of enterprise systems induced organizational transformation," *Communications of the Association for Information Systems (CAIS)*, vol. 19, pp. 352-385, 2007.
[29] D. Howcroft and B. Light, "The social shaping of packaged software selection," *Journal of the Association for Information Systems*, vol. 11, no. 3, pp. 122-148, 2010.

[30] K. Dery, R. Hall and N. Wailes, "ERPs as technologies- in-practice: social construction, materiality and the role of organizational factors," *New Technology, Work and Employment*, vol. 21, no. 3, pp. 229-241, 2006.
[31] J. Kallinikos, "Deconstructing information packages: organizational and behavioural implications of ERP systems," *Information Technology & People*, vol. 17, no. 1, pp. 8-30, 2004.
[32] E. L. Wagner, S. Newell and G. Piccoli, "Understanding project survival in an ES environment: a sociomaterial practice perspective," *Journal of the Association for Information Systems*, vol. 11, no. 5, pp. 276-297, 2010.
[33] L. Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*. Cambridge, England: Cambridge University Press, 2007.
[34] Y. Yoo, O. Henfridsson and K. Lyytinen, "Research commentary - The new organizing logic of digital innovation: an agenda for information systems research," *Information Systems Research*, vol. 21, no. 4, pp. 724-735, 2010.
[35] Y. Yoo, "Computing in everyday life: a call for research on experiential computing," *MIS Quarterly*, vol. 34, no. 2, pp. 213–231, 2010.
[36] C. Ng, "A case study on the impact of customization, fitness, and operational characteristics on enterprise-wide system success, user satisfaction, and system use," *Journal of Global Information Management*, vol. 21, no. 1, pp. 19-41, 2013.
[37] T. H. Davenport, "Putting the enterprise into the enterprise system," *Harvard Business Review*, vol. 76, no. 4, pp. 121-131, 1998.
[38] T. H. Davenport, *Mission Critical: Realizing the Promise of Enterprise Systems*. Boston, MA: Harvard Business Press, 2000.
[39] P. M. Leonardi, "Crossing the implementation line: the mutual constitution of technology and organizing across development and use activities," *Communication Theory*, vol. 19, no. 3, pp. 278-310, 2009.
[40] S. V. Scott and W. J. Orlikowski, "Great expectations: the materiality of commensurability in social media," In: P. Leonardi, B. Nardi and J. Kallinikos, eds. *Materiality and Organizing: Social Interaction in a Technological World*. Oxford, England: Blackwell, pp. 113-133, 2012.
[41] S. V. Scott and W. J. Orlikowski, "Entanglements in practice: performing anonymity through social media," *MIS Quarterly*, Special Issue on Sociomateriality, 2014.
[42] L. D. Introna, "Ethics and the speaking of things," *Theory, Culture and Society*, vol. 26, no. 4, pp. 25-46, 2009.
[43] R. Zammuto, T. Griffith, A. Majchrzak, D. Dougherty and S. Faraj, "Information technology and the changing fabric of organization," *Organization Science*, vol. 18, no. 5, pp. 749-762, 2007.
[44] A. Majchrzak and M. Markus, "Technology affordances and constraints in management information systems (MIS)," in *Encyclopedia of Management Theory*, E. Kessler, Ed. Thousand Oaks, CA: Sage, pp. 832-836, 2013.

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