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A CONTEMPORARY VISION OF PROJECT SUCCESS CRITERIA

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ABSTRACT

Goal: The objective of this research is to provide researchers and project management professionals with a contemporary view of the measurement of project success.
Design/Methodology/Approach: After a dense literature review, a research-based study analyzes the project success criteria perspectives of 264 Brazilian project managers and provides a ranking of the most widely used measures in practice in Brazilian organizations.
Results: The study analyzes contemporary literature on project success criteria and discusses overlaps and trends. One of the important findings of this research is the identification of mismatches between academic perspectives and those of project managers in regard to project success as well as real success criteria used in organizations.
Limitations of the investigation: As the sample covered was comprised exclusively of Brazilian project managers, cross-cultural success criteria research is, therefore, encouraged.
Practical implications: The proposed performance criteria can be used in future research and for professional proposes in success criteria assessment.
Originality/Value: Given the diversity of success criteria measures, authors can have difficulty in finding the one that better fits their needs; alternatively, they can create their own scale. The reliability of several studies can be questioned due to their subjectivity and, in some cases, weakly defined measures. The present study can therefore provide project professionals with guidelines for success assessment that make measuring and comparing different projects possible.

Keywords: Project management; project success; success criteria; success measure.

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1. INTRODUCTION

Project success has ceased to be just a matter of the triple constraints of budget, time, and quality to become a complex evaluation of benefits to organizations and stakeholders. That is why the concept of project success has been revisited several times, and is still being revisited, in order for it to be refined and aligned with organizations' practical needs. Measures of product success (Baccarini, 1999)an outsider, project efficiency, impact on the customer, direct business and organizational success, preparation for the future (Shenhar et al., 2001), organizational benefits, project impact, stakeholder satisfaction, future potential (Khan et al., 2013), and other dimensions for measuring project success have been identified in the literature as elements of the evolution of project success constructs.

This evolution is justified because project success is not only of academic importance, but also a practical issue. Over the last decades, project success has been an important topic in project management literature since project management has become a key activity in most modern organizations (Belout et Gauvreau, 2004)human resource management (HRM. In a competitive environment, organizations face a challenging atmosphere that requires constant adaptation. Projects are means for organizations to implement strategic plans, and they are responsible for making changes in order to maintain organizational competitiveness in a global environment. Projects usually involve internal and external stakeholders, have a wide variety of enterprise goals, and are conducted in various activities.

There is still no consensus on how to measure project success. It is known that different success criteria can be considered in different projects (Alami, 2016; Baccarini et Collins, 2004; Chang et al., 2013; Shenhar et al., 2001). Success criteria can vary in accordance with project type, complexity, life cycle phases, industries, nationalities, organizations (Müller et Jugdev, 2012; Müller et Turner, 2007), context, and perspective (Khan et al., 2013). It should also be noted that different stakeholders can have different perceptions and expectations in regard to project success, as they may have different perceptions of success criteria and performance (Bryde et Robinson, 2005; Davis, 2014; 2017). The more importance a certain criteria is given, the greater the chance is that such criteria will be achieved (Müller et Turner, 2007), as the focus of the efforts during the course of the project is influenced by the criteria of success measurement chosen.

There is no common set of project criteria (Albert et al., 2017); however, there is ongoing research on the factors that influence their selection.

Even though there is considerable literature on this topic, there is still a gap on how to measure project success. Some suggested measures either have not been tested in reliable empirical research or have been tested in a specific industry or sector, but not in a general perspective. Hence, there is a need for a set of performance indices that formalize the measurement process and make explicit evaluations.

Given the diversity of organizations and project types, the expected contribution of this research is to present researchers and project management professionals with a contemporary view of project success measurement. Project management, as a discipline, is still in need of substantial development. Research on project management success is an ongoing process in academic journals and business magazines. Ika (2009) has performed a comprehensive literature review and posits that efforts to find a universal set of measures should be transformed into two alternatives: (1) a context-specific tool and (2) success grounded in empirical narratives of success and failure. Nonetheless, neither alternative would fill academic and professional gaps in project measurement tools. Given the diversity of success criteria measures, authors can have difficulty in finding the one that better fits their studies; they can even create their own scale. The reliability of several studies can be questioned because of subjectivity, and, in some cases, weakly defined success measures. Additionally, the fact that each research study measures project success differently means different results are achieved; consequently, comparisons cannot be established. A generalist and contemporary success criterion should be able to solve this conundrum.

