



Value management in IT projects: a study in Brazilian organizations

Gestão de valor em projetos de TI: um estudo sobre organizações no Brasil

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Abstract: Nowadays, it has been acknowledged that there is an insufficiency of projects assessment based on scope, time and cost restrictions to ensure the organization's creation of value. Despite that, this metric keeps being used and, quite often, it is the only one used to assess the project's success. This study is based on theoretical references to analyze how some Brazilian and multinational organizations manage the creation of value through their Information Technology (IT) project portfolios. This work aims to understand the processes used and identify the main challenges faced by those organizations. To achieve this goal, an exploratory qualitative approach was used, based on semi-structured interviews with IT portfolio managers from 14 companies of several segments and sizes. The research indicated improvement opportunities and showed that few companies effectively assessed the value generation of their projects, prevailing a perspective of dissonant assessment procedures from corporate results, which does not contribute to the organizational improvement and learning process.

Keywords: IT projects; Value-adding; Return on investment; Organizational learning.

Resumo: Atualmente, admite-se a insuficiência da avaliação de projetos baseada em restrições de escopo, prazo e custo para assegurar a criação de valor pela organização. Apesar disso, essa métrica continua sendo, muitas vezes, a única utilizada para avaliar o sucesso dos projetos. Neste artigo, a partir de referências teóricas, analisa-se como algumas empresas nacionais e multinacionais gerenciam a criação de valor por suas carteiras de projetos de Tecnologia da Informação (TI). Busca-se entender os processos utilizados, bem como identificar os principais desafios encontrados pelas organizações pesquisadas. Para atingir esse objetivo, foi utilizada uma abordagem exploratória qualitativa baseada em entrevistas semiestruturadas com gestores de portfólios de TI de 14 organizações brasileiras de diversos segmentos e portes. A pesquisa indicou oportunidades de melhoria e mostrou que poucas são as organizações que avaliam de forma efetiva a criação de valor por seus projetos, prevalecendo uma visão de desempenho não alinhada aos resultados corporativos alcançados e que não colabora com o processo de melhoria e aprendizagem organizacional.

Palavras-chave: Projetos de TI; Geração de valor; Retorno sobre o investimento; Aprendizagem organizacional.

1 Introduction

Project management is a topic that has progressively gained importance in academic literature. However, its contribution to value generation, namely, the achievement of corporate objectives, has not been given the same attention.

In a recent article, Ciani et al. (2015) observed that companies in developed countries added three times

as much economic value during the period 2000 to 2010 than companies in emerging countries (Brazil, Russia, India and China). Among them, Brazil was the country with the worst performance.

From a business point of view, the information and communications technology industry, which is the basis of the "new economy" and important

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sociological changes, corresponds to a very wide range of activities. The software development segment alone represented a global market of \$350 billion in 2012 (IDC, 2015), not including segments, such as telecom services, and e-commerce.

The discussion about value generation through Information Technology (IT) projects is a recent issue. Brynjolfsson & Hitt (1998) are among the first to attempt to understand IT's contribution as a new production factor, coining the term "Productivity Paradox." With this term, they indicated that it was not only an intensity in the use of "computers" that increased wealth generation, but pointed to the importance of a new way of organizing work, and as such, opened a wide field of research.

Oliveira et al. (2015) investigated the benefits of IT investment from a sample of one hundred and forty-nine Brazilian companies. In their analysis, based on Resource-Based Theory (Barney, 1991), they were unable to establish a difference between the performance of companies with higher IT installed capacity, and those with lower capacity.

Lin et al. (2010) investigated the role of IT in the increase of productivity in a small number of countries. Using three different macroeconomic models, they found that the UK and Japan experienced productivity increases of more than 100% during the period from 1998 to 2006, corresponding to their IT investments, while France, Austria, and Belgium experienced a decrease in value from their investments. In 2013, the same authors changed the research analysis unit and analyzed 376 organizations, identifying different investment scenarios to be considered. They then pointed to the convenience of abandoning the aggregate data analysis and undertaking a contingent analysis of investments.

Regarding the United States of America's (USA) financial sector IT projects, Tallon (2010) observed that, while the largest banks managed large IT portfolios to reduce costs and remotely service their customers, between 1994 and 2008 the profit margin of smaller banks was consistently superior, showing that there was still room for profit through personalized service without necessarily taking advantage of IT tools.

Using data from the Standish Group (Table 1), it is possible to estimate the costs of non-quality IT projects in the USA in figures of the order of hundreds of billions of dollars per year. As a result, studies

became relevant that sought to understand how these costs could be reduced, and the generation of value promoted by them enhanced. This brief summary of recent literature demonstrates the complexity of the topic and the relevance of the discussion.

