Research Article

IT project manager competencies and IT project success: a qualitative study

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Abstract
Project managers' leadership competencies have been highlighted as contributing to projects success in the literature. Project managers can develop competence that will allow them to build a productive environment for team members to perform well, ensuring project success. Since there is a lack of studies regarding the relationship between information technology (IT) project manager competencies and project success, this paper addresses the following research question: what are the most relevant competencies in IT project managers' development to achieve IT project success? To answer this question, we conducted a qualitative research study using an exploratory approach. To collect data, 16 in-depth interviews were conducted with Brazilian professionals from diverse business sectors. The data analysis showed that the most relevant competencies are — team management, business domain knowledge, communication, project management and people skills. We also observed that technical skills were considered relatively less relevant to IT project success than behavioral, business and managerial competencies.

Keywords: IT project manager competencies; IT project success; qualitative research; project management

Introduction
Information technology (IT) project management is a research topic that has been discussed extensively in the literature (Atkinson 1999; Delone & Mclean 1992, 2002; Jetu & Riedl 2012). Despite continuous investments and studies on this theme, the failure of IT projects continues to trouble executives and organizations (Sumner, Bock & Giamartino 2006). From 2003 to 2012, in large software projects, 52% were over budget, late and/or had unsatisfactory implementation; 42% were either canceled prior to completion or not used after being implemented; and only 6% were implemented and deemed successful (implemented on time, within budget and had satisfactory results) (The Standish Group 2014).

The literature includes different studies on IT project success, such as criteria to measure project success (Atkinson 1999; Delone & Mclean 2003) and success factors (Cooke-Davies 2002; Young & Jordan 2008). Traditionally, project success is defined as meeting user requirements within the budget and time specified (Atkinson 1999; Jha & Iyer 2007). However, many authors argue that these criteria do not represent reality. Shenhar and Dvir (2007) emphasize that project managers should pay more attention to the business environment. For them, a successful project: (1) increases efficiency; (2) brings positive impact to customers; (3) produces business success; (4) prepares the organization for future endeavors; and (5) affects the project team positively (Shenhar & Dvir 2007).

Studies affirm that project managers are one of the basic factors contributing to project success (Jha & Iyer 2007; Wateridge 1997). For this reason, staffing projects with

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managers who have the "right competencies" is crucial to achieve organizational goals, to maintain competitive advantage and to ensure that the organization's projects will achieve the expected performance (Sumner et al. 2006; Thamhain 2004). Despite this, organizations seem to appoint project managers to manage projects mainly based on their technical skills rather than their managerial skills, which can jeopardize the results of the project (Kerzner 2009; Wateridge 1997).

The challenges and dynamics of today's IT environment require the project manager to develop other competencies besides technical skills, such as communication and leadership (Keil, Lee, & Deng 2013; Skulmoski & Hartman 2009; Sumner et al. 2006). The IT environment is stressful, challenging and dynamic. Moreover, IT project managers are often required to deal with users, technical workers, managers, conflicts, miscommunication and work burnout (Sumner et al. 2006). Therefore, IT project managers have to develop a diversified range of competencies in order to be successful.

As the literature lacks studies on the relationship between IT project manager competencies and project success (Turner & Müller 2005), this paper aims to identify which project manager competencies are more relevant to achieve success in IT project settings. To do this, we started with the following research question: what are the most relevant competencies in IT project managers' development to achieve IT project success? To answer this question, we conducted an exploratory qualitative study based on 16 in-depth interviews with experienced IT professionals from different companies and business sectors. The collected data was analyzed using the software NVIVO 10.

The paper is structured as follows: (1) introduction, (2) theoretical background about IT project manager competencies and IT project success; (3) research methodology; (4) data analysis; (5) discussion; and (6) conclusion.

Literature review

This section presents the theoretical background of the two pillars of this paper: IT project manager competencies and IT project success.

IT project manager competencies

The definition of competence has been the object of continuing debate and remains a contentious topic in the organizational literature (Crawford 2005). For the purpose of this research, competence is defined as a combined set of an individual's knowledge, abilities, personal characteristics used to perform a specific task or activity (Capin, Knoepfel, Koch, Pannenbäcker, Pérez-Polo, & Seabuy 2006; Crawford 2005; Müller & Turner 2010).

The IPMA Competence Baseline divides project manager competencies into three groups: technical, behavioral and contextual (Capin et al. 2006). The **technical competencies** refer to competencies related to project management itself, for example, project planning, time management, etc. **Behavioral competencies** are to do with the personal abilities and skills of the project manager such as leadership, creativity and commitment. The **contextual competencies** range involves the competencies related strictly to the context of a specific project, such as development and programming skills, business knowledge, knowledge of legal issues, and others (Capin et al. 2006). Figure 1 illustrates the IPMA standard competence model known as the 'standard competence eye'.