Although we recognize the influence that differences in project type, complexity, industry, life cycle, and other elements have on project success criteria, the aim of this paper is to give researchers and project management professionals a contemporary measure of project success. Instead of proposing a fixed framework of project success criteria, we have analyzed 20 years of literature review on the topic is search of existent concepts or dimensions of project success that have already been tested and validated. This research attempts to provide researchers and professionals with a reference for measurement of project success. To achieve this goal, this research analyzes project success criteria through a survey of 264 Brazilian project managers. Two questions were asked in this research: "How do you rate each criteria in terms of importance?", from very important to unimportant in a five-point Likert scale, and "What criteria do you use to measure project success?"

The questionnaire was tested in Brazil across industries, activity sectors, and business areas. According to PMTech (2017), Brazil is number five in total number of Project Management Institute members and Project Management Professionals, behind only the USA, Canada, India, and China in this ranking. Therefore, Brazil is considered to have good sample representativeness.

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Despite previous research indicating that project success criteria can vary across projects, this research considers a measure that captures the concept's essentials. We understand that given the diversity of project types and contexts, establishing context-specific measures for each case would be a futile effort. Therefore, instead of a measure of success or failure, we consider success dimensions that can be a parameter for comparing different projects or contexts.

The research also provides a ranking of the most widely used measures in practice in Brazilian organizations and discusses the differences in usage and perception of importance of each measure.

This paper is divided into seven sections. Section 1 will describe the research method. Section 2 will describe the theoretical background. Section 3 is dedicated to analysis, results, and discussion of study findings. Section 4 will indicate limitations and suggestions for further research. Section 5 presents the authors' conclusions.

2. METHOD

The research study begins with a literature review on project success criteria over the last 20 years. Reliable and representative journals in the area were considered. Following that, a research survey was conducted with a total of 264 respondents by means of a questionnaire with 32 variables—seven of which relate to characterization of the individual respondents, while 25 relate to five constructs. Table 1 presents a descriptive analysis of the respondents' characterizations.

Two questions were asked: "How do you rate each project criteria in terms of importance?", from very important to unimportant (Likert scale), and "What criteria do you use to measure project success?" A set of 25 constructs of success were tested, divided into five dimensions: (1) Project Efficiency, (2) Organization Benefits, (3) Project Impact, (4) Future Potential, and (5) Stakeholder Satisfaction. Questionnaire constructs were based on (Khan et al., 2013), see Table 2.

Table 1. Descriptive Analysis of the Characterization.

Variables		N[1]	%
Time working with projects	Less than 1 year	7	2.65%
	From 1 to 2 years	9	3.41%
	From 3 to 5 years	45	17.05%
	From 6 to 10 years	80	30.30%
	More than 10 years	123	46.59%
Sector of activity	Agribusiness	3	1.14%
	Trade/Service	145	54.92%
	Industry	73	27.65%
	Mixed	43	16.29%
Organization	3rd Sector	5	1.89%
	State-owned	6	2.27%
	Private	234	88.64%
	Public	19	7.20%
Business area	Consulting	34	12.93%
	Engineering and Construction	66	25.10%
	Innovation and Technology	64	24.33%
	Internal Projects in the Organization	38	14.45%
	Others	61	23.19%
Projects per year	Less than 10	73	27.65%
	From 11 to 50	103	39.02%
	From 51 to 100	36	13.64%
	From 101 to 500	33	12.50%
	More than 501	19	7.20%
Average duration of projects	Less than 1 month	1	0.38%
	From 1 to 3 months	43	16.29%
	From 4 to 6 months	55	20.83%
	From 7 to 12 months	90	34.09%
	From 13 to 24 months	45	17.05%
	More than 25 months	30	11.36%
Number of project team members	Less than 11 members	147	55.68%
	From 11 to 15 members	55	20.83%
	From 16 to 20 members	21	7.95%
	From 21 to 25 members	7	2.65%
	From 26 to 30 members	4	1.52%
	More than 30 members	30	11.36%

Source: Authors themselves.

N[1] – Number of individuals.

Hence, it is valid to highlight that:

- Most individuals (46.59%) have worked on projects for more than 10 years.
- Most individuals (54.92%) operate in the Trade/Service sector, and a large number (27.65%) operate in the Industrial sector.
- The vast majority of individuals (88.64%) work in private organizations.
- A large number of the individuals (25.10%) work in Engineering and Construction and a large number (23.44%) work in Innovation and Technology.
- Regarding the number of projects per year, most individuals (39.02%) answered that 10 to 50 projects are undertaken by their organization per year.
- Regarding the average duration of the projects, the majority of individuals (34.09%) indicated that the projects last on average from 7 to 12 months.