The objective of this work was to study how some organizations, from different backgrounds, manage the value of their IT projects, as well as the challenges encountered in these processes, leading to the research question: "How is the value management of IT projects being carried out in organizations from different Brazilian contexts, and what are the challenges encountered?"

In this work, an exploratory research was developed, including interviews with portfolio managers from fourteen Brazilian organizations, who coordinated more than two thousand IT projects in a given year. The unit of analysis was the organization, with its portfolio of IT projects. This work aims to provide a better understanding of how a group of national companies manages the value added from their projects. Due to the diversity of these organizations and the singular importance of several of them, it is believed that the challenges found in this research are representative of a much larger number of Brazilian organizations.

2 Theoretical foundation

The theoretical foundation shows the results of the literature review that was carried out, as well as the theoretical basis for the exploratory study. Initially, the concept of value management is presented, followed by its relationship with information technology projects, the importance of particularities in the definitions of organizational objectives, alignment and project selection, project management and results evaluation, and knowledge management.

2.1 Value management

A project is a temporary effort undertaken to create a product, a service, or a particular result (PMI, 2013a). However, would products and services from the perspective of project promoters be an end in itself? From the authors' perspective, using Freeman & Evan's (1990) concepts, projects would be innovative initiatives designed to generate value for stakeholders in a sustainable manner within agreed criteria.

Table 1. Results of the IT projects surveyed in USA.

Result/Year	2009	2010	2011	2012	2013
Successful	36%	38%	37%	41%	36%
Problematic	44%	40%	46%	40%	48%
Canceled	20%	22%	17%	19%	16%

Sourced: Standish Group (2013).

The literature has gradually been adopting the effective view as the success criterion, complementing traditional metrics based on effectiveness and efficiency that are materialized in traditional success, based on the triple constraint (i.e. meeting the requirements of scope-cost-time).

But what would constitute value? The concept of value is used in different contexts, from sociology to accounting, from philosophy to economics, from marketing to project management, but there is no unanimous definition of value.

For the purposes of this study, value will be defined as the weighted sum of benefits received, subtracting the weighted sum of sacrifices incurred, directly or indirectly, in the process of generation of the aforementioned benefits, both resulting from a phenomenon, interpreted at a given moment by a given individual, and confronted with a set of reference parameters.

Value management emerges, then, as the set of processes related to the assurance of value generation by the projects.

2.1.1 Value management and information technology projects

The high value of investments made by companies in IT projects motivated some researchers to investigate the role of these investments in obtaining corporate results.

Pinheiro & Tigre (2015) examined innovations based on Brazilian's IT resources. The results showed that such innovations alter internal processes and the relationship with stakeholders, demanding a greater organizational integration effort. This result is similar to that of Prasad & Heales (2010) who, studying a small developing country in Oceania, observed that IT investments needed to be coordinated with complementary investments in order to achieve the effect observed in developed countries. It is seen, therefore, that the business environment influences the effectiveness of this type of project.

In a study by Souza & Arpino (2011) of small and medium-sized Brazilian companies, it was verified that IT investments, while promoting greater operational efficiency, did not increase the profitability of their operations. A similar conclusion was established by Kang et al. (2013), who investigated IT investments in computer-aided design systems in the field of civil engineering.

The profit perspective, however, is not the only factor that leads an organization to invest in IT. Cano & Baena (2015) demonstrated that IT investment was fundamental to the reduction of time and cost in international negotiation processes, when they analyzed the process of company internationalization,

thus making IT investment a factor in increasing competitiveness.

By contrast, Galy & Saucedo (2014) investigated the effect of implementing integrated management systems, or more specifically, Enterprise resource planning (ERP), but were not able to identify financial benefits to firms in subsequent years.

Dewan & Ren (2011) correlated the IT investments of five hundred companies listed in *Fortune 1000* magazine in the period 1987 to 1994, concluding that there is a negligible association between IT investments and the return on these investments, but a positive link with respect to risk reduction. Otim et al. (2012), following the work of Dewan and Ren, analyzed the effects of IT investments in the period 1985 to 2004 but focused on the reduction of (downside) risks rather than exceptional returns.

Lunardi et al. (2012) compared the performance of one hundred and one companies listed in the Sao Paulo Stock Exchange Index, (Índice da Bolsa de Valores do Estado de São Paulo, or IBOVESPA), before and after implementing IT governance mechanisms, and observed that these had a higher aggregate performance when compared to the other 303 companies that did not adopt such mechanisms.

Moreno et al. (2014) verified the need for effective knowledge sharing between IT and business areas to generate value, as measured by customer satisfaction.

Costa & Porto (2014) adapted the concept, and systematized a set of "technological governance" elements with the capacity to lead innovation investments in Brazilian multinationals, coining the concept of "cooperativeness".

