



Barriers to the use of an IT Project Management Methodology in a large financial institution

Marco Alexandre Terlizzi ^{*}, Fernando de Souza Meirelles,
Heverton Roberto Oliveira Cesar de Moraes

Escola de Administração de Empresas de São Paulo da Fundação Getulio Vargas, FGV EAESP, São Paulo, SP 01313-902, Brazil

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Abstract

The global financial crisis of 2008 demanded greater control mechanisms from the financial service industry. The IT Project Management Methodology (PMM) is considered an important control mechanism for IT governance to support managers in achieving more predictable rates of project management success (PMS). The aim of this study is to further investigate how an implemented IT PMM that contributes to PMS is used in a large Brazilian financial institution. A case study was conducted on one of the largest financial institutions in the world that is located in Brazil by means of interviews, analysis of a database of 3047 IT projects and a survey of 347 IT professionals. The study showed that, despite the belief of 90% of the IT professionals that the use of an IT PMM improves PMS rates, there are five main barriers that prevent its proper use: very tight project deadlines; working as both a developer and a project manager; working simultaneously on several projects; difficulty using the project management software; and a lack of knowledge of the PMM. Finally, an action plan to solve these issues is presented.

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1. Introduction

The global financial crisis of 2008 and several corporate fraud scandals demanded increased transparency from the financial service industry (FSI). The fact that the FSI is heavily dependent on information technology (IT) and is subject to governance and control mechanisms that are required by external regulatory agents brings more complexity to IT governance (Joshi et al., 2013), which consists of IT processes and leadership to ensure compliance with an enterprise's

overall principles (ITGI, 2003; Weill, 2004).

Since 1992, the Brazilian Federation of Banks (FEBRABAN) has conducted studies on leading financial institutions to understand the state of banking technology in Brazil and its prevailing trends. The research published in 2015 revealed that the FSI is the largest worldwide investor in technology, with US\$ 351 billion in 2014. Moreover, IT investments in the Brazilian FSI continue to grow at a rapid rate, totaling US\$ 11.9 billion. Thus, the FSI is responsible for 18% of the total IT investments in Brazil. These investments also maintain the country as a relevant player in the international arena, surpassing other emerging markets such as India and Mexico and keeping Brazil close to developed countries such as France and Germany (Febraban, 2015).

The FSI in Brazil is more computerized and invests in relatively more IT projects than other industries of the economy (Fonseca et al., 2010, 13; Meirelles, 2015). Thus, technology is a major risk component that demands significant attention from the agencies

^{*} Corresponding author.

E-mail addresses: materlizzi@outlook.com (M.A. Terlizzi),
fernando.meirelles@fgv.br (F. de Souza Meirelles),
heverton.mestrado@yahoo.com.br (H.R.O.C. de Moraes).

that regulate the FSI, such as the Central Bank of Brazil (BACEN), which uses the CobiT framework to audit IT processes and recommends the implementation of a Project Management Methodology (PMM) as a mechanism of governance and control (Fernandes and Abreu, 2014, 36; Isaca, 2008; Sun et al., 2013).

A PMM is a structured approach comprised of a set of processes with clearly defined activities aimed at the delivery of projects (Turner, 2014). However, a PMM is not focused on whether the project's benefits are realized (Young and Jordan, 2008); on the contrary, a PMM is established to support managers in achieving more predictable rates of project management success (PMS), which means project delivery on time, within the budget and with the required functions (Bouer and de Carvalho, 2005; Clarke, 1999; Isaca, 2008; Joslin and Müller, 2015; Lunardi, 2008; Project Management Institute, 2013; Tiwana, 2009).

According to The Chaos Manifesto of 2013, only 39% of worldwide IT projects achieved PMS (The Standish Group International, 2013). In Brazil, few studies have attempted to determine the PMS rate for IT projects in the FSI (Terlizzi, 2014, 211), but it is easy to note recent failures of IT projects implemented by financial institutions in Brazilian newspapers and magazines (Almeida, 2014; Folego, 2014; Folha, 2014; Gonzaga, 2013). These failures are surprising, given that the use of a PMM increases PMS rates (Atkinson, 1999; Baccarini, 1999; Tan, 2011; Thomas and Fernández, 2008; Wit, 1988), and PMMs are recommended for the Brazilian FSI. Similarly, no study has attempted to determine whether implemented PMMs are properly used by these organizations.

This study aims to address this gap by attempting to answer the following two questions:

- (1) To what degree is an IT PMM implemented in a large Brazilian financial institution?
- (2) How is an implemented IT PMM that contributes to PMS used in a large Brazilian financial institution?

To address these questions, a case study was conducted on one of the largest financial institutions in the world that is located in Brazil using interviews, analysis of a database of 3047 IT projects and a survey of 347 IT professionals. The study showed that, despite the belief of 90% of the IT professionals that the use of an IT PMM improves PMS rates, there are five main barriers that prevent its proper use: very tight project deadlines; working as both a developer and a project manager; working simultaneously on several projects; difficulty using the project management software; and a lack of knowledge of the PMM. Finally, an action plan to solve these issues is presented.

This study proceeds by reviewing the related literature and then presenting methodology, results and discussion sections. It finishes with conclusions and a discussion of the practical implications of the findings. The questionnaire is provided in the Appendix.

2. Literature review

IT project execution entails delivering or improving products and/or services that contribute to the realization of

an organization's strategic goals. Therefore, increasing the project management and project success (PS) rate is quite important for justifying organizational investments to control and standardize management initiatives. In this context, an analysis of the prior PMM literature is important to clarify IT governance and its role in relation to a PMM as well as the differences between the PS and PMS concepts.

2.1. IT governance

2.1.1. IT governance and project management

IT governance is the organizational capacity exercised by the Board, executive management and IT management to control IT strategy formulation and implementation and thus to ensure alignment between the business and IT strategies (Grembergen, 2004, 5). Lunardi (2008) explains that in the IT literature, the term was first used in 1991 by Venkatraman to describe how IT governs relationships in a business through an IT-based system.