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- Most individuals (55.68%) answered that in general the projects involve less than 11 members.

Table 2. Research questionnaire.

Dimension		Item
Future Potential	FP1	Enabling of other project work in future.
	FP2	Resources mobilized and used as planned.
	FP3	Improvement in organizational capability.
	FP4	Motivated for future projects.
Organizational Benefits	OB1	Adhered to defined procedures.
	OB2	Learned from project.
	OB3	New understanding/knowledge gained.
	OB4	End product used as planned.
	OB5	The project satisfies the needs of users.
Project Efficiency	PE1	Finished within budget.
	PE2	Met planned quality standards.
	PE3	Met safety standards.
	PE4	Minimum number of agreed scope changes.
	PE5	Finished on time.
	PE6	Complied with environmental regulations.
	PE7	Activities carried out as scheduled.
	PE8	Cost effectiveness of work.
Project Impact	PI1	Project's impacts on beneficiaries are visible.
	PI2	Project achieved its purpose.
	PI3	Project has good reputation.
	PI4	End-user satisfaction.
Stakeholder Satisfaction	SS1	Met client's requirements.
	SS2	Steering group satisfaction.
	SS3	Sponsor satisfaction.
	SS4	Met organizational objectives.

Source: Designed from (Khan et al., 2013).

3. THEORETICAL BACKGROUND

Project success view before 21th century

All of a project manager's efforts are aimed at achieving project success. Aligned with that, this research aims to provide project managers with tools to improve their chances of accomplishing that goal. Project success can bring benefits to organizations by creating value and establishing competitive advantages, as they implement cost reductions, new product releases, and procedural improvements as well as satisfy other organizational needs.

The difference between success criteria and success factors is a crucial one. Critical Success Factors (CSF) are preexistent conditions that facilitate achieving success, while Success Criteria are parameters used to measure success during project execution and upon completion. Both are considered necessary for the project to accomplish its goals and be considered a success.

Based on studies by Jugdev et Müller (2005), Table 3 shows the theoretical evolution of the project success concept from 1960 to 2000 and that time's vision of the future. The evolution of project success is divided into four periods: Period 1: Project implementation and handover (1960s-1980s); Period 2: CSF Lists (1980s-1990s), Period 3: CSF Frameworks (1990s-2000); Period 4: Strategic Project Management (21 Century). The evolution over these four periods is presented in regard to project focus, success metrics, customer interference in project management, literature development, and success measurement across the project life cycle. Also in a literature review study, Ika (2009) confirms 21st century trends in a retrospective of articles published on the topic. According to Ika (2009), the iron triangle is still relevant as success criteria and as a strategic objective of client organizations. On the other hand, business success, end-user satisfaction and stakeholders' benefits are the new concerns of project professionals and academics.

The traditional concept of success criteria was initially focused on the triple constraint: cost, quality, and time, also known as the Iron Triangle. However, limiting project success to measures of time, cost, and quality limits project management to a tactical value (Jugdev et Müller, 2005); thus these measures are partial and misleading (Shenhar et al., 2002). During the 1980s–1990s period, the emphasis of research studies was to develop a project success criteria framework and schemes taking tangible and intangible criteria into account (Müller et Jugdev, 2012). At this time, broader concepts of project measures were developed in order to adapt the existing limited understanding about success measures to a corporate level, diminishing the lack of perception of stakeholder benefits and introducing post-project results measures (Atkinson, 1999; Baccarini, 1999; Shenhar et al., 2001). There is merit to this approach as long as project goals are aligned with the organization's goals; moreover, results must bring benefits to organizations as a whole. After all, "project managers are the new strategic leaders, who must take on total responsibility for project business results" (Shenhar et al., 2001, p. 669). There have been various examples of projects in the information technology industry that were able to achieve all their goals, but resulted in significant losses to the organization (Alami, 2016). In other words, project management success may lead to project success; however, a project can be a failure despite successful project management (Ika, 2009). Success criteria must be aligned with an organization's needs.

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Table 3. Project Success Evolution Framework.