Dolci & Maçada (2014) analyzed the results obtained by IT investments from an original perspective, related to logistical factors. From their results, it is inferred that specific market conditions, e.g. regulation, competition, cooperation, etc., are parameters that limit the value generation obtained by IT investments. The increasing interdependence of systems, rapid technological obsolescence, and the ambiguity of customer-supplier roles, make the analysis of these investments more complex than others made in traditional segments.

Cao (2010) identified four organizational dimensions in his study of IT value generation: organizational processes, structure, politics, and culture, advocating the adoption of a contingent approach to promoting the alignment of these dimensions.

Martín-Oliver & Salas-Fumás (2012) analyzed the IT investments of a large Spanish bank in a period of high expenditure and indicated that the results of IT investment will depend on the organization's market power, which will limit the ability to transform the organization's IT capital into increased profitability.

Ciani et al. (2015) observed that, while the largest companies in the USA and other developed countries add three times more value than the largest BRIC companies (the group of the largest emerging countries composed of Brazil, Russia, India and China), only Brazil figured negatively in terms of the Economic Value Added (EVA) among its twenty largest companies. Interestingly, while half of US companies surveyed are from the IT sector, only one Brazilian company belongs to this sector.

Finally, this panorama of ongoing discussions into value creation in IT projects is completed with the work of Vidal et al. (2015) who studied 23 Brazilian companies listed in *Forbes Global 2000*. These North American researchers found that only 35% of the companies surveyed had a broad vision of value generation, with most of them still focusing on the mere generation of short-term financial value from the perspective of their shareholders.

2.1.2 Value management and organizational idiosyncrasies

In order to understand the challenges of value management in the corporate context, two theories have been identified as relevant: the Agency Theory and the Stakeholder Theory.

The development of Theory of the Firm is supported by different school of economy since Adam Smith. In this theory, the main objective of the business organization is to increase shareholder wealth (Camargos & Coutinho, 2008). A consequence of the firm's growth, and subsequent separation of the corporation's ownership and management, was the subject of a study that concluded in the Agency Theory. According to this theory, the separation between control and ownership entails costs, termed "agency costs." These include, in addition to the costs resulting from the control mechanisms, the losses arising from managers' decisions not made in the interest of business objectives, but made to privilege their personal interests (Jensen & Meckling, 1976).

Freeman & Reed (1983) was an important influence in the substitution of stakeholders as the ultimate end of a company's initiatives, defining stakeholders as key factors for the company's survival and prosperity. In subsequent works (1984, 1990) he refined the stakeholder theory, indicating that a firm's success depends on its ability to operate in equilibrium within its ecosystem, taking into account the interests of a large number of stakeholders. Rabechini et al. (2010) brought a similar approach to the area of project management, defending the importance of a new client-supplier relationship, based on cooperation.

2.2 Strategic alignment and project selection

A particular need can be met in different ways. In recent literature, Raschke & Sen (2013) developed an approach to improve the ex-ante evaluation of IT projects by applying a process of quantification of scope elements that do not add value to the final product. Dutra et al. (2014) developed a literature review, and proposed a probabilistic model based on a broad set of qualitative and quantitative criteria that integrated social, environmental, economic, and long-term effects. The model was tested in the prioritization of projects of a large Brazilian company, with a set of sixteen criteria. Marzagão & Carvalho (2013) analyzed the portfolio management in forty-five Brazilian companies from different segments, and observed gaps in the project selection process.

Since there are usually numerous project demands within an organization, a preliminary selection, the development of alternatives, and the formalization of the projects where the resources of the organization are to be allocated, become necessary. For each elaborated concept, the feasibility to generate the desired value should be analyzed. The concept development can take place over as many phases as necessary (CII, 2006).

Turning now to analyzing strategic alignment, the literature identifies various ways in which organizations articulate their priorities. In this area, the Front-End Loading (FEL) process, a method for the evaluation and conception of large projects, advocated by the *Independent Project Analysis Inc.* and the *Construction Industry Institute* (CII, 2006), emerges as a state of practice, having been applied for decades in several industries.

Caution must be exercised with regards to breakthrough innovations. In these cases, the various attempts to apply forecast methodologies have proven to be ineffective, and organizations should allocate specific funds for this purpose. The use of forecasting methods in these cases, has been recognized as "innovation annihilators" (Christensen et al., 2007).

2.3 Project management

Mir & Pinnington (2014) revisited the topic of success in project management and were faced with the same reality that had been continually reported in recent articles: despite the increasing adoption of methodologies - there is no evidence of performance improvement at the organizational level. They pointed out that the fundamental obstacle was the lack of clarity about the concept of success, and concluded that the use of cost, time, and quality criteria were inadequate, since they represented a short-term view with a limited impact on the generation of value.