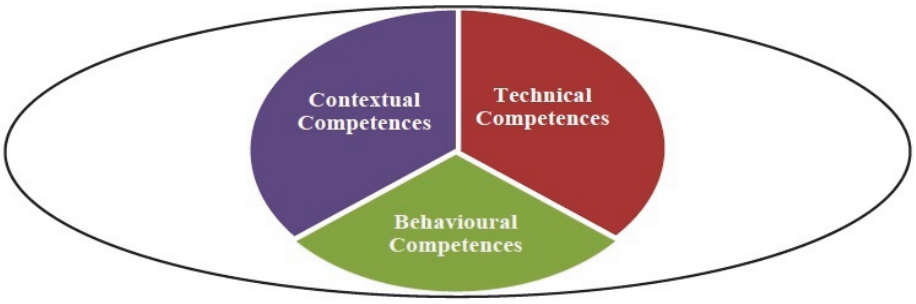

Figure 1. The IPMA standard competence eye
Source: Adapted from (Capin et al 2006)

Many studies have been conducted to determine which individual/managerial competencies are essential for efficient project management (Keil et al. 2013; Skulmoski & Hartman 2009; Turner & Müller 2005). An interesting finding from these studies is that IT project managers lack soft skills such as communication and leadership, which jeopardizes their performance (Stevenson & Starkweather 2010; Sumner et al. 2006).

Based on a variety of articles, especially the studies of Keil et al. (2013) and Skulmoski and Hartman (2009), we compiled an extensive list of IT project manager competencies relevant to IT project success. These competencies were grouped into ten categories according to their characteristics and/or purposes, similar to the studies of Keil et al. (2013) and Skulmoski and Hatman 2009 (Table 1).

Table 1: Summary of competence categories for effective IT project management

Competence Category	Category Description	Skills	Caupin et al (2006)	Keil et al. (2013)	Skumoski and Hartman (2010)	Stevenson & Starkweather (2010)
Team Management	Includes competences required to manage and lead team members effectively. Not only should IT project managers lead their team but they also need to motivate and empower project team members.	Ability to motivate team members		X	X	
		Ability to empower future leaders (mentoring / coaching)		X	X	
		Celebrating accomplishments	X	X	X	
		Collaboration		X	X	
		Ability to bridge diverse teams		X	X	
		Virtual team skills		X	X	
		Leadership	X	X		X
		Create an effective environment	X		X	X
		Share-information and credit			X	
		Protect the team			X	
		Provide feedback			X	
		Give autonomy to team members				
Business domain knowledge	This category encompasses the competences needed to work effectively with business partners. A successful IT project manager understands the overall context of the project and oversees the impact of the project on the organization.	Ability to understand the business domain	X		X	
		Ability to identify stakeholders	X	X	X	
		Ability to involve end-users	X		X	
		Business skills	X	X	X	
		Knowledge of the end product		X		
		Ability to document process	X	X		
		Strategic thinking		X		
		Vision-oriented/articulate the business problem		X	X	

Competence Category (continuation)	Category Description	Skills	Caupin et al. (2006)	Keil et al. (2013)	Skumoski and Hartman (2010)	Stevenson & Starkweather (2010)
Business Domain Knowledge (cont.)		Cultural fit				X
Communication	Communication involves all the skills necessary to communicate effectively with the team, stakeholders and all those affected directly or indirectly by the project.	Verbal communication	X	X	X	X
		Written communication	X	X	X	X
		Listening		X	X	
		Ability to construct persuasive arguments		X	X	
		Effective questioning			X	
		Open communication	X		X	
		Presentation skills			X	
		Ability to communicate at multiple levels				X
People skills	These skills are used to build and maintain good relationships with the individuals involved in the project. Building good relationships is crucial to avoid political and relational obstacles.	Conflict management	X	X	X	
		Good people skills		X	X	
		Negotiation	X	X	X	
		Relationship building		X		
		Understanding the psychology of people		X		
		Charisma			X	
		Political awareness/agility/tact			X	
		Compromise			X	

Competence Category (continuation)	Category Description	Skills	Caupin et al. (2006)	Keil et al. (2013)	Skumoski and Hartman (2010)	Stevenson & Starkweather (2010)
Technical	Generally, these skills are related to IT developers. They include knowledge on IT development methodologies, processes and techniques.	Technical skills	X	X	X	X
		Development methodology skills		X		
Project management	This category includes competencies necessary to ensure that the project is well managed, such as planning and motoring.	Scope management	X	X	X	
		Project planning	X	X	X	
		Time management	X	X	X	
		Resource utilization	X	X	X	
		Closing projec	X	X	X	
		PM tool skills		X	X	
		Project chartering	X	X	X	
		Cost management	X	X	X	
		Risk management	X	X	X	
		Alignment	X		X	
Personal characteristics	There are personal characteristics that may help project managers to achieve positive results. This category includes innate and nurtured personal features.	Sense of humor			X	
		Consensus seeking			X	
		Attention to detail			X	
		Patience	X	X		
		Ability to handle stress	X	X		
		Persistence		X		
		Cooperation		X		
		Decisiveness	X	X	X	

Competence Category (continuation)	Category Description	Skills	Caupin et al. (2006)	Keil et al. (2013)	Skumoski and Hartman (2010)	Stevenson & Starkweather (2010)
		Objectivity		X	X	
		Confident/realistic		X	X	
		High-level perspective		X	X	
		Flexibility/manage ambiguity		X	X	X
Personal characteristics (continued)		Judgment		X	X	
		80/20 perspective/ pare to principle		X	X	
		Mental capability	X		X	
		Ability to learn/ self-evaluation			X	
		Self-organization/ self-directed			X	
		Initiative/ proactive			X	
		Empathy			X	
		Transparency/ honesty	X			
Organizational	Organizational competences include abilities that enable the IT project manager to organize and coordinate the project activities and resources.	Organizational skills	X	X		
		Multi-tasking		X		

