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Belfort, Ana Claudia; Dai Prá Martens, Cristina; Mello Rodrigues de Freitas, Henrique
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ENTREPRENEURSHIP IN PROJECT MANAGEMENT SYSTEMS: PROPOSAL OF A MODEL AND PRELIMINARY EMPIRICAL EVIDENCE

Ana Claudia Belfort
Cristina Dai Prá Martens
Henrique Mello Rodrigues de Freitas
Universidade Nove de Julho, UNINOVE – São Paulo, SP, Brasil

ABSTRACT

This study analyzes the manifestation of the dimensions of Entrepreneurial Orientation (EO) and Project Management Systems (PMS). We used a qualitative approach to conduct exploratory research through a study in literature and a pilot case in a software company. Data was collected from semi structured interviews, documents, and records on file, then triangulated and treated with content analysis. The model proposed for the relationship between the types of PMS (ad hoc, Classic PM, innovation, entrepreneurship/ intrapreneurship) and the dimensions of EO (innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy), was partially corroborated by empirical studies. New studies are suggested to validate the applicability and setup of the model.

Keywords: Project Management Systems; Strategic PMS Model; Entrepreneurial Orientation.

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Address for correspondence / Endereço para correspondência

Ana Claudia Belfort, PhD Student, Management Graduate Program, UNINOVE – Universidade Nove de Julho in São Paulo, Brazil. Master in Business Administration with emphasis on Project Management, UNINOVE – Universidade Nove de Julho in São Paulo, Brazil (2013-2015). Universidade Nove de Julho Av. Francisco Matarazzo, 612, Prédio C – 2º andar 05001-100 – São Paulo, SP, BRASIL E-mail: belfortanaclaudia@gmail.com

Cristina Dai Prá Martens, Professor, Management Graduate Program, UNINOVE – Universidade Nove de Julho, São Paulo, Brazil. PhD in Business Administration - Information Systems and Decision Support at PPGA/EA/UFRGS (2009), with a thesis about Entrepreneurial Orientation. Post-doctorate at CERAG/UPMF – Université Pierre Mendès-France (Grenoble, France -2010), in Entrepreneurship and Strategy. Universidade Nove de Julho Av. Francisco Matarazzo, 612, Prédio C – 2º andar 05001-100 – São Paulo, SP, BRASIL E-mail: cristinadpmartens@gmail.com

Henrique Mello Rodrigues de Freitas, Professor, Management Graduate Program, UNINOVE – Universidade Nove de Julho, São Paulo, Brazil. PhD in Management from UPMF / ESA (1990-1993), post-doctorate from the University of Baltimore, MD, USA (1997-1998), and the UPMF (2003-2004) (2012). Universidade Nove de Julho Av. Francisco Matarazzo, 612, Prédio C – 2º andar 05001-100 – São Paulo, SP, BRASIL E-mail: freitas138@gmail.com

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1. INTRODUCTION

The theme of project management (PM) has been increasingly present in academic and professional environments as an alternative for adopting new tools and methodologies within the organizational context.

Amid the progress in discussions and studies on PM several concepts have emerged, notably that of Project Management System (PMS), which is composed of a series of standards, techniques, and methodologies for project management. Cooke-Davies, Crawford, and Lechler (2009) correlated PMS to corporate strategy. They proposed a strategic PMS model based on new product development, entrepreneurship and intrapreneurship, and on PM itself, entitled Strategic PMS - Value Driver Portfolio.

One of the concepts present in the PMS model proposed by the authors is entrepreneurship, which in this article is approached from the perspective of entrepreneurial orientation (EO). The literature on EO denotes the importance of this issue in the corporate environment, mainly due to its contribution to organizational performance (Rauch, Wiklund, Lumpkin, & Frese, 2009) and to the generation of innovations (Srivastava, Yoo, Frankwick, & Voss, 2013). These aspects are also relevant within the context of software companies (Martens, Freitas & Andres, 2011), given the speed at which innovativeness has to take roots in the sector.

EO consists of five dimensions within the organizational context (Lumpkin & Dess, 1996): innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy. Brazilian studies, such as that of Freitas, Martens, Boissin and Behr (2012), provide a basis for identifying the manifestation of EO in organizations by proposing elements that characterize each of these dimensions.

The PMS and EO analysis found in literature allowed for the identification of preliminary theoretical evidence of their relationship. First of all, both affect and are affected by internal and external organizational environments (PMI, 2013; Miller, 1983; Lumpkin & Dess, 1996). Secondly, both PMS and EO refer to corporate strategy, insofar as they comprise strategic decisions (Cooke-Davies, Crawford, & Lechler, 2009; Basso, Fayolle, & Bouchard, 2009). Thirdly, PMS and EO perceive the adoption of entrepreneurial activities as an organizational strategy (Miller, 1983; Covin & Slevin, 1989; Lumpkin & Dess, 1996; Cooke-Davis, Crawford, & Lechler, 2009).

Given the importance of PMS and EO issues in the corporate environment, especially within the context of software companies, this article aims to analyze the manifestation of Entrepreneurial Orientation dimensions — innovativeness, risk-taking, proactiveness, autonomy, and competitive aggressiveness — in Project Management Systems. Therefore, we used the Strategic PMS model proposed by Cooke-Davis, Crawford, and Lechler (2009), the dimensions of EO proposed by Lumpkin and Dess (1996), and the elements characterizing each dimension of EO proposed by Freitas et al. (2012).

This research is exploratory in nature with a view to achieving greater familiarity with the topic and understanding certain phenomena (Kripendorff, 1980). As a methodological approach, we have adopted the bibliographic study and the single-case study (Yin, 2010) in a software company, considering that this is one of the sectors that uses project management the most (Dai & Wells, 2004), besides being characterized by innovation and entrepreneurship (Freitas et al., 2012).