Browning (2014), on the same line, believes that projects exist to create value. Scope, time, and costs can become ends in themselves instead of the means

to create value from the project. The article presents an integrated approach to quantify and monitor the project value in terms of key attributes that are important to its stakeholders.

From the point of view of management processes, the “Japanese miracle” of the 1960s has perhaps been the phenomenon that has brought greater turbulence to the world market, since the foundations of so-called “scientific management” were laid at the beginning of the 20th century. The USA, until then without a competitor, saw its hegemonic position threatened. In response, there was a national mobilization and several initiatives were launched. The concept of the quality system, and the ISO 9000 Standard approved in 1987, were two relevant milestones that had a permanent impact on the corporate world on a global scale.

During the same period, in the North American aerospace industry, an original approach was being undertaken, supported by new techniques of work organization and operational research. Both aspects have led to an innovative way of conducting business, defined in temporary organizations that promote projects. Products of this process are the project management practices consolidated by the Project Management Institute (PMI), published in 1987 and continuously reissued (PMI, 1996, 1997, 2013a, b, 2016).

With the success of the worldwide quality movement in the 1980s and 1990s, these concepts were absorbed by the growing project management community, and were accepted as an international standard, ISO 21500 (ISO, 2012).

From the efficiency point of view, value is built from the adoption of good project management practices by organizations.

There is a strong tendency in the marketplace to replace the traditional management methodologies described here with agile management techniques (Sutherland & Ahmad, 2011) as a way of responding to the specifics of the IT segment.

In order to fill the identified talent management gap, the potential of the International Project Management Association’s (IPMA) International Excellence Model was identified to account for the relationship between skills, learning, and outcomes (IPMA, 2006).

2.4 Results assessment and knowledge management

With the final acceptance of the project, it is then passed to the product life cycle, where the product, service, or result will be operated and maintained. Often, the product will be improved, which can generate new demands and projects, and eventually be discarded.

It is important to point out that the various stages of value management will not necessarily be conducted by the same agents, especially in organizations whose business is the development of projects for third

parties. In those, once the project has been closed, there is usually no involvement with the product, which may result in a significant loss of learning.

In order to understand the process of value generation following the traditional line specified by Independent Project Association Inc. and Construction Industry Institute (CII, 2006) and by the IPMA, attention must be paid to the two extreme points of the project: the ex-ante selection and the ex-post evaluation; an instance which an expectation of value generation is created and, ultimately, which it is confirmed or not.

After the finalization of the project, the evaluation of the ex-post project results is carried out, using the knowledge acquired to improve the organizational skills in the project selection. Learning is the main gain of the process, and there is a strong overlap between value management and knowledge management that will lead to the improvement of competences, as detailed in the IPMA (2006) approach, as well as in the last edition of Project Management Body of Knowledge - PMBOK (PMI, 2016), published after the completion of this study. In this issue, the “Talent Triangle” was conceptualized, presenting project management techniques, leadership, and business strategic competence aspects; a scope now expanded and the topic of interest of this article.

2.5 Competence groups in value management

The literature review did not identify a single model capable of covering the entire process of value management in IT projects. However, several standards, guides, and methodologies, as well as research in several areas, were the base for the proposition of three competence groups in value management.

The competence groups were chosen based on a review of the literature, having as criteria the logical-temporal sequence, from which value generation occurs through IT projects, and the basis of each of these groups, as well as their interrelations in the literature.

This process resulted in the proposal of three groups of competences: project selection and strategic alignment, project management, and results evaluation. For each of the competency groups, associated competences, considered relevant from the review of the literature, were determined. The description of each of the groups and competences, their codifications, as well as the literature references are summarized in Chart 1.

3 Methodology

The research fits into field, qualitative, and exploratory research. Theoretical studies covering the evaluation of the processes and value management challenges in Brazilian organizations’ IT projects, as well as evaluation models of value management, were not found in the literature review, for this reason, qualitative exploratory research was chosen, in order

to gain a better understanding of the topic and the context (Hart, 1998).

The research methodology was imbued with some aspects of the case study approach proposed by Yin (2015). This method allows for the study of contemporary phenomena, inserted in their real context, and in which the boundary between the object and its context is not clearly evident. The “multiple” case study subtype emphasizes the research question according to the focus of multiple organizations and contexts.

Even in an exploratory study, it is necessary to formulate preliminary theoretical bases that will guide the investigation (Yin, 2015). The competency groups identified in the literature review form the theoretical framework that guide the data collection, and the analysis and interpretation of these data.

Following the recommendation of Yin (2015), in order to ensure the reproducibility of the study, the research protocol was elaborated, containing the following topics: overview, procedures for data collection, data collection issues, and report guidance.