	Period 1: Project implementation and handover (1960s-1980s)	Period 2: CSF Lists (1980s-1990s)	Period 3: CSF Frameworks (1990s-2000)	Period 4: Strategic Project Management (21 century)
Project Focus	Project done.	Staff training, dedicated resources, good tools, strong leadership and management, and development of the individual, team and organization.	Achievement of project performance objectives, contribution to the business strategy and to customer organization.	Project success dimensions include benefits to the organization and preparation for the future.
Success Metrics	Time, cost, and specifications.	Single measure instead of multiple measures.	Technical performance and contribution to the organization's strategic mission and to the customer's organization.	Success criteria should be agreed on before the start of the project. Collaborative working relationship between project manager and client. Project manager empowered. Client should take an interest in project performance.
Customers	Minimal contact.	Importance of stakeholders' satisfaction increases.	Success as stakeholder dependent.	Considerable responsibility for Project success, with attitude and interest towards the Project.
Literature	Theoretical with lack of empirical work.	Anecdotes and single case studies. Publications were neither grouped nor integrated. CSF lists developed.	Integrated success frameworks.	Summarized empirical results and outlined the necessary, but not sufficient, conditions for project success.
Project Life Cycle	Execution.	Planning and execution.	Planning, execution, handover, and utilization.	Conception, planning, execution, handover, utilization, and close down

Sources: Designed from (Jugdev et Müller, 2005) and compiled by authors.

During the 1990s-2000 period, contribution to the business strategy and to development of the individual, team and organization were also considered as success criteria (Jugdev et Müller, 2005).

As a result of a retrospective literature review of success criteria, authors presented their 21st century view of strategic project management highlighting the importance of a broader success framework that includes, including benefits for the organization, and preparing for the future (Jugdev et Müller, 2005). Also in a future perspective, strategic objectives of client organizations and business success, satisfaction of end-users, benefits to stakeholders, and benefits to project personnel should be part of symbolic and rhetorical evaluations of success and failure (Ika, 2009).

Literature on the contemporary view of project success

After Ika (2009) and Jugdev et Müller (2005) published their view of future, much has been studied in this area. In accordance with the first objective of the present research, the last twenty years of literature on project success were analyzed. Words such as "project success", "measure", "criteria" or "assessment" were used to search for papers on project management in peer-reviewed journals. From the 63 relevant articles analyzed, 19 had the objective of creating or reviewing project success measures.

As a summary of the literature review, Table 4 shows recent works, from the last 20 years, on project success criteria, their dimensions, contexts, and perspectives. It also indicates which ones were empirically tested.

It is important to highlight that as shown in Table 3, from 2001 to 2005 success criteria dimensions were defined on a generalist basis and few frameworks were empirically tested (Shenhar et al., 2001), (Collins et Baccarini, 2004) and (Diallo et Thuillier, 2004). After 2015, frameworks were developed in context-specific studies, and six of them were empirically tested. That approach agrees with Ika (2009), who suggests that projects should be measured in context-specific ways.

In order to overcome the limitations of the traditional iron triangle project success criteria approach, research efforts have been committed to promoting and developing theoretical frameworks that focus on the value projects give back to stakeholders and organizations. Project success can be defined as efficiency and effectiveness, which are different concepts that deserve different measures. The Iron Triangle – cost, time, and quality – is a measure for project efficiency. On the other hand, effectiveness can be measured by orga-

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Table 4. Recent studies on success criteria dimensions.

Authors	Success Criteria Dimensions	Context	Tested	Perspective
(Atkinson, 1999)	Iron triangle Information system Organization benefits Stakeholders' benefits	General	No	
(Baccarini, 1999)an outsider	Project Management Success Project success	General	No	
(Mohamed; Lim, 1999)	Project Completion Satisfaction	General	No	Literature Review
(Shenhar et al., 2001)	Project efficiency Impact on the customer Organizational success Preparation for the future	General	Yes	Project Managers
(Baccarini et Collins, 2004; Collins et Baccarini, 2004)	Project management success Project success	General	Yes	Project Managers
(Diallo et Thuillier, 2004)	Three Macro-dimensions: 1) profile, chance of additional funds, deliveries, and reputation 2) budget, time, and objectives 3) duration, impact, and satisfaction	General	Yes	Project Managers
(Yu et al., 2005)	Project execution cost Net product operation value	General	No	Clients
(Ahadzie et al., 2008)it is crucially contingent towards enabling appropriate and effective allocation of resources in project management practice. Mass house building projects (MHBPs	Environmental impact Customer satisfaction Quality Cost and time	Mass house building projects in Ghana	Yes	Senior Managers
(Thomas et Fernández, 2008)	Project management success Technical success Business success	IT projects in Australia	No	Chief Information Officers and Project Managers
(Moe et Khang, 2008)	Different sets of success criteria based on previous studies for the different stages of the project life cycle	International development projects in Vietnam and Myanmar	Yes	Balanced representation of the different sectors and types of stakeholders
(Al-Tmeemy et al., 2011)	Project management success Product success Market success	Building projects in Malaysia	Yes	Contractors
(Savolainen et al., 2011)	Customer satisfaction Short-term business success for the supplier Long-term business success for the supplier	Literature review on software development projects	No	Suppliers
(Khan et al., 2013)	Project Efficiency Organization Benefits Project Impact Future Potential Stakeholder Satisfaction	Public sector projects in Pakistan	Yes	Variety of stakeholders
(Chang et al., 2013)	Iron triangle Defense capability Training to Increase Capability Good relationships Customer satisfaction Problem solving Project members wellbeing	Australian defense mega projects	No	Senior executives