Competence Category (continuation)	Category Description	Skills	Caupin et al. (2006)	Keil et al. (2013)	Skumoski and Hartman (2010)	Stevenson & Starkweather (2010)
Problem solving	Successful IT project managers are able to identify, analyze and solve problems that occur during the project.	Analytical skills		X	X	
		Research skills		X	X	
		Creativity/ innovation/ resourcefulness	X		X	
		Decision making ability				
		Credibility	X	X	X	
Professionalism	Professionalism refers to the project manager's values and characteristics that express his/her commitment and integrity.	Commitment	X	X	X	
		Focus on quality	X	X	X	
		Professional skills		X		
		Ownership of tasks			X	
		Not compromising on the facts			X	
Professionalism (continued)		Participate and contribute fully	X	X		
		Results-oriented	X	X		
		Lifelong learning		X		
		Experience				X

IT project success

Traditionally, projects are assessed using time, cost and quality specifications — the so-called "Iron Triangle" (Atkinson 1999). However, several scholars have suggested that assessing projects using only the Iron Triangle criteria does not assess accurately the impact of the project results on the organization (Atkinson 1999; Pinto & Slevin 1988). Many projects that have been concluded within schedule and budget specifications turned out to be failures; while others, despite exceeding time and cost specifications, ended up achieving profits for the organization (Pinto & Slevin 1988; Shenhar & Dvir 2007).

Pinto and Slevin (1988) argue that a project success should be measured by three criteria: technical validity, organizational validity and organizational effectiveness. First, a project should be technically correct. Second, the project should solve the clients' needs and problems. And, finally, the project has to be used after its implementation, bringing positive impact for its users.

Shenhar and Dvir (2007) proposed a framework to achieve project success using five dimensions:

1. **project efficiency,** which determines if a project was completed on time and within the budget;
2. **impact on the customer,** assessed by how the project's product impacted the customer's life and business as well as how the project results addressed the customer's needs;
3. the **project impacts on its team members**;
4. **business and direct success** by evaluating the project's impact on the organization; and
5. **preparing for the future**, reflecting on how the project results will help the organization to construct competitive advantage and engage in future endeavors

Studies show that IT project managers overestimate the importance of time and budget constraints, neglecting the impact of the project on business and the satisfaction of end-users (Atkinson 1999; Delone & Mclean 1992, 2002). As IT project managers place less emphasis on the impact and end-user satisfaction, the rate of IT project failures has increased over the years (Sumner et al. 2006). Nowadays, not only are IT project managers required to control the project budget and schedule, but they are also expected to manage business factors and people issues such as interpersonal conflicts and team satisfaction (Sumner et al. 2006).

Even though the literature has ignored the impact of the project manager on project success (Turner & Müller 2005), many studies have shown that project managers play a fundamental role in project management and are a critical project success factor (Turner & Müller 2005). Effective team leadership enhances team performance and productivity, which improves work quality and the chances of achieving positive results (Thamhain 2012). Besides this, project managers are directly responsible for providing a work environment that stimulates members' creativity and commitment (Thamhain 2011). Table 2 displays a summary of project success criteria presented in project management literature.

Table 2: Comparative analysis of different project success frameworks and models

Success Criteria	Atkinson (1999)	Delone & Mclean (2002)	Pinto & Slevin (1988)	Shenhar & Dvir (2007)	Wateridge (1996)
The project should contribute to the organization's overall business strategy	X			X	X
End-user satisfaction	X	X	X	X	X
Supplier satisfaction	X				
Project Team's satisfaction				X	
Other stakeholders' satisfaction	X	X	X	X	
Performance in terms of cost, time and quality (iron triangle)	X	X	X	X	X
Meet user requirements/ technical specifications	X	X	X	X	X
Project achieves its purpose	X	X	X	X	X
Customer satisfaction	X	X	X	X	X
Reoccurring business/commercial success		X	X	X	X
Solving major operational problems	X		X	X	
Actually used by the customer	X	X	X	X	
Open new opportunities/venues			X	X	
Bring positive results to the organization (performance, time optimization)	X	X	X	X	

Source: Based on (Atkinson 1999; Delone & Mclean 2002; Pinto & Slevin1988; Shenhar & Dvir 2007; Wateridge 1996)

Methodology

As mentioned previously, this research aims to identify the competencies IT project managers should develop to achieve project success. Figure 2 illustrates the conceptual framework used for this research.

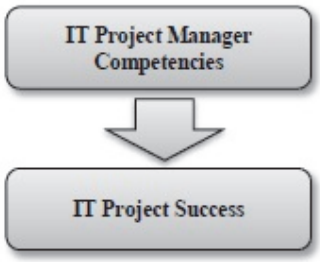

Figure 2. Conceptual framework

This research used a qualitative method and with an exploratory approach. This choice was made based on the need for a profound understanding of the IT professionals' thoughts and feelings regarding the role of project manager competencies for IT project success. The literature shows that the qualitative method is the most appropriate method when researchers intend to conduct a deep analysis of a phenomenon (Gibbs 2008; Hesse-Biber & Leavy 2006) and to identify the meaning the respondents attached to a specific experience or event (Ritchie & Lewis 2003). In the qualitative tradition, this research is classified as contextual qualitative (Ritchie & Lewis 2003) since its purpose is to explore the participants' understanding of the object of study.