According to Peterson (2004, 8), IT governance describes “the distribution of IT decision-making rights and responsibilities among different stakeholders in the enterprise and defines the procedures and mechanisms for making and monitoring strategic IT decisions”. The process of execution after those decisions are made is called IT management (Colella and Nunno, 2015).

Tiwana et al. (2013) expand upon this concept and organize IT governance in a framework (Fig. 1) called *The IT Governance Cube* where research on the topic can be positioned. Using the cube as a reference, this study is focused on the use of a PMM as a mechanism of control that involves decision rights, control (processes) and architecture to govern the IT deliverables, content and stakeholders in an IT project.

In an IT project, mechanisms of governance are needed to establish and manage procedures and decision rights that motivate and allow the stakeholders to reach the expected goals (Midha and Bhattacharjee, 2012). Sambamurthy and Zmud (1999) explain that project management is one of the IT governance mechanisms that is related to the patterns of authority for the key IT activities in organizations. Weill (2002) identifies some emerging management practices that lead to IT-enabled business value: (1) IT governance — through the IT steering committee, IT strategy committee and priority setting; and (2) project management — through a PMM, a project office, engaged business managers and frequent stakeholder meetings.

When an organization develops projects sporadically, there is no need to systematically develop skills, standards and procedures for IT projects. However, if the organization dedicates considerable energy to project implementation, an unstructured and undisciplined approach leads to inefficiencies that can be harmful. In this case, IT governance should be developed to enforce a PMM for the various dimensions of IT projects (Rau, 2004), including their scope, time, cost, quality, and risks.

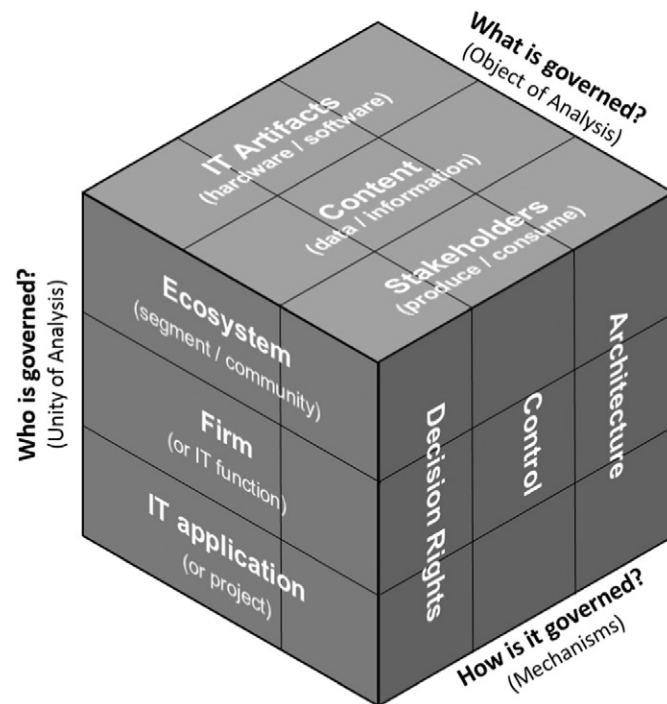


Fig. 1. The IT Governance Cube. Source: adapted from Tiwana et al., 2013.

2.1.2. IT governance and projects in the FSI

Project risks that seem to affect only the IT project budget or schedule can spread throughout an organization and affect its long-term goals (Shenhar et al., 2007). To mitigate these risks, an organization must institute a strong framework of IT governance, such as the CobiT framework, which is based on mechanisms of control such as an IT PMM (Winkler and Brown, 2013).

The establishment of a PMM is recommended for the FSI in Brazil. The BACEN regulates all financial institutions in the country, and the assessment model applied in its audits is the CobiT. The CobiT framework organizes IT into processes, which allows managers to control requirements, technical issues and business risks. Each process can be evaluated and classified according to a specific level of maturity, from 0-Non-existent to 5-Optimized. The process *PO10-Manage Projects* can be considered level 3-Defined only when a PMM for IT projects is established and communicated throughout the whole organization; moreover, the process suggests the use of a Project Management Body of Knowledge (PMBok) to organize the PMM (Isaca, 2008). The minimal maturity level required by the BACEN for all processes is 3-Defined (Fernandes and Abreu, 2014, 36). This system of project management control aims to improve the probability that projects will be delivered on time, within the budget and with the required features and functions.

2.2. Project success and project management success

The success of a project can be evaluated from different perspectives because there is no single best method of

measurement (Thomas and Fernández, 2008). Indeed, this topic has generated extensive discussion since the 1970s due to its varied dimensions and interpretations (Ika, 2009).

The PS concept may seem ambiguous because some projects that are completed within the planned time and budget are considered failures, while other projects that are completed late and over budget are considered successes; thus, considering only cost, time and quality as PS criteria is not enough (Atkinson, 1999; Ballantine et al., 1996; McCoy, 1986; Pinto and Slevin, 1988; Turner, 2014; Wateridge, 1998; Wit, 1988). As a result, Wit (1988) and Cooke-Davies (2002) present two major concepts of project success that should be distinguished: (1) PS and (2) PMS.

The first concept, PS, is defined by the achievement of the project's overall objectives (Wit, 1988, 165):

The project is considered an overall success if the project meets the technical performance specification and/or mission to be performed and if there is a high level of satisfaction concerning the project outcome among key people in the parent organization, key people in the project team and key users or clients of the project effort.

The second concept, PMS, is measured by three components: (1) time, cost and quality specifications; (2) the quality of the project management process; and (3) stakeholder satisfaction related to the project management process (Baccarini, 1999). PMS is subordinate to PS, and the degree of emphasis on their criteria changes from one phase of a project to another (Baccarini, 1999; Turner, 1993; Wit, 1988).