3.1 Screening for analysis units

In order to study the value management processes and challenges in different contexts, and the particularities of the IT sector, qualified candidates

were chosen, so that at least one organization from each of the sizes/segments of Chart 2 was available for the study.

The choice of size categories and the segment of the organizations to be studied was carried out based on the literature review, taking into account the particularities of the IT segment; mainly the possibility of studying the value management when IT projects constitute the organization’s end and middle area.

While the scope of the screening was being finalized, it was decided to enrich the study with other candidates, forming, in some cases, more than one unit of analysis per size/segment considered. From a total of sixteen organizations contacted, fourteen were available for the study.

3.2 Analysis units

The units of analysis were the IT project portfolios of the organizations studied. The study was carried out in fourteen organizations, and each one was assigned a code, from O1 to O14, as shown in Chart 3.

The organization’s processes and challenges in the value management of their IT projects were studied based on the competence groups’ theory.

Chart 1. Competence Group in Value Management.

Competence Groups	Description and Theoretical Foundation
Strategic Alignment and Project Selection (SAS)	The organization must have guidelines for project selection (C1) and this selection must be in line with its strategy (C2). Financial (C3) and non-financial (C4) factors should be taken into account in this selection. Risks should be evaluated (C5). It is important for the projects to be priced properly (C6). It is important that the project manager participates in the selection process (C7) (CII, 2006; PMI, 2013a, b; IPMA, 2006; Raschke & Sen, 2013; Dutra et al., 2014; Marzagão & Carvalho, 2013; Christensen et al., 2007; Freeman, 1984).
Project Management (PM)	The organization must have processes to manage its projects, whether agile or traditional (C8). Value generation integrates the role of successful project metrics (C9). The project’s value generation must be monitored during its conduction (C10) (CII, 2006; PMI, 2013a, b; IPMA, 2006; ISO, 2012; Mir & Pinnington, 2014; Browning, 2014; Sutherland, 2014; Sutherland & Ahmad, 2011).
Results Evaluation and Knowledge Management (KME)	The project results should be evaluated in the short (C11) and in the long term (C12). This assessment should be integrated with the organizational knowledge management and the organization should use the knowledge generated to improve its competencies (C13), especially those related to Strategic Alignment and Project Selection (C14) (CII, 2006; PMI, 2016; IPMA, 2006).

Chart 2. Organization Screening Framework.

Size/Segment	Services - IT	Services - Others	Industry
Large	X	X	X
Small/Medium	X	X	X

Chart 3. Distribution of organizations by size/segment.

Size/Segment	Services - IT	Services - Others	Industry
Large	O8	O3, O7, O10, O12, O13	O2, O5, O6
Small/Medium	O1, O4, O14	O11	O9

3.3 Data collection

The data was collected from several sources. The methods of data collection used were: interviews, and analysis of records and documents. All data collection was performed between the years 2014 and 2015.

3.3.1 Interviews

Semi-structured interviews were conducted with executives from each of the organizations studied. The interview script was initially based on obtaining the following demographic data from the organizations: name, business segment, business description, interviewee function, predominance of internal or external projects, profile of clients, major profile of IT projects, number of projects under execution, workforce allocated, outsourcing, Project Management Office (PMO) existence and positioning, and relevance of regulation, contractual claims, or lawsuits for IT projects. It should be emphasized that the interview's aim was to obtain demographic data in order to improve the study conditions, but not all data was necessarily used for the discussions and results obtained.

Later, a second script was created with the aim of evaluating the value management competences cited in the theoretical basis, as well as determining the challenges encountered in the project value management. A semi-structured interview was found appropriate for this exploratory study, since the scope expands as the interview develops, aiming to broaden knowledge of the units of analysis. A guideline was established specifying that the interviewees should have knowledge of the organizational processes under study, and this was guaranteed by the authors during the interviews. The interviews took place either in person or through the *Skype* tool, they lasted between forty and fifty minutes, and were all recorded.

3.3.2 Analysis of records and documents

In the public organizations, the public records provided by the transparent communication channels were analyzed. Corporate public data and investor relations were used for the private publicly traded organizations. All interviewees were asked to provide evidence documents of the cases they reported, and these were analyzed.

4 Results and discussions

Initially, the results and discussions are presented with the demography and a summary of the competences evaluated, followed by the study of each of the analysis units, and finalized with the study of the challenges encountered by the organizations.

4.1 Demography and summarization of competences

The demographic data considered relevant in the organizations studied are presented in Charts 4 and 5.

Regulation is considered in the broad sense, that is, both internal regulations, as well as laws, norms, and regulations imposed externally. The project profile presents information on whether IT projects constitute a core business activity of the company, or if they are business support activities. It was also determined whether the company had a PMO in its organizational structure.