We conducted 16 20–30-minute semi-structured in-depth interviews with IT project managers. As recommended by Boyce and Neale (2006), this interview technique allowed the respondents to be more spontaneous and to give their actual perspectives on the issues. We selected 16 Brazilian IT professionals who work in IT projects. We chose these professionals since they all performed the role of project manager and had substantial experience working in IT project settings (they had at least five years of experience). The fact that we selected professionals from different business sectors provided us a detailed an unbiased view of our object of study. Table 3 presents the profile of the 16 respondents.

Table 3: Respondents' profile

Interviewee	Occupation	Firms' Business Sector	Years of Experience in IT Project	Size of projects he/she has managed
Interviewee 1	IT manager	Big multinational fashion retail clothing store	20	All sizes
Interviewee 2	IT project manager	Small technology consultancy	10	Small to medium
Interviewee 3	IT project manager	Small technology consultancy	5	Small to medium
Interviewee 4	IT project manager	Big multinational IT consultancy	20	All sizes
Interviewee 5	IT project manager	Big multinational technology company	18	All sizes
Interviewee 6	IT project manager	Big multinational technology company	15	All sizes
Interviewee 7	IT project manager	Multinational in the telecommunication sector	16	All sizes
Interviewee 8	IT project manager	Multinational in the telecommunication sector	8	Small to medium
Interviewee 9	IT Business Analyst	Multinational in the telecommunication sector	5	Small to medium
Interviewee 10	IT Senior Business Analyst	Multinational in the telecommunication sector	7	All sizes
Interviewee 11	Senior System Analyst	Public data processing company	10	Small to medium
Interviewee 12	Team Coordinator	Multinational e-commerce company	16	All sizes
Interviewee 13	IT Project Management	Multinational security and protection company	5	All sizes

Interviewee (continuation)	Occupation	Firms' Business Sector	Years of Experience in IT Project	Size of projects he/she has managed
Interviewee 14	IT Project Management	Multinational security and protection company	6	All sizes
Interviewee 15	IT Project Management	Multinational security and protection company	7	All sizes
Interviewee 16	IT Senior Business Analyst	Multinational security and protection company	10	Small to medium

We conducted the interviews using a semi-structured guide with open questions (see appendix A). As we intended to analyze the relationship between IT project manager competencies and IT project success and to identify which competencies were more relevant to achieve project success, we designed the questionnaire based on the literature on IT project success (Atkinson 1999; Delone & Mclean 2002; Pinto & Slevin 1988) and project manager competencies (Keil et al. 2013; Kerzner 2009; Stevenson & Starkweather 2010). We used linking sentences — such as "now, in order to be successful …" between the two sections of the interview (competencies and project success). We used these linking sentences so that respondents would relate the project manager competencies to project success. During the interviews, we ensured that all questions of the questionnaire were answered.

All interviews were recorded and transcribed. Six interviews were face-to-face and recorded using Evernote. The others were conducted via Skype and recorded using the software Pamela for Skype. All interviews were transcribed using Express Scribe and TranscriberAG. After transcription, the collected data was analyzed using the software NVIVO 10. We used codes to classify the qualitative data. As Gibbs (2008) and Hesse-Biber & Leavy (2006) state, codification is defining one or more excerpts of a text or parts of data as parts of a broader picture. The codes or categories were generated based on literature review as recommended by Gibbs (2008). The code categories that were used to classify the content of the interviews are described below:

- IT project manager's competencies: the sub-codes are presented in table 1;
- Success criteria: the sub-codes are presented in table 2.

Data analysis

To analyze the perspective of IT project manager competencies, we used the ten categories described in the literature review (see table 1). To classify the categories in order of relevance, we added up the number of references to each category. Every time an interviewee mentioned a specific competence, we counted one reference to that competence.

IT project manager competencies

Figure 3 illustrates a bar graph showing the ranking of the ten categories of IT project manager competencies ordered according to the number of references. The number of references of each competence category is displayed in their respective bar.

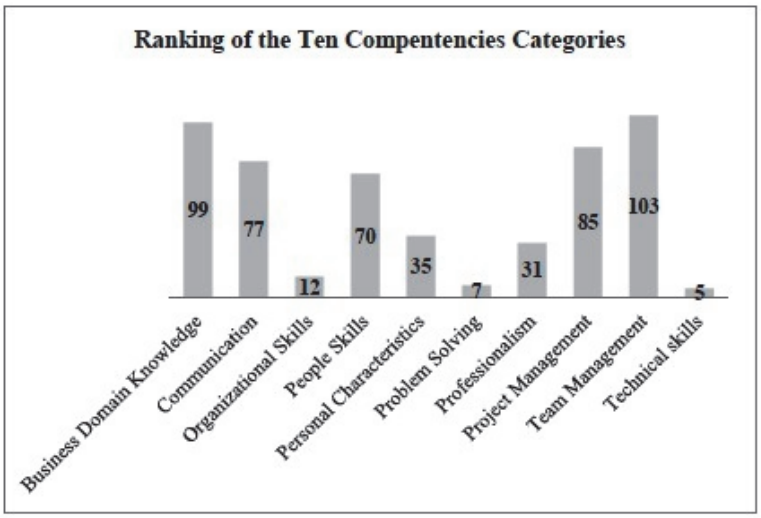

Figure 3. Ranking of the ten categories (according to the number of references)

The results indicated that the five IT project manager competencies that are more relevant to achieve IT project success are (in order of importance): team management, business domain knowledge, project management, communication and people skills. These results are slightly different from those of Keil et al. (2013). In their study, the top five categories (in order of importance) were communication, team management, project management, people skills and personal characteristics. Despite these differences, four categories appear in the top five of both studies: team management, project management, people skills and communication. This emphasizes the importance of these competencies in IT project management to achieve success.