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(Pankratz et Basten, 2014)	Adherence to budget Adherence to schedule Achievement of functional requirements Achievement of non-functional requirements Process efficiency Customer satisfaction Contractor satisfaction System utilization by customer	Information system projects in Germany	No	Project Managers
(Davis, 2014)	Cooperation Time Identification of objectives Stakeholder satisfaction Use of finished product Cost/budget Project manager competencies and focus Strategic benefits Top management support	Literature Review	No	Segmented across groups
(Mir et Pinnington, 2014)	Efficiency Impact on Customer Impact on Team Business Success Preparation for the future	Project-based organizations in the United Arab Emirates	Yes	Project Managers
(Zidane et al., 2015)	Relevance Efficiency Effectiveness Sustainability	Case study of an Algerian high-way megaproj-ect	No	
(Martens et Carvalho, 2016)	Efficiency Impact on Customer Impact on Team Business Success Preparation for the future Sustainability	Expert Panel	Yes	28 experts from 21 universities in 8 countries

Source: Authors themselves.

nization benefits and stakeholder community benefits. Altogether, efficiency and effectiveness, defined as the Square Route, can provide a more realistic and balanced indication of success (Atkinson, 1999). This research was not empirically tested, but it is in line with the professional perception that multiple projects finished on time and on budget are still considered failures. Some projects are finished late and over budget and, nevertheless, are considered successful. "Efficiency is shown to be neither the only aspect of project success nor an aspect of project success that can be ignored." (Serrador et Turner, 2015, p. 30).

Although there is a predominance of project measures related to time, cost, and quality, the most important success criterion is meeting the project owner's satisfaction (Baccarini et Collins, 2004; Collins et Baccarini, 2004). That does not suggest time, cost, and quality are useless measures. Project performance can affect the achievement of project success (Baccarini et Collins, 2004; Collins et Baccarini, 2004). In order to create a success framework, Baccarini (1999) divided project success into two distinct components: (a) project management success – the accomplishment of time, cost, and quality, and (b) product success – the effects of the project's final product. He suggests a new project success framework that considers input and output for project management success and goals and purposes for product success. His framework was tested in 2004 (Collins et Baccarini, 2004) and used in subsequent research studies.

Shenhar et al. (2001) grouped project success measures into four dimensions: (1) project efficiency, (2) impact on the customer, (3) direct business and organizational success, and (4) preparing for the future. The choice of the dimensions to be used to measure success depends on project type. For lower-uncertainty projects, where efficiency is important, success relies on time and budget measures, where the first dimension is worth. When technological uncertainty is higher and poor performance in the short term may be compensated by long-term benefit, then other dimensions can be relevant when measuring success (Shenhar et al., 2001). The framework developed by Shenhar et al. (2001), which was similar to the organization Balanced Scorecard, was empirically tested and used in subsequent studies.

Diallo et Thuillier (2004) has divided success criteria into three dimensions: 1) profile, chance of additional funds, deliv-

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eries, and reputation; 2) budget, time, and objectives, and 3) duration, impact, and satisfaction. In terms of generalizations of success criteria, they tested and confirmed the possibility of generalization in different countries in Africa, with different sectors and maturity.