From the perspective of IT, the success of projects can be described through a combination of PMS and PS (Espinoza

et al., 2006). Bakker et al. (2010) examine the evolution of the concept of success for IT projects. According to their literature search, the concept of PS using the criteria of cost, time and scope (triple constraint) is used in approximately two-thirds of the 26 publications analyzed from 1997 to 2009. The Standish Group has monitored IT projects worldwide since 1985 by also using the triple constraint as a factor for PMS (The Standish Group International, 2013).

Pinto and Slevin (1988) determine the success of a project from two perspectives: (1) the project — the internal factors to the project that determine the project's efficiency (cost, time and scope); and (2) the customer — the external factors to the project that determine the effectiveness of the product or service produced by the project (use, satisfaction and effectiveness).

According to Agarwal and Rathod (2006), success is found relatively rarely in the world of software projects. The authors find that there is a significant difference in the meaning of success in the minds of people who evaluate project performance. Good project management not only avoids project failure but also contributes to overall PS (Atkinson, 1999; Baccarini, 1999; Thomas and Fernández, 2008; Wit, 1988).

In 2010, the Gartner Group conducted a wide-ranging survey to ascertain the reasons for the success or failure of IT projects. The results show that project management contributes more than 20% to PS, which means that the adequate use of a PMM increases the chances of PS (Tan, 2011).

2.3. PMMs

During the 1980s, the first formal PMMs were set up by government agencies to control budgets, plans, and quality (Packendorff, 1995). Table 1 presents some definitions of PMM.

There are several PMMs available for use by professionals and organizations to better manage their projects. The nature of the industry or the organization and the requirements of the project's sponsors combine in unique ways in every project (Project Management Institute and Institute of Electrical and Electronics Engineers, 2013). Some organizations adapt their PMM based on external standards such as the PMBoK; nevertheless, project life cycles and management structures are different in every organization (Zielinski, 2005).

Kerzner (2013, 78) believes that the best way to achieve project management excellence in an organization is by having

Table 1
Definitions of PMM.

Definition	Author(s)
A set of guidelines and principles that can be tailored and applied to a specific situation.	Charvat (2003)
A system of practices, techniques, procedures, and rules used by those who work in a discipline.	PMI (2013)
A structured approach for delivering a project that consists of a set of processes, with each process having clearly defined resources and activities.	Turner (2014)
Processes, tools, techniques, knowledge areas, and comprehensive capability profiles.	Joslin and Müller (2015)

Note. Source: authors.

a single PMM because it lowers costs, reduces the requirements for support, and eliminates duplicated effort. Conversely, a contingency approach suggests that a PMM should consider the different characteristics and requirements of projects (Office of Government Commerce, 2009; Shenhar and Dvir, 2007; Wells, 2011).

Senior management must obtain the support of all staff, and possibly customers, to ensure that the methodology is used on all projects. If a good PMM already exists and is used consistently across an organization, it will impact PS positively (McHugh and Hogan, 2011). The use of a PMM is a fundamental factor in ensuring IT PMS and consequently IT PS, but to sustain this relationship, IT professionals need to learn best practices in communication, negotiation and people management (Luftman and Brier, 1999).

2.3.1. PMM and governance

There are different levels of governance that vary in coverage, scope and focus and that may influence the effectiveness of using PMMs to achieve PS, for example, corporate governance, IT governance, the governance of projects, and project governance (Joslin and Müller, 2015). The governance of projects focuses on the collective governance of a group of projects, such as programs or portfolios (Müller and Lecoeuvre, 2014), while project governance focuses on “the use of systems, structures of authority, and processes to allocate resources and coordinate or control activity in a project” (Pinto, 2014, 383). Corporate and IT governance influence both the governance of projects and project governance through oversight functions that collectively encompass a project's lifecycle to ensure a consistent approach to managing the project with the aim of ensuring its success (Joslin and Müller, 2015).

IT governance practices such as the establishment of a PMM define a set of processes, rules and decision control rights to influence efficiency and effectiveness outcomes in traditional IT projects (Tiwana, 2009). A PMM will describe what an organization considers to be best practices and will minimize the duplication of effort by using common language, resources, documentation and training (Clarke, 1999).

2.3.2. Barriers to PMM

The “human factor” is an essential component in PMM adoption, and the corporate culture is responsible for methodology execution. Therefore, the successful implementation of a PMM requires identifying and overcoming an organization's resistance to change. IT departments usually display very little resistance to project management because such departments are almost entirely project-driven (Kerzner, 2013).

Despite all of the positive benefits that a PMM brings to organizations, its adoption may be negatively impacted by some factors that can prevent its consistent, successful implementation and maintenance (McHugh and Hogan, 2011). Some of these barriers are related to resistance to change and the limitations of the methods and techniques adopted (White and Fortune, 2002). Table 2 presents some of the barriers to the use of a PMM.

2.4. Theoretical development

IT governance is responsible for establishing mechanisms of governance and control for approved projects to make it possible to assess whether they are being properly managed by the IT department so that the projects' benefits are realized. The use of a PMM as a mechanism of governance and control is recommended for Brazilian financial organizations because a PMM contributes to project management success, which in turn influences project success; however, there are some barriers that can prevent its proper use. Fig. 2 summarizes the theoretical framework of this study.

3. Research methodology

The use of PMMs is relatively recent in the FSI in Brazil, and, following a review of the literature, it was apparent that there is a lack of both qualitative and quantitative research in this area. As the subject under investigation is new and there was little existing research, the objective of this study emphasized the need for exploratory research. Therefore, the empirical research conducted in this study employed the case study method. Case studies provide researchers with an opportunity to understand the conditions that are present in a particular situation (Yin, 2010). Case studies are frequently used in IT studies (Sarker et al., 2012), and they are particularly appropriate for investigating management aspects rather than technical aspects (Benbasat et al., 1987).

3.1. Case study design

The case study design is the logic that links the data to be collected with the conclusions, thus ensuring coherence in defining the research question; defining the unit and period of analysis; linking the data to the research question; and defining the criteria for interpreting the findings (Yin, 2010).

To address the research questions, the case study was conducted on a large financial institution, and the units of analysis were 3047 IT projects and 347 IT professionals.