The categories of team management, business domain knowledge, people skills and communication had 349 references altogether, while technical skills got only five. This shows that for the interviewees, interpersonal and business skills are more fundamental to IT project success than technical skills. In fact, some of them observed that project managers who are very skilled technically could underestimate the other important aspects of project management such as organizational strategy, political skills and people management:

So, he was more technical, he lacked political knowledge, you know? He lacked the political power to make the project work.

Sometimes, a project manager who has good technical skills doesn't focus on people.

However, this result does not mean that participants believe technical skills are no longer necessary. On the contrary, some respondents pointed out that technical knowledge can: (1) facilitate communication with developers and programmers, "when you have technical skills, you can communicate with the person who's developing the system and pass down

to the programmer what the client wants"; and (2) facilitate the management of the project itself, "because many times when a project manager is managing a project in which he doesn't have technical knowledge, he needs to have someone [with technical knowledge] who he trusts by his side all the time".

Team management was the most cited competence in the interviews. It was clear from our analysis that the respondents believe that one of the most important responsibilities of the project manager is to help build the competencies of his team, to motivate team members and to ensure they have an appropriate work environment in which to perform their tasks, as mentioned by Turner and Müller (2005). The top five competencies in this category were: to create an effective team environment, ability to motivate team members, to share information and credit for success, to provide feedback and virtual team skills (figure 4).

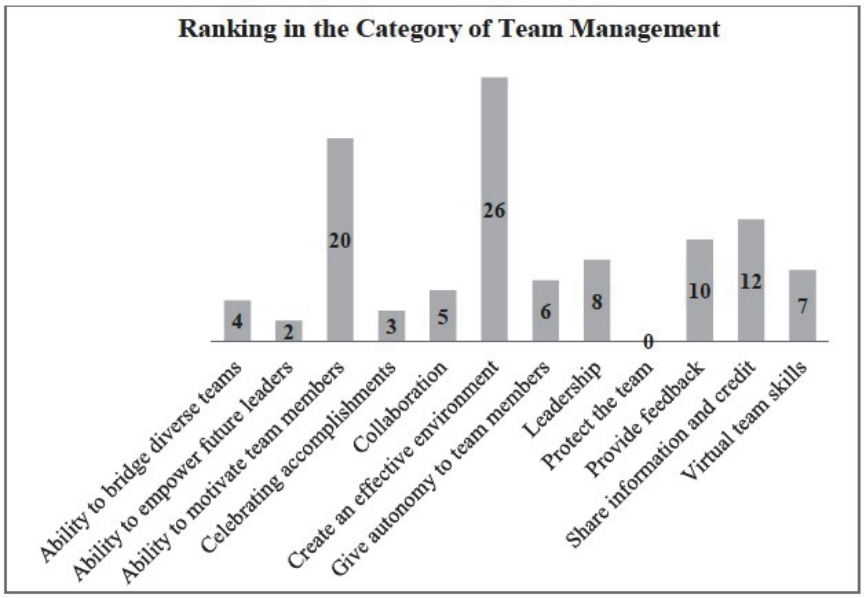

Figure 4. Ranking of competencies in the category of team management (according to the number of references)

Respondents made it clear that the team's attitude is fundamental to achieve success:

I think that one of the main factors that influence results is the team's motivation.

Therefore, IT project managers should develop team management competencies so they are able to build a work environment that allows team members to perform well and with commitment:

The second thing is that you create an environment where people will work and have fun too ... an environment where people are required to do their tasks, but they will have autonomy with responsibility.

Business domain knowledge was the second most relevant group of competencies according to our respondents. As mentioned above, this finding corroborates the fact that today's project management environment demands that project managers develop business skills in order to be more effective (Kerzner, 2009). Many participants emphasized the

relevance of building business skills in an IT project setting. This perspective appears in many excerpts of the interviews such as the following:

The project manager has to be able to talk to the client, being aware of what they are talking about. He might not know the business deeply, but he has to know what [the clients] are talking about.

The four most cited competencies in this category were the ability to involve end-users, to understand the business domain, strategic thinking and business skills (figure 5).