An evaluation of each of the competences of the theoretical basis was carried out, in order to summarize the results. To this end, a grade was assigned to each company, and its meaning is shown in Chart 6. The assignment was based on the data analysis and the comparison with the competences' theoretical foundations. The results are summarized in Chart 7.

Chart 4. Demographic data of the organizations studied (1).

Code	Nature	Business	Size	Source
O1	Private company	IT Services - Logistics	Small	Brazilian National
O2	Private company	Industry - Automotive	Large	Foreign Multinational
O3	Private company	IT Services - E-commerce	Large	Brazilian National
O4	Private company	IT Services - Development	Small	Brazilian National
O5	Private company	Industry - Cosmetics	Large	Brazilian Multinational
O6	Private company	Industry - Home appliances	Large	Foreign Multinational
O7	Public organization	Services - Financial	Large	Brazilian National
O8	Private company	IT Services - Development	Large	Brazilian National
O9	Private company	Industry - Civil Construction	Medium	Brazilian National
O10	Private company	Services - Financial	Large	Foreign Multinational
O11	Private company	Services - Financial	Medium	Brazilian National
O12	Public organization	Services - Financial	Large	Brazilian National
O13	Private company	Services - Financial	Large	Brazilian Multinational
O14	Third sector	Services - Development	Medium	Brazilian National

Chart 5. Demographic data of the organizations studied (2).

Code	Profile of IT Projects	Relevance of Regulation	Existence of PMO
O1	core business activity	Low	Existent
O2	support activity	High	Existent
O3	support activity	High	Existent
O4	core business activity	Low	Non- Existent
O5	support activity	Low	Existent
O6	support activity	Low	Existent
O7	support activity	High	Non- Existent
O8	core business activity	High	Non- Existent
O9	support activity	Low	Non- Existent
O10	support activity	High	Existent
O11	support activity	High	Existent
O12	support activity	High	Existent
O13	support activity	High	Existent
O14	core business activity	High	Existent

Chart 6. Description of competence grades.

Grade	Description
0	Competence does not exist in comparison to the theoretical basis
1	Competence exists but it is considered insufficient compared to the theoretical basis
2	Competence exists, and it is considered sufficient in comparison with the theoretical base (shaded item for enhancement)

Chart 7. Summarization of the grades of organizations' competences.

Group	Competence/Organization	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SAS	C1 - Selection Guidelines	1	1	1	1	2	1	1	2	1	2	1	2	2	2
	C2 - Strategic alignment	0	1	0	1	1	1	0	2	1	2	0	2	2	2
	C3 - Financial Criteria	0	1	1	1	1	1	0	2	1	2	0	2	2	2
	C4 - Non-financial Criteria	0	1	0	0	2	1	0	2	1	2	0	2	1	2
	C5 - Risks	0	1	0	0	1	1	0	2	0	2	0	2	2	2
	C6 - Pricing	0	1	0	2	0	0	0	2	1	2	0	1	2	2
	C7 - PM Participation	0	0	0	0	1	1	0	2	2	0	0	2	0	2
PM	C8 - PM Processes	1	2	2	2	2	1	0	2	1	2	1	2	2	2
	C9 - Value and Success	0	1	0	2	1	0	0	2	1	2	0	1	2	2
	C10 - Monitoring Value	0	1	0	2	1	0	0	2	1	2	0	1	2	2
KME	C11 - Short Term Evaluation	1	1	0	1	1	1	1	2	1	2	0	1	2	2
	C12 - Long Term Evaluation	0	0	0	0	0	0	0	2	1	1	0	0	1	1
	C13 - Knowledge	0	0	0	0	0	0	0	2	0	1	0	0	0	1
	C14 - Selection Improvement	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.2 Study of organizations

In this section, each of the organizations surveyed will be addressed individually.

- a) O1: Company whose business is to develop and support IT logistics solutions for other companies. Unclear project selection processes, based only on analyzing the company's ability to respond to customer demand. Project management is through PMBOK and agile based methodologies, but without consideration of the process of value generation. There is no post evaluation of projects. Being an organization with IT as

its main activity, the low levels of competence observed can create disadvantages in terms of competition, and this can jeopardize the entire business of the company, especially due to the lack of adequate pricing. O1 is a small company, where processes are centralized to its owners' decisions. Its focus is on the improvement of project delivery processes. The company had a negative experience with a project cost control tool that was costly and complex, and ended up discouraging the teams from trying to control project costs and, consequently, evaluating the value generated. The interviewee also sees the

organizational structure of the company, in which there is low integration among the sectors, with each being focused only on what is allocated to them, as one of the causes for the absence of a process of cost management and project value generation. The company is able to visualize the revenue per project, but cannot have a vision of the costs, making it impossible to evaluate the value generated by the project. Since the solutions developed are shared among several clients, there is an expectation of future revenue associated with each development; however, this expectation is not measured in objective terms, existing only in the perception of the managers;