Hence, this study used a single embedded case study design, and the period of analysis was between June 2014 and April 2015. The period of analysis was defined by the electronic database available for the study and the timing of the interviews and the survey. The database was extracted from the Corporate Project Management Software (CPMS) in April 2015, and it contains all of the IT projects initiated after June 2014. Additionally, the interviews and the survey were scheduled for April 2015.

The organization has not authorized the disclosure of its name. It is a Brazilian company in the FSI that is present in more than 15 countries and is one of the largest in the world in its field, with more than US\$ 400 million in assets and more than 80,000 employees. The IT department has more than 5000 internal and external collaborators, it has a local IT Project Management Office (PMO) with 50 employees who are responsible for the PMM, and its portfolio includes more than 3000 annually initiated IT projects.

Interviews are one of the most important sources of facts and opinions. Documentation can be used to support and increase the evidence from other sources, and such archival records are precise and quantitative (Yin, 2010). With the aim of better understanding the establishment and evolution of the IT PMM in the organization, an in-depth interview was conducted in April 2015 with the manager and the PMO expert responsible for the methodology. Moreover, to be in compliance with CobiT, the guide describing the methodology was based on the PMBoK Fifth Edition, so all of the inputs and outputs of the 28 processes declared in the PMM were compared with the PMBoK to assess the organization's degree of adherence to this model.

A contingency methodology allows flexibility with regard to a project's characteristics (Shenhar and Dvir, 2007), but such a methodology is not used in the studied organization, which applies a single methodology for all projects. According to the CobiT framework "approval of subsequent phases of the project should be based on review and acceptance of the deliverables from the previous phase" (Isaca, 2008, 68), which means that for a project to be in compliance with the PMM, the deliverables recommended by the PMM for each project must be registered in the CPMS.

The major deliverables are elaborated in the project phases "initiating" and "planning"; thus, to maximize the database extraction and to not discard projects that were "in execution", the selection criteria used to extract data included all projects that had started after June 30, 2014 (closed or not), with the initiating and planning phase status "concluded". Thus, in April 2015, a database of 3047 records was extracted from the CPMS. By reviewing whether the recommended deliverables were registered in the CPMS and applying a frequency distribution analysis, it was possible to determine whether the projects adhered to the methodology. This study aimed to analyze the organization's IT PMM in detail, so Table 3 presents only the main recommended output documents for the initiating and planning phases.

Surveys are used to collect opinions for the analysis of facts and opinions (Gil, 2010). Hence, with the objective of

Table 2
Barriers to the use of a PMM.

Barriers	Authors
Fear of added workload.	Kerzner (2013)
Fear of embarrassment.	
New guidelines/processes.	
Need to share "power" information.	
Creation of a fragmented work environment.	
Rigid policies and procedural requirements.	Dicks (2000)
Necessity of constantly improving the methodology.	
The amount of documentation required.	Abbasi and Al-Mharmah (2000)
Too much documentation, too time consuming.	
Lack of training/expertise.	White and Fortune (2002)
Inadequate for complex projects.	
Too unwieldy, not cost effective.	
Not fully developed/immature.	

Note. Source: authors.

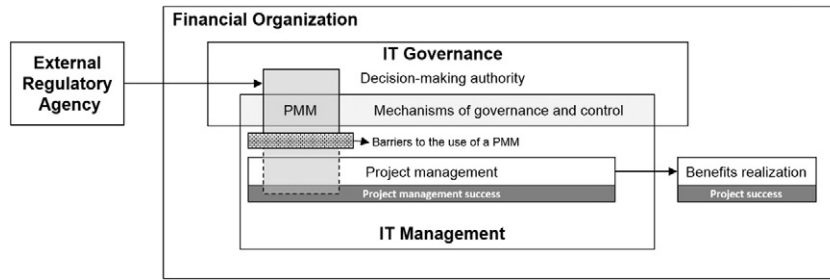


Fig. 2. PMM as a mechanism of governance and control. Source: authors.

collecting the opinions of the IT professionals regarding the contribution of the PMM to PMS, question 1 (Appendix A) on the questionnaire asked whether the proper use of the PMM contributed to PMS (delivered on time, within the budget and with the required features and functions), and it also asked for additional comments.

Using the Survey Monkey software, the electronic questionnaire was sent by the PMO on April 13, 2015, to all of the IT professionals with the “Project Manager” role in the CPMS (2,307 invitations). It had a return rate of 15% (347 responses) within two weeks.

The results of the dichotomous questions were analyzed using frequency distribution analysis, and the comments were individually analyzed to gain an understanding of the additional details provided by the professionals who did not believe that the proper use of the IT PMM contributed to PMS.

Considering that resistance to change is one of the barriers to the use of a PMM mentioned in the literature review, this type of exploratory analysis helps us to understand whether the organization’s IT professionals believed that the use of an implemented PMM is beneficial to IT projects, and whether they were culturally prepared for future improvements in the methodology.

There is no recommended number of interviews to be performed, but it is suggested that the number of interviews be reported in a study (Sarker et al., 2012). Hence, four senior

managers with more than five years of experience as project managers who were responsible for relevant projects or areas within the organization were interviewed in April 2015. A high-level profile of these project managers is displayed in Table 4. The objective of the interviews was to investigate the main barriers to the proper use of the methodology in the organization.

Each interview was transcribed as soon as possible after the interview, as recommended by Miles and Huberman (1994). The interview transcriptions were read several times so the researchers could become familiar with the data in greater detail (Eisenhardt, 1989). Using cross-case analysis, the answers were compared with the barriers previously identified in the literature review, classified and then discussed with the PMO. Thus, using the same questionnaire, it was possible to pose question 2 (Appendix A) to understand the barriers to the use of a PMM based on the opinions of people throughout the IT department.

The answers to the question were analyzed using frequency distribution analysis, and the comments were individually analyzed to identify additional barriers that were not considered in the question.

4. Results and discussion

The organization employs a single methodology for technology projects that is published on the intranet and is

Table 3
Recommended output documents from the IT PMM.