Since 2005, authors have started testing success measures in specific contexts. For mass house building projects, Ahadzie et al. (2008)it is crucially contingent towards enabling appropriate and effective allocation of resources in project management practice. Mass house building projects (MHBPs developed and empirically tested a framework adding environmental impact and customer satisfaction to the iron triangle success measure. Moe et Khang (2008) tested a new model in the context of international development projects in Vietnam and Myanmar. Moe et Khang (2008) compiled different sets of success criteria based on previous studies for the different stages of project life cycles and balanced representation of different sectors and types of stakeholders. Al-Tmeemy et al. (2011) tested project management success, product success, and market success dimensions in building projects in Malaysia.

In recent research, Khan et al. (2013) developed and successfully tested a model for success factors in the Pakistani public sector derived from a literature review of the past 40 years. Their model offers a balance between hard and soft factors as well as measures success using five success criteria dimensions: (1) Project efficiency, (2) Organizational benefits, (3) Project impact, (4) Stakeholder satisfaction, and (5) Future potential.

In a qualitative study, Pankratz et Basten (2014) interviews eleven information systems project managers and indicates eight success criteria they considered the most relevant: (1) Adherence to budget, (2) Adherence to schedule, (3) Meeting functional, (4) Meeting non-functional, (5) Process efficiency, (6) Customer satisfaction, (7) Contractor satisfaction, (8) Project delivery is used by customer.

Adapted from the Shenhar et al. (2001) measure model, Mir et Pinnington (2014) included impact on team as a dimension and tested it on project-based organizations in the United Arab Emirates. After that and further adding to Shenhar's model, Martens et Carvalho (2016) included a sustainability dimension.

There is still not a consensus on the meaning of project success factors; in addition to that, a large part of the contributions made to this topic is based on theoretical considerations, instead of empirical studies (Pankratz et Basten, 2014). From the nineteen academic papers listed in Table 4, only nine have been empirically tested. It should be noted that only research studies conducted for the purpose of finding a success measure were taken into account.

The authors still consider that success criteria can vary by project (Baccarini et Collins, 2004; Chang et al., 2013; Shenhar et al., 2001). This variation can be related to project complexity, project type, life cycle phases, industries, nationalities and organizations (Müller et Jugdev, 2012; Müller et Turner, 2007), context, and perspective (Khan et al., 2013). In addition, different stakeholders can have different perceptions of project success as their interpretation of success criteria and performance might differ (Bryde et Robinson, 2005; Chang et al., 2013; Davis, 2014; 2017). Furthermore, even different cultures can grade the same scale differently (Andersen et al., 2002). In a literature review, Albert et al. (2017) concluded that there are no specific patterns for the selection of success criteria across various fields of application due to the lack of overlap within and between them.

Although there is no consensus regarding success criteria, there is agreement on the importance of success measures. "The way organizations define project success influences project success" (Khan et al., 2013, p. 5). The more important a certain criterion is considered to be, the more it can accomplish by the end of the project (Müller et Turner, 2007). Formally defined success criteria improve the outcome and resource utilization (Thomas et Fernández, 2008). An adequate project success analysis can contribute to knowledge management in a project environment (Todorović et al., 2015), which is the reason why project success criteria are used in diverse academic research in order to propose the most advantageous practices improvements in the project management context. Its analysis can help understand, for instance, how project manager personality (Hassan et al., 2017), or transformational leadership (Maqbool et al., 2017), or emotional intelligence (Trejo, 2016), or personal attributes and stakeholder relationship (Mazur et Pisarski, 2015), or job satisfaction and trust (Rezvani et al., 2016) affect project success; moreover, it helps to identify the factors behind failure (Alami, 2016).

In addition, vague or ambiguous success criteria might be interpreted differently, leading to conflicting and unrealistic expectations on the part of project stakeholders (Hussein et al., 2015)2. A generic model to access project success should be developed to provide a common guideline in order to avoid the use of different approaches for evaluating the same project, which may result in different analyses (Albert et al., 2017).

4. RESULTS AND DISCUSSION

This research attempts to provide researchers and project management professionals with a contemporary view of project success measure. Table 4 summarizes the latest research studies on the topic and shows an overlap of success dimensions even when different project contexts are taken into account. Therefore, the premise of finding specific-context assessment, from (Ika, 2009), proved to be inexhaustible and

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ineffectual.

Project efficiency, or the iron triangle, remains important. The views of the strategic project management concept from Ika (2009) and Jugdev et Müller (2005) were confirmed: benefits for the organization and for stakeholders, business success, and end-user's satisfaction could be seen in recent studies. Some new dimensions could be noticed: sustainability (Ahadzie et al., 2008; Diallo et Thuillier, 2004; Hussein et al., 2015; Martens et Carvalho, 2016), top management support (Davis, 2014), and market success (Al-Tmeemy et al., 2011).