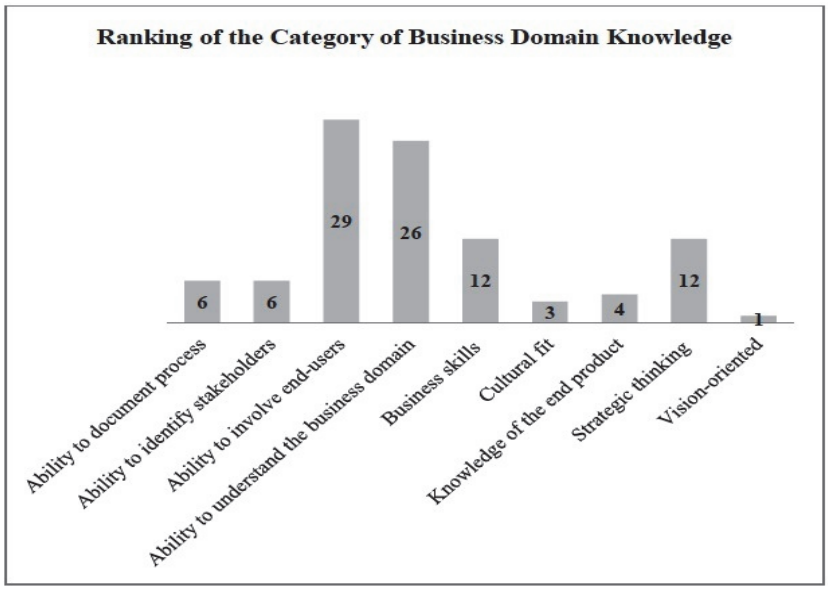

Figure 5. Ranking of competencies in the category of business domain knowledge (according to the number of references)

The ability of involving end-users was highly cited by the respondents (26 references). It shows that end-user satisfaction is very important for the professionals interviewed in this research. Many mentioned that not involving end-users from the start of the project is a serious risk that could lead to project failure. The following quote illustrates this perspective:

So, I think involving [end-users] from the beginning also helped them to believe they were part of it [of the project], you know ... to believe they're involved ...

Communication was the third most relevant competence category according to the research results. The three most cited competencies in this group were ability to communicate at multiple levels, open communication and listening (figure 6). There were several interesting statements regarding the importance of communication in IT projects:

Communicating well with [people involved in the project] is not only talking, but it's listening as well, right? Listening and understanding what their interests are and to use this to the benefit of the project.

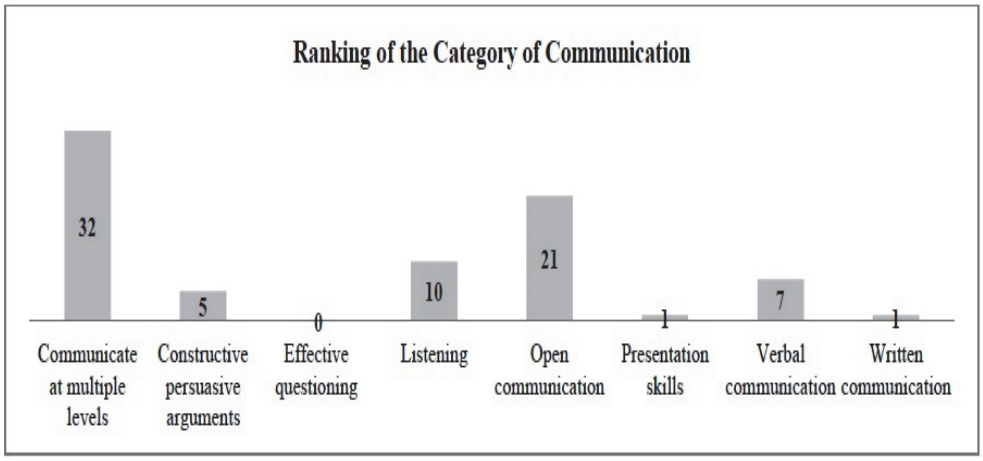

Figure 6. Ranking of the competencies in the category of communication (according to the number of references)

Project management was the fourth most relevant competence from the respondents' perspective. The work used as the basis for the construction of the team categories showed a similar result. In the study by Keil et al. (2013), the project management competence category was ranked as the third most relevant. The top five competencies in this category were: alignment, resource utilization, time management, scope management and risk management (figure 7)

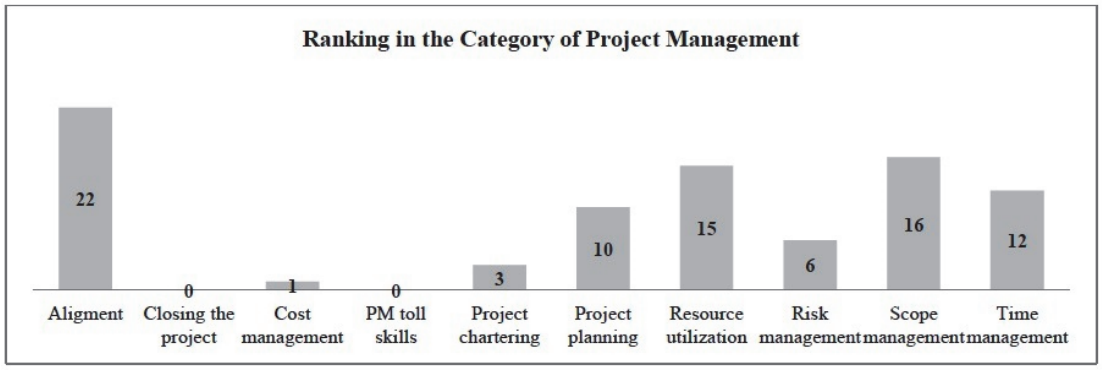

Figure 7. Ranking of the competencies in the category of project management (according to the number of references)

People skills were the fifth category with a significant number of references. This was expected. While often overlooked in IT settings, the psychological factor was stressed by many of the respondents: "The manager is like a psychologist, right?" For many respondents, the IT project manager is supposed to develop skills to deal with the psychological aspect of team management to achieve project goals: "Knowing how to get the best from each one … you have to work with people the best way possible".