Phase	Area	Document and description	Mandatory
Initiating	Integration	Project charter — documents the business’ needs, the customers’ needs, and the new product, service or result to be achieved. ^a	Yes
Planning	Stakeholders	Stakeholder register — a document that identifies, assesses and classifies the project’s stakeholders. ^b	No
	Scope and quality	Requirements documentation — the details of the requirements and business rules that the project will meet. It is one of the input artifacts used to define the project scope. ^b	No
		Scope baseline — describes the project deliverables in detail and the work required to create those deliverables, thus generating a common understanding of the project’s scope and its main objectives for all stakeholders. ^a	No
	Time	Schedule baseline — the approved version of the project schedule, which is created after analyzing the sequences of activities, their duration, the resource requirements, and the constraints. ^a	Yes
	Cost	Cost baseline — the approved version of the project budget, including the investment necessary to run the project, for example, hours of internal and external development and hardware and telecom requirements. ^a	Yes
	Risk	Risk register — a document in which the results of the risk analysis and risk response plan are recorded. ^a	No
	Human resources	RACI matrix — a grid containing the activities and responsibilities of each member. ^b	No

Note. Source: adapted from the IT PMM guide available on the organization’s intranet.

^a CPMS screen.

^b Uploaded document.

Table 4
High-level profile of the project managers interviewed.

Manager	Years of experience as a project manager	Responsible for
#1	10	Checking account system (core system in a bank)
#2	10	Cash management system (major system for corporate clients to manage their cash flow)
#3	8	New platform for personal loans (a 2-year project with predicted benefits of US\$ 500 million over the next 5 years)
#4	5	New platform for collections (a 2-year project with predicted benefits of US\$ 300 million over the next 5 years)

Note. Source: authors.

widely disseminated among all of the IT professionals. The guide states the following:

The IT PMM is a set of standards, procedures and techniques applied to project management based on the PMBoK. Benefits: increase in the conditions for the success of projects; establishment of a “common language” in project management; reduction of the level of rework to increase productivity; anticipation of unfavorable situations; transparency between those involved in the projects; communication efficiency; agility in identifying and troubleshooting; and increased customer satisfaction.

The methodology is the same for all IT projects, and the PMM explains in detail the processes that are needed for project management, which are divided into five phases: initiating, planning, execution, monitoring and controlling, and closing. Each process includes input documents, activities, and output documents. The methodology provides the instructions for filling out the output documents and the required templates. Most of the output documents are screenshots that are available from the CPMS, but some of the documents use MS Office templates that must be uploaded and linked to the project.

IT PMM version 1.0 emerged in 2011, version 2.0 was launched in 2012 with the purchase and installation of the CPMS, in 2013, version 3.0 addressed all areas of knowledge with regard to the PMBoK, and in 2014, version 3.1 intensified the use of the CPMS by replacing several attached documents with automated screens of structured information, thus allowing the creation of quality indicators.

According to the interview with the personnel from the PMO, which is responsible for maintaining the PMM in the organization, at this time, controls to ensure the proper use of the methodology have not been established. There are some automatic controls in the CPMS that allow one to fill out documents related to integration, stakeholders, scope and quality, time, cost, risks and human resources. However, not all of the documents are mandatory, and there is no established process to validate their information quality.

To classify a project’s adherence to the PMM, this study evaluated whether the project output documents recommended by the PMM for both the initiation and planning phases were properly formalized in the CPMS. To be considered in adherence with the PMM, a project must have 100% of its initiating and planning phase documentation registered in the CPMS. For each area of possible adherence, the PMO used the following scale for interpretation: areas with less than 50% project adherence were considered low adherent; areas with between 50% and 75% project adherence were considered medium adherent; and finally, areas with above 75% project adherence were considered highly adherent.

The sample selected was 3047 projects with start dates after June 30, 2014, and the status of their planning phase was “completed.” Fig. 3 presents the results of the evaluation.

Low adherence was identified in the recommended documents that formalize the scope, project risks and team members’ roles and responsibilities: 2582 projects (85%) did not have the *Requirements Documentation*; 2967 projects (97%) did not have the *Risk Register*; and 2998 projects did not have the *RACI Matrix*.

Conversely, it was observed that the *Project Charter*, *Schedule Baseline* and *Cost Baseline* documents had 100% adherence. The mandatory CPMS rules state that projects are not allowed to proceed without proper PMM document registration.

The analysis of the documentation and interviews with specialist staff revealed that there is a properly implemented PMM for IT projects that is disseminated throughout the Brazilian financial organization. In addition, the single IT PMM is based on the PMBoK, thus corroborating some of the authors in the literature review (Fernandes and Abreu, 2014; Isaca, 2008; Kerzner, 2013; Zielinski, 2005).

Despite the existence of a PMM, adherence with it is low for non-mandatory documents. The absence of a clearly defined scope is one of the most common risks in IT projects and can impact the achievement of the expected schedule, cost, scope and quality (Koolmanojwong and Boehm, 2013; Terlizzi and Biancolino, 2014). Furthermore, project risks that seem to affect only the IT project budget or schedule can spread throughout the organization and affect its long-term goals (Shenhar et al., 2007); thus, it is crucial to manage project risks, especially in a financial institution.

In response to the electronic questionnaire regarding whether the proper use of the PMM contributes to PMS (delivered on time, within the budget and with the required features and functions), 90% (313) of the respondents answered YES and only 10% (34) answered NO.