In an effort to use an empirically tested framework, the model developed by Khan et al. (2013) was selected for this research to test project managers' perceptions of project success and the real assessment used by organizations. Comparing the three most recent empirically tested criteria, (Khan et al., 2013; Martens et Carvalho, 2016; Mir et Pinnington, 2014), the model developed by Khan et al. (2013) is a superset of the success criteria from the leading researchers on project success based on the past 40 years of recent literature. The model includes the typical iron triangle (Project Efficiency), plus four actual project success criteria dimensions aligned with professional project issues: organizational benefits, project impact, stakeholder satisfaction, and future potential. The questionnaire (see Table 2) was empirically tested and has already been used as a reference in strengths studies in the project management area (Joslin et Müller, 2014; 2015; 2016). Models developed by Martens et Carvalho (2016) and Mir et Pinnington (2014) were based only on Shenhar et al. (2001). Mir et Pinnington (2014) included the dimension of impact on team and Martens et Carvalho (2016) included the sustainability dimension—both were considered in the model developed by Khan et al. (2013). Impact on team is part of stakeholder satisfaction, while sustainability is a part of the project efficiency dimension.

This research analyzed respondents from a range of industries, sectors of activity, business areas, and experience levels in order to present the project managers' perspective on project success criteria. An important issue stems from the fact that project success depends on one's perception and perspective. Although this survey is limited to project managers' perceptions on the importance of success criteria, Davis (2014) compared the success perception of nine criteria across stakeholder groups. The conclusion is that the project managers' perception of project success overlaps with other stakeholders perspectives in eight criteria. Therefore, their perception is considered to be relevant as a broader measure. It comprises, for instance: suppliers' perspectives of success that consider only (1) customer satisfaction, (2) short-term business success for the supplier, and (3) long-term business success for the supplier (Savolainen et al., 2011). That is a limited perspective of project success, considering only suppliers' interests; the project manager's view of success encompasses a global vision.

Figure 1 shows the comparison between the ranking of importance attributed by project managers' to each element and their real usage in organizations. Some differences are highlighted.

Regarding the future potential, project impact, and stakeholder satisfaction constructs, the percentage of usage of measurement items is coherent with the importance attributed to the latter. There are some differences between usage and importance; however, they are inconsequential.

Regarding the project efficiency construct, items PE8 (cost effectiveness of work), PE5 (finished on time), and PE1 (finished within budget) are respectively ranked 1, 2, and 7 in terms of usage. Noenetheless, their levels of importance were considerably lower, ranking 9, 13, and 17, respectively. That should be explained by the traditional concept of success criteria that was initially focused on the triple constraint: cost, quality, and time, also known as the Iron Triangle (Jugdev et Müller, 2005).

Despite project success criteria trends pointing to more strategic project management—with focus on benefits to the organization and future forecast (Jugdev et Müller, 2005), in regard to the construct organizational benefits, the importance rankings for items OB4 (end product used as planned) and OB3 (new understanding/knowledge gained) are, respectively, 3 and

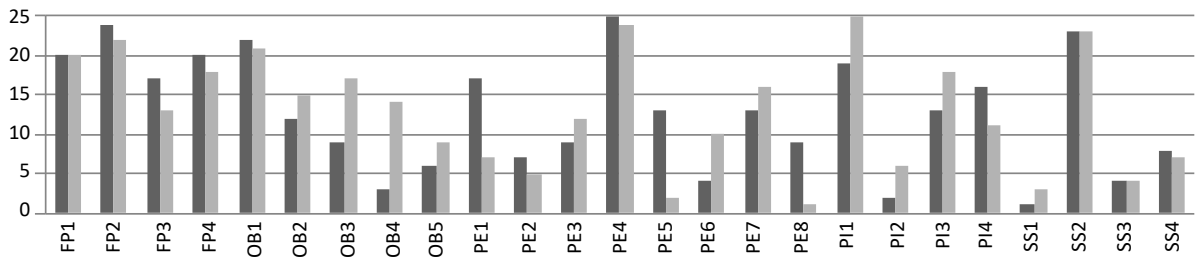

Figure 1. Importance and Usage Ranking.
Source: Authors themselves.

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9. Their usage rankings are 14 and 17, however. Although project managers must be aware of and care for project business results (Shenhar et al., 2001), organizational benefits are still neglected when measuring project success in organizations.