As it can be seen in figure 8, the three most cited competencies on the people skills category were: understanding the psychology of people, good people skills and negotiation.

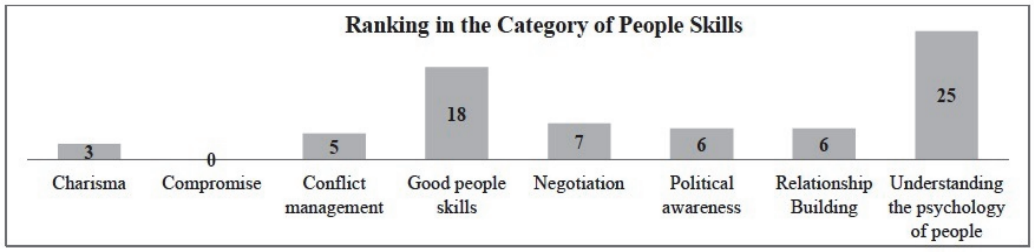

Figure 8. Ranking of competencies in the category of people skills (according to the number of references)

Participants also pointed out some other factors that are critical to IT project success: management, organizational culture and a highly committed project team. Regarding the importance of having the support of executive management, interviewees stated: "I believe that it also helped … the commitment of the directors"; "The support of the top-management executives … was strategic. So, we had the support of the top-management executives for everything we needed".

IT project success

The content of interviews regarding IT project success was analyzed in the light of the literature covered in this research. Once more, we increased the number of citations each time a respondent mentioned a success criterion listed in table 2. The goal was to understand what project success means from the respondents' perspective. Figure 9 presents the ranking of success criteria based on the number of references each criterion received in the 16 interviews.

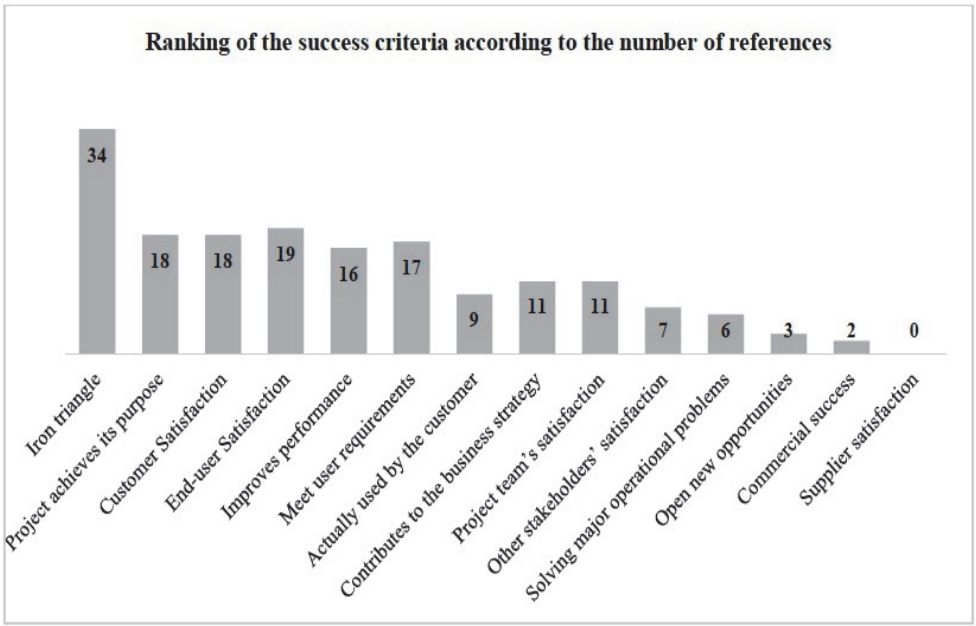

Figure 9. Ranking of the 14 project success criteria (according to the number of references)

The iron triangle criteria (Atkinson 1999) — cost, budget and quality — were the most cited by the respondents. On the other hand, a significant number of respondents recognized that time and budget overruns are common in IT projects. Most agreed that a project should not be evaluated by budget, cost and scope criteria only:

Delivering a project within time and cost constraints and with quality … surely, these are the pillars of success, but these are not the only ones?

Moreover, delivering projects over time and over budget does not imply that the project was not successful. On the contrary, if the project achieves its purposes, despite not accomplishing time and cost constraints, it can be a case of project success:

I believe that deviations are acceptable, once the goal is accomplished.

This finding corroborates what previous researchers have shown: IT project criteria need to be revised in order to reflect the reality of this sector (Atkinson 1999; Delone & Mclean 1992, 2002).

End-user satisfaction and customer satisfaction ranked third and fourth respectively. This shows how important the end-user community is in IT settings: "I think … the satisfaction of the people involved comes first"; "I think that the satisfaction of the end-user is the most important thing!". In fact, many affirmed that good management of end-users' requirements is a fundamental success factor: "Is this really what the client wanted to receive? Is it what he expected? This is what I think that is a fundamental matter". This result is in tune with many studies on success criteria (Delone & Mclean 2002, 2003; Pinto & Slevin 1988).