When the answer was NO, the questionnaire requested an explanation with more detail. Table 5 Here presents six examples of additional clarification that were reported by the survey participants on question 1. The two main points identified were as follows: (1) as mentioned by Tiwana (2009) and Clarke (1999), using a PMM should make the process faster and reduce the required effort, but some participants criticized the current version of the PMM, explaining that the amount of documents required is excessive, which makes the process complex and slow, thus corroborating the study by White and Fortune (2002);

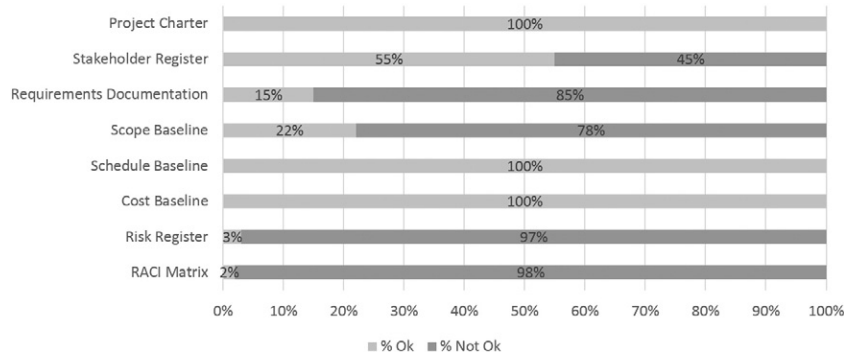


Fig. 3. Output project documents adherence. Source: authors.

and (2) aligned with Shenhar and Dvir (2007); Office of Government Commerce (2009); McHugh and Hogan (2011); Wells (2011) and Project Management Institute (2013), the methodology should be simplified and adapted to different project sizes (small, medium, large) and different methods of management (agile or waterfall). The effort expended on crafting the documents in the planning phase is high, and in some cases, these documents are not subsequently used. Thus, the methodology should be closer to the organization’s daily reality.

Most of the organization’s IT professionals (90%) understand that the proper use of the implemented PMM contributes to IT PMS. This result shows the IT professionals and the literature review are in alignment, thus corroborating Kerzner’s (2013) assertion that IT departments are almost entirely project-driven and present very little resistance to project management.

The literature explains the benefits of using a PMM and mentions some barriers to its use; however, there is a lack of studies identifying the barriers that may impact its use in IT projects in the FSI. Simply developing a PMM for IT projects is not enough; its proper use is fundamental so that the benefits can be captured. Before drawing up the questionnaire, four

senior managers were interviewed to obtain an in-depth understanding of the main difficulties in the proper use of a PMM. The selected managers are responsible for relevant departments or technology projects within the organization. During the interviews, the following question was posed: “In your opinion, are there some barriers to the proper use of the IT PMM?” Later, the answers were compared with the barriers identified in the literature review for classification. Table 6 presents the answers to this question, although only the most significant excerpts are provided to facilitate understanding.

Notably, the managers have good knowledge about the IT PMM, and they identified some opportunities for improvement. Based on the interviews, it was possible to corroborate the literature, complement it, and prepare question 2 of the survey questionnaire (Appendix A) using the eight identified factors that could impact the use of the PMM in the financial institution.

Before the distribution of the electronic questionnaire, the question was discussed and validated with the PMO. The graph of Fig. 4 plots the results, where it is possible to observe that only 15 (4%) participants answered that there are no barriers to the use of the IT PMM, while 332 (96%) participants indicated that there are some barriers.

The top five barriers to the use of a PMM in IT projects are project deadlines that are very tight (70% — 234 answers); working as both a developer and a project manager (67% — 225 answers); working simultaneously on several projects (56% — 188 responses); difficulty in the use of the CPMS (47% — 158 responses); and lack of knowledge of the PMM (36% — 122 responses).

In addition to the closed questions, 82 (23%) participants complemented their responses with comments that were analyzed individually. After the analysis, additional factors were not identified; however, the comments were useful for understanding the problems faced by the IT professionals in more detail. Table 7 presents ten examples of additional issues reported by the survey participants on question 2 classified by the dimensions of PMM implementation and development: tools, processes, people and structure. All of the answers were provided to the PMO, and their analysis helped them to (1) understand the difficulties faced by project teams on a daily basis; (2) adapt the methodology to the users’ needs; and (3) justify to the executives the investment in process changes and training.

Table 5
Additional comments reported by survey participants on question 1 (Appendix A).

#	Answer
1	“I understand that the success of the project is related to good management. Documents help the manager to control the project, but the methodology isn’t enough to ensure project success.”
2	“The methodology should be updated for agile development methods.”
3	“The methodology has too many processes, is bureaucratic, and has many artifacts that are not always used.”
4	“Very bureaucratic process with excessive volume of documents and steps that hinder the progress and timing of projects. I suggest that the methodology should be simplified to reduce the number of required artifacts for the result to be effective.”
5	“The methodology addresses excessive documentation and processes, which means that the vast majority of project managers do not use it in its entirety.”
6	“The present methodology is not adapted to agile development, which has been proven to be more efficient. Moreover, experience shows that defining the scope strictly generates problems with the user and delivers useless software. A fixed schedule is also harmful because our environment is very dynamic.”

Note. Source: survey.

Table 6
Results of manager interviews about the barriers to the proper use of an IT PMM.