It is also important to highlight that the last item in importance ranking is PE4 (minimum number of agreed scope changes) whereas the first is SS1 (met client's requirement). Scope changes were a critical issue when there was no adequate technology for planning and controlling projects. Even though scope changes can also come with budget or time changes, the rework in planning is remarkably simpler with current software than it was in the past. Hence, scope changes are currently more acceptable, and consequently less important, as success criteria to project managers. Moreover, they support the most relevant success criteria, which is to meet the client's requirement.

There is still no consensus on project success criteria. We recognize that different success criteria are adopted to measure different projects, in agreement with previous literature (Baccarini et Collins, 2004; Chang et al., 2013; Shenhar et al., 2001). They vary in accordance with project nature, complexity, life cycle phases, sector activities, nationalities, organizations (Müller et Jugdev, 2012; Müller et Turner, 2007), context, and perspective (Khan et al., 2013). It is also important to reinforce that different interested parties can have different perceptions and expectations on project success (Davis, 2014). However, considering that vague or ambiguous criteria measures might be interpreted differently by different stakeholders, professionals need a reliable set of measuring tools. In addition, academic studies need objective, reliable success measures to compare diverse projects. We posit that projects should not be analyzed with a single grade of success or failure; instead, analysis of the five dimensions should consider the specificities of each project. Depending on its nature, each project can have a specific analysis, as shown in Figure 2. With the use of a comparison radar graphic, project success ceases to be merely a measure of success or failure to become a comparison of dimensions that can be customized to different specificities. Organizations and research studies can thus prioritize each of the dimensions and adapt analyses as needed, since succeeding in all dimensions is not mandatory. Nevertheless, professionals, authors, and organizations can have a comparison grid between different projects and contexts.

5. LIMITATIONS AND FURTHER RESEARCH

There are certain limitations, as the sample consisted exclusively of Brazilian project managers. This demographic characteristic of the sample could carry cultural bias affecting the results. It is therefore critical that the same study be conducted in multiple countries and cultures before theoretical generalization can be made.

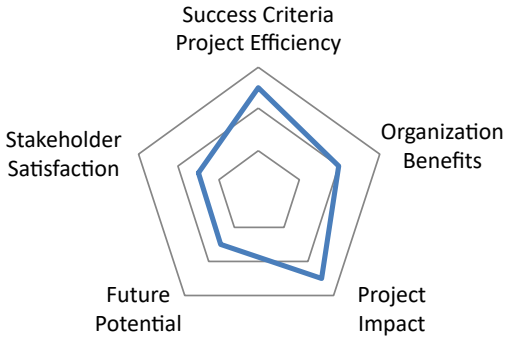

Figure 2. Example of a project analysis.
Source: Authors themselves.

Furthermore, different stakeholders may have different perceptions of success criteria and performance (Davis, 2014). This study measured project manager perception of project success; hence, the perception of how other stakeholders perceive project success should also be considered in future research.

The academic perspective was investigated through a dense literature review from the last two decades. Project managers' perspective of success criteria and real usage of measures were identified by survey. One of this research's crucial findings is the identification of mismatches between academic perspectives, project managers' perspectives, and real success criteria usage in organizations. This analysis opens discussions for future research on the "whys" and "hows" in order to narrow this gap and equalize academic and professional understanding of project success.

6. CONCLUSION

This research provides researchers and project management professionals with a set of contemporary project success criteria. This reference of measure and the questionnaire can be applied in future research studies on project success and their relation to best practices, team or project manager profiles, or methodologies. It is important to note that there is still no consensus on project success criteria. However, there is need for a set of measures of success that formalize the process and make explicit what is implicit rather than employing subjective evaluations.

After a literature review covering the last twenty years, this study considers the dimensions of project success proposed by Khan et al. (2013) as a value success criteria. Their framework was based on forty years of literature review and was empirically tested. Additionally, it has already been used as a reference in relevant research studies, considering also no new dimension has been proposed in recent literature.

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It is important to highlight that projects have specific contexts, different stakeholders have distinct perceptions of success, and project managers' perceptions of importance have proved to be different from organizations usage when measuring success. Owing to that, this research advocates the use of success criteria not as a measure of success or failure, but as a set of dimensions that should be used to compare different projects. The set of measures can be represented as a radar graphic, as shown in Figure 2. Depending on context-specific issues, emphasis on each dimension can vary; nevertheless, authors and professionals can have comparison criteria for future work.

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