Regarding the importance of the IT project manager in IT project success, respondents were unanimous. All of them stated that the IT project manager is a critical success factor. Many compared the project manager to the conductor of an orchestra: "Oh, yes, for sure ... the project manager is like a conductor in an orchestra"; "If there is not a conductor, nobody plays at the right tempo". This corroborates what many scholars have affirmed regarding the role of the project manager (Jha & Iyer 2007; Turner & Müller 2005). This evidence correlates with the literature (Turner & Müller 2005) as it points out a direct relationship between the role of project manager and IT project success. Table 4 presents some highlights of the interviews regarding IT project success.

Table 4: Relevant excerpts related to the most cited success criteria

Competencies	Excerpts of interviews
Performance in terms of cost, time and quality (iron triangle)	'I think that success is a mix of different authors' concepts. Success is not only this tripod; it's not only that. But, today, in the organization, we work very focused on that tripod. Schedule, schedule, schedule … the rest doesn't matter'
Project achieves its purpose	'Of course, we work in order to accomplish time and budget targets, and so on ... However, it doesn't mean that straying a little bit from these targets will compromise the results. I believe that deviations are acceptable, once the goal is accomplished.'
Actually used by the customer	'If you work in a project that has everything all set, everything is fine, but at the end it's never used, we can hardly say that the project was successful.'

Bring positives results to the organization	'No, cost, budget ... delivering a project in time, on the budget and with quality surely is one of the pillars of success, but it's not only that, right? It's the final results … it's the result after the project implementation that counts.'
End-user satisfaction / Customer satisfaction	'I don't develop systems to take home! So, it's the opinion of the person who is at the end (end-user) that matters the most, because he'll tell me what he needs. He'll tell me what's best for him. He knows his daily routine.'
Meet User Requirements	'First, I think we need to meet the client's expectations regarding what's being developed, right? Is it really what the client would like to receive? Is it what he really expects? I believe this is fundamental'

Discussion

The implications of the research results are relevant to the academic field and organizations. As mentioned before, traditionally, IT project managers have a strong technical background, and consequently, focus their work on the technical and procedural aspects of the project management. This approach has been the cause of many of the common issues in IT project settings such as the lack of end-users' involvement, miscommunication and inefficient leadership (Sumner et al. 2006). The high failure rates in IT projects prove that IT project managers need to expand their knowledge and competencies (Stevenson & Starkweather 2010). As projects have become fundamental to achieving competitive advantage (Shenhar & Dvir 2007), the project managers' role is no longer limited to guaranteeing the execution of a specific task. They are expected to build competencies that add economic and social value to the organization and to the individuals involved (Crawford 2005; Sumner et al. 2006).

The evidence from our research shows that the perspective of Brazilian IT professionals is in agreement with the literature. The "hard" technical skills are not enough to ensure positive results in project management (Stevenson & Starkweather 2010). This does not imply that IT project managers should abandon the technical competencies that they developed throughout their careers. However, it does imply that IT project managers should combine technical skills with interpersonal and managerial competencies so they are better equipped to achieve project success.

This research also shows that communication skills are necessary not only in the relationship between the project manager and his/her team, but that an effective project manager should be able to communicate at multiple levels. This ability has been cited many times in our interviews. These results highlight that the ability to communicate not only with team members, but also with stakeholders and executives from different levels in the organization "represents a specific type of communication that should be assessed differently" (Stevenson & Starkweather 2010, p. 669).

Conclusion

This paper addressed the following research question: what are the most relevant competencies in IT project managers' development in order to achieve IT project success? To answer this question, we conducted a qualitative study with an exploratory approach. We interviewed 16 Brazilian IT professionals from different business sectors. The data analysis showed that the most relevant competencies are team management, business domain knowledge, communication, project management and people skills. Contrary to

what is traditionally accepted in IT project settings, technical skills were considered less relevant to IT project success than behavioral, business and managerial competencies.

Even though we cannot generalize the conclusions of this qualitative research, this study provided insightful information and corroborated results from previous researches. This research has also offered some contributions for further studies, such as: (1) providing the foundation for research into the relationship between IT project manager competencies and project success; and (2) some useful information for organizations and educational institutions to improve the content of their training programs and courses on project management and competence development.

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Appendix A – Interview Questionnaire

Success Criteria for IT Projects (Atkinson 1999; Delone & Mclean 2002; Pinto & Slevin 1988)

Think of the projects you worked on the last 3 years.

Focus on the projects that succeeded:

1. For you, what were the main reasons for success?
2. What kinds of projects were these? Big, small, medium size? Tell me about these successful projects.
3. Were clients/users satisfied?
4. Did the project managers of these projects have anything in common? If so, what? What characteristics of this/these project manager(s) caught your attention?
5. Did the leadership style of this/these project manager(s) have any impact on the project success?

Focus on the project that failed:

6. For you what were the main reasons for failure?
7. What kinds of projects were these? Big, small, medium size? Tell me a little about these unsuccessful projects.
8. Were clients/users satisfied?
9. Did the project managers have anything in common? What characteristic of this/these project manager(s) caught your attention?
10. Did the leadership style of this/these project manager(s) have any impact on the project failure?
11. For you, what are the main criteria for IT project success?
12. Is it common to see the project manager, the project team, stakeholders, clients and sponsors agreeing upon the success criteria at the start of the project? Why? If you answered "yes", give examples.
13. In your opinion, which competencies, abilities or skills are essential for a project manager?
14. Knowing that the project manager is not the "real" boss, does the project manager ***really*** have any impact on project success?