#	Answer
1	Yes! ¹ As the PMM is unique for all project sizes, I understand that some documents should be eliminated for small projects and others should be included to support larger projects or programs. ^{2/3} Lack of commitment by the executives in the PMM adoption. I realize that adherence to the PMM is not part of their goals; they do not encourage or request its use. ⁴ The IT professionals don't like and don't have the culture of filling out documents. They usually start the development without a proper plan. ⁴ There should be more people as focal points with the skills to clarify doubts about the methodology. ⁴ There are good project managers that don't know the methodology in detail. That's a problem because they create processes or artifacts without a pattern and without adherence to the methodology. ⁷ Except for large projects, project managers accumulate both management and development functions. Consequently, they don't formalize the documents required by the methodology and perform management by "head." ⁸ As the deadlines for the projects are insufficient, the methodology doesn't receive the necessary attention, and some of its processes are suppressed, for example, risk management. ⁹ Lack of roles segregated between managers of projects and systems analysts. As such functions are performed by the same team pairs, they end up competing with each other and omitting project information.
2	Yes! ¹ There should be more conversations like this with the development teams to understand their difficulties and adapt the methodology to their needs. ² Executives have goals on the availability of the systems that are running in production, but they should also have goals on the adherence to the methodology for projects that are in development. ⁴ Many project managers don't have adequate training in the PMM. The PMP certification should be a prerequisite for those who assume this function. ⁴ There should be more workshops on project management topics to ensure that professionals internalize the benefits of adequate and standardized use of an MGP. ⁵ The methodology and the flow of the project management tool should be adapted to the reality of the organization. There are missing features for program management, and the functionality for risk management is very complex.
3	Yes! ^{1/3/6/8} There are several managers that act simultaneously on small projects with short deadlines. Therefore, only the required documents are prioritized. ² The lack of adherence to the PMM doesn't impact the goals of the project managers. ^{2/3} There should be adherence indicators to the methodology published periodically for the entire IT department. Thus, in addition to serving as an indicator of the health of a project, it also would generate healthy competition among managers and improve the adherence rate of the organization in general. ⁴ A <i>Knowledge Manager</i> of the methodology should be in the departments. This is already a good practice adopted for the systems development methodology and would be a way to disseminate and ensure the uniformity of the PMM.
4	Yes! ⁴ Lack of courses in project management and methodology. ⁵ For some processes, the flow required by the project management tool is very complex, discouraging its use, for example, risk management. ⁶ Many of the output documents required by the methodology are the responsibility of the members of the project team; however, because they work simultaneously on several projects with an excessive workload, the methodology isn't followed properly. ⁸ The project deadline estimates are unrealistic because it does not consider the time required for the processes of the methodology, inhibiting its proper use.

Note. Source: authors.

¹ Single PMM for all project sizes; ² Lack of support (supervisor or executive); ³ Lack of mandatory use of the PMM; ⁴ Lack of knowledge of the PMM; ⁵ Difficulty using the project management software; ⁶ Working simultaneously on several projects; ⁷ Working as both a developer and a project manager; ⁸ Very tight project deadlines; and ⁹ aspects not related to the PMM.

Notably, the organization undergoes a process of acculturation in project management such that the IT professionals are aware of the methodology, and there are some barriers that make its use difficult. Knowing about such barriers is very

important for the PMO and the executives and can make it possible to implement an action plan that eliminates the barriers and allows the benefits proposed by the PMM to be achieved.

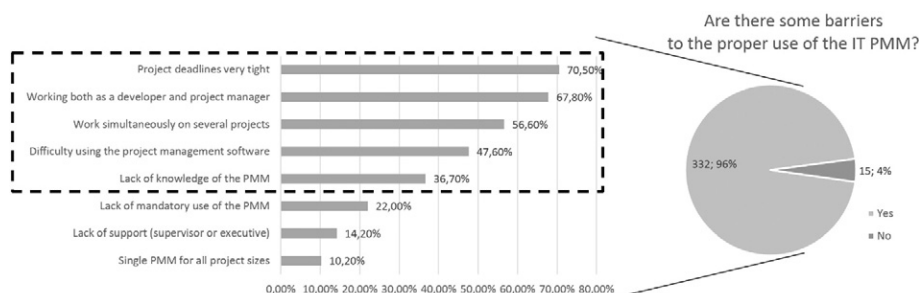


Fig. 4. Barriers to the proper use of the IT PMM. Source: authors.

Table 7
Additional comments reported by survey participants on question 2 (Appendix A).

#	Answer	Dimension
1	"I am blind, and the project management tool is not accessible for use with the screen reader's software; for this reason, I cannot work as a project manager."	Tools
2	"The methodology is not adequate for agile methods."	Process
3	"The methodology should be simplified for small projects and the quantity of output documents reduced."	Process
4	"The software development methodology (SDM) has too many mandatory deliverables, increasing the development time of a project; consequently, to deliver the project at the scheduled time, the PMM is sacrificed."	Process
5	"There are too many output documents with redundant information."	Process
6	"The project manager's role isn't properly recognized in the organization and many times is exercised by professionals without the position of manager."	Structure
7	"The project deadlines are agreed between managers rather than being estimated using the metrics recommended by the PMM."	Process
8	"The project management tool is slow and bad for control of large schedules."	Tools
9	"There are no mechanisms that block the progress of the projects if the methodology is not properly used. People look for shortcuts to circumvent the methodology. For example, if the analyst, who is the project manager, estimates a coherent budget that covers all phases of the PMM and SDM, the budget is considered too expensive, and the project is not approved."	Process, people
10	"In my opinion, the factors that make the use of the IT PMM difficult are:	Process, structure
	1. Tight deadlines. In our organization, it is impossible to plan a project using the best practices of the market. Usually, we have just 2 or 3 days to plan a project with a 10,000 hour budget.	
	2. Frequently, people work as both a developer and a project manager. This situation makes it difficult for the professional as the project progresses because he is overloaded and has no time to do the activities as well as possible.	
	3. There is no recognition by the executives of the application of the methodology because they want to see only the schedule. Other dimensions of project management that are also important are remembered only in times of crisis.	
	4. Some proposed templates are not functional. For example, it's very difficult to create a WBS using our template developed in MS Excel."	

Note. Source: survey.

5. Conclusions

Based on the literature review and the discussion of the results of the case study, it was possible to answer the research questions presented in this study: (1) "To what degree is an IT PMM implemented in a large Brazilian financial institution?" and (2) "How is an IT PMM that contributes to PMS used in a large Brazilian financial institution and to what degree is it implemented?"

The establishment of a PMM for IT projects is recommended for large Brazilian financial institutions because the IT processes in these organizations are audited by the BACEN using the CobiT framework, which recommends the use of a PMM as a significant mechanism of control in IT governance. In addition, the proper use of a PMM increases a project's chances of success (delivered on time, within the budget and with the required features and functions).

A PMM can be unique for all projects or adaptable to each project's characteristics, depending on the organizational culture and the maturity level of the professionals regarding project management. A PMM can also be developed internally or can be based on good practice guides.