- b) O2: Automotive Industrial Company. There are selection guidelines that are proposed and evaluated by the direction of the programs, and aligned with the strategy. Analysis of financial indicators is performed, but non-financial indicators are little used. Risks are poorly assessed, and the project manager is not involved. Agile project management methodologies are used, but without value monitoring processes. The project results are evaluated only in the short term. According to the interviewee, the biggest challenges are in proving the projects' financial returns. In general, they are projects outside the company's main area of business and, hence, the difficulty in proving the financial gains;
- c) O3: E-commerce segment company. Projects are proposed by functional areas, without metrics-based analysis, risk assessment or involvement of project managers. Project management methodology is based on the PMBOK, without monitoring value generation during project management. There are no processes in place for evaluating the results. O3 operates in a highly dynamic electronic retail market, with high staff turnover and strong pressure for short-term financial results, making it difficult to adopt a long-term value vision. Being an organization with IT as a highly relevant activity, the low levels of competences observed can create disadvantages in terms of competition, which can jeopardize the entire business of the company. The interviewee sees the heavy financier culture as a difficulty in measuring the return on investments, based on the traditional/functional costing of the company, which tends to make the board evaluate the return on investment by functional areas instead of projects, in addition to the low relevance given by senior management to project management in general;
- d) O4: Small software development company. Selection processes are performed informally by project managers and managers. The company strength lies in the implementation of agile management methodologies and focuses on value generation. Evaluation of projects is carried out only in the short term and applied in the evaluation of the company's financial results. The interviewee believes that it would be important to measure the value generated by their internal projects, but relates to the indirect nature of the revenue generated by them as the biggest challenge, pointing out the inexistence of a technique/methodology that allows for the obtaining of the value generated by these internal projects;
- e) O5: Industrial cosmetics company. Selection processes have guidelines, but fails to evaluate the projects' financial points of view. Project management methodology is based on PMBOK, with some considerations regarding value generation. Processes of evaluation of results are focused on the short term. The O5, despite having a corporate IT PMO at the time, chose to abandon a centralized strategic IT orientation, leaving the tactical-operational decisions to the business units (BU). The BUs were evaluated by financial criteria, with their responsibility being to define their priorities, and with the corporate PMO acting as an advisory and support instance in the implementation of IT solutions. At the time of the interview, the O5 was in the midst of changing to a new business model. The interviewee recognizes the importance of improving the value management processes;
- f) O6: Industrial company in the appliances segment. Poorly defined selection processes. Project management methodology considered to be of low maturity by the interviewee. Results are evaluated only in the short term. IT has low priority in the organization, according to the interviewee. Some difficulties pointed out by the interviewee are: intangible and difficult to measure objectives, non-mandatory application of business cases, failures in revenue and expenditure systems, low maturity in portfolio

- management and low qualification of project managers and programs;
- g) O7: Private organization of financial services. Poor selection processes. Poorly defined project management processes, with failed attempts to implement PMBOK-based methodology, and not focused on value generation. Results are evaluated only in the short term. Due to the particulars of its market, the O7 operates with high profitability. This characteristic, according to the interviewee, allows for accommodations for the improvement of its management processes. In addition, the calculation of data is not reliable;
- h) O8: Company that develops large IT systems for management. Regarding its processes, it was considered the most competent among the companies studied. Counts using well-defined selection processes, with reliable metrics, and a consolidated project management PMBOK-based methodology, with a strong vision of value generation, which evaluates the results of projects in the short and long term. The evaluation of the results is used in the marketing of the company as success cases with commercial purposes; thus, the evaluation only deepens in cases considered successful in the first place. There is an opportunity for enhancement of the evaluation of projects in order to improve the skills in selecting new projects, as well as other competences. Challenges cited by the interviewee, include: failures in documenting changes, and shortage of professionals with a business profile;
- i) O9: Construction company and real estate developer. Simplified selection processes that are considered adequate by the interviewees. Project management methodology not yet consolidated, but with a strong vision of value. Simplified processes for evaluating results in the short and long term, but with low integration of knowledge management. Although the processes are simplified, and IT has relatively little importance in the business of the company, the interviewees evaluate the value management processes as positive, and indicate that the company has been obtaining good results from its IT investments. The main challenge was the internal clients' low perceptions of value generated by IT;
- j) O10: Financial Institution. Well-defined project selection processes with reliable metrics. Consolidated project management methodologies based on cascade and agile methodologies, and focused on value generation. Short term evaluation of the results is performed, but with little evaluation in the long term, and presents low integration with knowledge management. Challenges cited by the interviewee are: lack of effective follow-up of the business case, lack of metrics for projects which the return is focused on processes rather than revenue, and faults in documenting innovative aspects of success in project management that could be used in other projects;
- k) O11: Financial Institution. Unclear guidelines for project selection. Project management methodology in consolidation, not focused on value generation. There is no evaluation of project results. The challenges mentioned are: organizational culture does not weigh the benefit of the initiatives, but only the aggregate result of the organization, and lack of data reliability;
- l) O12: Financial Institution. Well-defined project selection processes. Consolidated project management based on agile and PMBOK methodologies, but little focus on value generation. There is no evaluation of project results. O12 sets standards for an entire sector of economic activity and, as such, they are expected to implement and suggest good practices. It should be noted that at least one of the organizations surveyed started an improvement process in this aspect, motivated by a recommendation made by O12;
- m) O13: Financial Institution. Well-defined project selection processes. Consolidated project management PMBOK and agile-based methodologies and focused on value generation. Evaluation of results in the short term, but shortcomings in the long-term evaluation and in the improvement of competences and knowledge management. Challenges cited include: lack of routine verification of project product results in the areas of business and conflicts with business areas because of their perception that the PMO team is evaluating them;
- n) O14: Social Organization of IT Services. Well-defined project selection processes. Consolidated project management PMBOK-based methodology and focused on value generation.