The study showed a positive outlook regarding the perception of IT professionals regarding the use of a PMM, as 90% of the professionals believe that the use of a PMM brings benefits to the organization, thus improving a project's chances of success. However, simply establishing a methodology is not sufficient to ensure its use by an organization; it is necessary to create an environment with the appropriate conditions for its use. In the studied organization, a lack of adherence to the PMM was identified in relation to the scope

and risk management process. The low level of adherence to the non-mandatory document requirements and the absence of consistent controls to ensure the proper use of the methodology reveal a low level of maturity in the project management process and opportunities for PMM improvement.

Regarding the barriers that make the use of an IT PMM difficult, five main factors were found: (1) very tight project deadlines; (2) working as both a developer and a project manager; (3) working simultaneously on several projects; (4) difficulty using the CPMS; and (5) a lack of knowledge of the PMM. With the results of this study and the support of executives, the PMO can act together with the IT professionals and improve the methodology.

In a financial sector company, technological advances of the computer systems are critical to ensure the safety of current operations and to support future growth. Thus, ensuring the efficiency and effectiveness of the execution of IT projects becomes a strategic issue that can be achieved through the proper use of an IT PMM. This study also contributes to the academic literature by confirming and extending the main aspects of requiring a Project Management Methodology in the financial services industry.

5.1. Practical implications

It is the researchers' hope that the findings reported here will complement existing research in the area of internationally recognized PMM and will be of interest to practitioners.

The study showed that IT professionals believe that the proper use of an IT PMM brings benefits to projects, but simply establishing such a methodology is not sufficient to ensure its use.

Table 8
Action plan.

Barriers	Action plan
Very tight project deadlines	<ul style="list-style-type: none"> - Make the flow review, scope statement and requirements approval mandatory. - Create quality indicator requirements and link them to the managers' goals. - Make the cost and schedule estimate process mandatory by automating it in the project management tool. The tool should consider the time required for the preparation of the mandatory methodology documents. - Develop and implement workshops about the estimate process.
Working as both a developer and a project manager	<ul style="list-style-type: none"> - Identify the professionals with both management and technical skills. - Clarify the dual role of project manager and developer for the identified professionals.
Working simultaneously on several projects	<ul style="list-style-type: none"> - Develop and implement training and workshops presenting the new version of the methodology and the integration of the developer and manager roles. - Develop an adapted version of the PMM for small projects. - Develop workload controls for the project teams.
Difficulty in using the CPMS	<ul style="list-style-type: none"> - Update the CPMS to the most recent reviewed version (simplest and most robust) that adheres to the necessities of the IT and company processes and implement it in waves by department. - Create the role of methodology focal point to stimulate the culture of project management and facilitate the adaptation to the new version of the tool.
Lack of knowledge of the PMM	<ul style="list-style-type: none"> - Offer new training classes. - Provide mandatory online training. - Set training goals for project teams.

Note. Source: authors.

After establishing an IT PMM, it is crucial to ensure adherence to it. If the level of adherence is low, it becomes necessary to identify and remove the barriers that prevent its use.

Exploring the causes of a problem can enrich the understanding of a given theory and allow readers to make more sense of complex organizational phenomena (Whetten, 1989). Therefore, the authors considered that the practical implications of this study would be incomplete if they only identified barriers and had not proposed solutions to the cause of the problems. Thus, the survey results were presented and discussed with the PMO team and the four managers who were previously interviewed. By doing so, it was possible to validate the interpretation of the results with the support of the organization's specialists and to suggest an action plan to enhance the processes in the organization related to the use of the IT PMM.

Table 8 presents the proposed action plan for the removal of the five main barriers that prevent the proper use of the PMM.

At the end of this study, a new IT PMM for small projects had been developed, and the flow review and approval of the scope statement and requirements became mandatory.

5.2. Strengths and limitations

On the one hand, the strengths of this study included the unrestricted access to one of the largest FSI companies in the world, which ensured data quality and enabled an in-depth analysis. In addition, the support and engagement of the organization's professionals who were interested in the study's results was very important because the study was used to understand the organization's shortcomings and to develop an action plan for the evolution of the methodology.

On the other hand, the study was limited by the fact that it employed a case study as its research approach. As a result, the findings are only representative of one company in the FSI at a

particular point in time in a specific country, making it difficult to generalize the results for other industries. Practices may vary across organizations or across countries. The starting point of crafting the questionnaire was based on the opinion of four experienced managers who are responsible for large IT projects. If additional project managers in the organization had been interviewed, they may have had differing opinions, depending on their level of experience and the division of the organization in which they worked.

Moreover, this research focused on the use of a methodology based on the PMBoK that is internationally recognized. Other methodologies based on models such as the ICB or PRINCE2 could also have been considered to examine the use of PMMs more broadly. Caution should be exercised relating the findings of this research to contexts other than similar organizations that use the PMBoK PMM.

5.3. Further research

Future research, either quantitative or qualitative, should further examine a broader range of organization sizes and industry sectors by evaluating the following questions:

- What factors facilitate the proper use of an IT PMM?
- Considering that a PMM has to evolve within an organization, what are the main deliverables that influence project success, and how should project success be measured?

Finally, it is important to address the limitations of this study by considering the perspective of project managers with different levels of experience and other stakeholders within the organization.

Appendix A. Questionnaire

The following question was asked to understand whether the IT professionals believe that the proper use of a PMM contributes to IT project management success.

1) Do you believe that the proper use of a PMM contributes to IT project management success (delivered on time, within the budget and with the required features and functions)?

Yes

No

<If the answer was NO>

Please explain:

The following question was asked to understand the barriers to the use of an IT PMM.

2) In your opinion, are there some barriers to the proper use of the IT PMM?

No

Yes

<if the answer was Yes>

Choose as many answers as necessary. I don't have the support of my supervisor or executive.

I don't know the PMM very well.

I have to work as both a developer and a project manager.

I have to work simultaneously on several projects.

The PMM doesn't fit all project sizes.

The project deadlines are very tight.

The new project management software is difficult to use.

The use of the PMM isn't mandatory.

Comments:

The other questions on the questionnaire are omitted because they do not have value for this study.

Conflict of interest

This manuscript has not been published and is not under consideration for publication elsewhere and we have no conflicts of interest to disclose.

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