The organization evaluates the short-term results, while long-term evaluation is still under development. It is noted that the adoption of management contract models in the third sector contributed positively to the improvement of processes. A challenge cited is the occurrence of internal conflicts over the project measurement criteria.

4.3 Challenges in value management

Cultural resistance to the adoption of structured project management techniques and technical-operational difficulties in evaluating the benefits of internal projects were the most frequent challenges. A significant part of the management of organizations is anchored in a traditional financial-accounting model, in which the project contributions are not analyzed individually. An interesting piece of data was the conclusion of one interviewee, who felt that the fact that his organization showed results well above the market average, leading to accommodation, since poor project results are diluted in the good results of the business, which is protected by strong entry barriers. Another interesting point was reported by another interviewee, who, curious about the performance of a project that had successfully been completed (triple constraint), found that it had generated revenues well below the amount invested. However, the organization was not interested in pursuing this investigation. These, and other accounts, suggest that the agency theory can explain much of the cultural resistance reported.

Technical-operational difficulties in evaluating the benefits of internal projects were, along with cultural resistance, the most frequent challenge. Thus, it can be observed that the transition from a process-focused culture to results-based management is a challenge that deserves further research efforts. It should be noted at this point that, since an organization is a system whose results are a function of multiple interdependent variables, many of them exogenous to the organization, their understanding passes through considerations about the inherent complexity of a system of systems. This topic is still situated at the frontier of knowledge.

The lack of integration of the value chain was another challenge. Here the problem would be delegation of responsibilities and loss of knowledge. External projects have their products transferred from one organization to another. Internal projects would require processes of cooperation and knowledge management that do not yet exist.

Finally, the lack of knowledge and low importance given to IT by top management was also one of the challenges determined, often being considered as a simple operational expense. Given the importance

of information technology in society, and in all economic sectors, this issue may indicate a strategic shortsightedness from some organizations.

5 Conclusions

In this research, it was verified that the organizations surveyed have a vision of success that is still strongly anchored in short-term financial indicators, confirming the findings of Vidal et al. (2015) in relation to the twenty-three largest Brazilian companies. The predominance of management models focused on processes with no clear vision of results, and a low level of cooperation along the supply chain was also verified; in these, the Stakeholders Theory assumptions and the concept of value management are not valued in the processes of decision-making.

There are several reasons for the gaps identified. In contexts where there is limited competition, e.g., monopoly, entry barrier, or high growth rate, there is evidence that this becomes a factor of reduced commitment in the processes of control and performance improvement of organizations. It was observed that the simple adoption of good project management practices was not able to stimulate a global view of value generation, possibly due to the simplicity and convenience offered by metrics related to triple constraint.

Based on the perspective gained in this study, it is suggested to continue the research in three directions. Initially, identify if the same challenges are observed in other activity segments. Then, with the knowledge gained, identify phenomena that can be used to categorize projects, and thus allow identification of sets of good practices that are applicable to different project categories, rather than to the total universe of projects, giving rise to a contingent approach to project and value management. Finally, carry out a deep study on complexity and culture in the context of project management, since they were extensively cited as the main challenges. In addition, further progress must be made in understanding the question proposed by Ciani et al. (2015) on the reasons why Brazilian organizations are particularly “value-destroying”.

In summary, it was observed that the use of short-term financial metrics and the triple constraint as criteria for the success of IT projects, without evaluating their long-term benefits, turns them into mere transactional relationships, with strong cost reduction biases. This has a double negative effect: it inhibits corporate learning, and limits the generation of benefits to a broader spectrum of stakeholders.

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