After this introduction, Section 2 consists of a literature review on PMS and EO. The methodological aspects are presented in Section 3. Section 4 presents the results of

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the survey conducted in a software company. Section 5 offers final remarks, the limitations of the study, and proposals for further research.

2 THEORETICAL EVIDENCE ON THE MANIFESTATION OF ENTREPRENEURIAL ORIENTATION IN PROJECT MANAGEMENT SYSTEMS

Project Management Systems (PMSs) are defined by the PMI (2013: 581) as "an aggregation of the processes, tools, techniques, methodologies, resources, and procedures to manage the project". They are systems with management structures, standards, and procedures, which embed projects (Cooke-Davies, Crawford, & Lechler, 2009). Such systems are subject to internal and external influences on the firm, as their levels influence the projects conducted (PMI, 2013): the organizational structure and culture influence the projects, the way they are managed, and how the systems are configured; political, economic, and social aspects of the country and the world also have an influence on the projects and on the PMS. Cooke-Davies, Crawford, and Lechler (2009) speculated that the organizational strategy is critical to the PMS configuration, since there is a relationship between the strategy, the PMS chosen to be implemented, and the type of project to be executed.

Entrepreneurial Orientation (EO) refers to entrepreneurship at the organizational level. Its conceptual domain incorporates organizational results related to preferences, beliefs, and behaviors expressed by executives (Covin, Green, & Slevin, 2006). The presence of EO depends on the organizational characteristics of their leaders as well as on internal and external factors that permeate the organization (Lumpkin & Dess, 1996). For this study, we chose the EO model consisting of five dimensions, as proposed by Lumpkin and Dess (1996): innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy. Such dimensions permeate the attitudes and behaviors of management and the organization.

Studies by Martens, Carneiro, Martens and Silva (2015) have identified that the dimensions of EO are related to the PM process, especially from the strategic point of view, constituting factors and dynamics that affect organizational performance. Regarding PMSs, Kanter (1985, as cited by Cooke-Davis, Crawford, & Lechler, 2009) argued that entrepreneurial and intrapreneurial behaviors should be developed simultaneously in the same way as operational excellence and innovation. Cooke-Davis, Crawford, and Lechler (2009) also stated that project managers need to act entrepreneurially in order to identify and explore market opportunities. This initial signaling refers to the possibility of adhesion between the PMS and EO issues, though only incipient studies seeking this relationship have been reported.

One possible piece of evidence for the relationship between PMS and EO is the fact that both affect and are affected by the organizational environment. With regard to the internal aspects, both the organizational structure and the prevailing culture of the firm affect the project, and the way these are managed and systematized exerts influence over the PMS (PMI, 2013). Similarly, EO is influenced by the internals of the organization, such as structure, strategic orientation, and characteristics of leaders (Miller, 1983; Lumpkin & Dess, 1996). Regarding the influence of the external environment, the PMS and EO have their actions outlined by political, economic, and social aspects (PMI, 2013; Miller, 1983; Lumpkin & Dess, 1996).

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Another possible piece of evidence of the relationship between the themes is that both refer to corporate strategy, since both PMS configuration and the adoption of an entrepreneurial approach include strategic decisions. The design of a PMS by the organization will depend on the organizational interests and on aspects related to the types of projects that it manages (Cooke-Davies, Crawford, & Lechler, 2009). In turn, EO permeates studies on strategy (Basso, Fayolle, & Bouchard, 2009), whose dimensions and related elements reflect the strategic direction of the organization (Covin & Slevin, 1991).

A third piece of evidence for this relationship can be found in the perception of entrepreneurship as an organizational strategy (Miller, 1983; Covin & Slevin, 1989; Lumpkin & Dess, 1996; Cooke-Davis, Crawford, & Lechler, 2009). Entrepreneurship-oriented organizations tend to engage in high-risk projects, act boldly and independently, seek to constantly innovate, act proactively, anticipate their competition, or compete aggressively (Miller, 1983; Covin & Slevin, 1989; Lumpkin & Dess, 1996). Similarly, organizations that have a PMS tend to have entrepreneurial characteristics (Cooke-Davis, Crawford, & Lechler, 2009), which suggests that there is evidence of elements from the EO dimensions in their actions.

The studies by Cooke-Davis, Crawford, and Lechler (2009) aimed to demonstrate the relationship between the PMS and corporate strategy, through three research lines: (i) development of new products; (ii) entrepreneurship and intrapreneurship; and (iii) project management. These elements were arranged in quadrants, each representing a PMS, in order to relate specific types of projects to certain strategic value drivers, thus originating the Strategic PMS - Value Driver Portfolio, whose quadrants/systems are called: (i) ad hoc; (ii) Classic PM; (iii) innovation; and (iv) entrepreneurship and intrapreneurship. Each scenario presented in the model defines a unique number of factors for the implementation of a PMS, and each of these requirements of the PM should be in harmony with the organizational strategy (Cooke-Davies, Crawford, & Lechler, 2009).

According to Cooke-Davies, Crawford, and Lechler (2009), some characteristics can be identified in association with the PMSs of each quadrant:

- **Ad hoc** system - PM is not recognized as having an important role in organizational strategy; organizations in this quadrant are predominantly operations based, with actions focused on business continuity, and no need for a stronger PMS.
- **Classic Project Management** or **Classic PM** system - competitive advantage can be achieved through operational excellence and high efficiency, thus requiring a highly efficient PMS. Large engineering companies working with complex projects that require a radical learning process to achieve efficiency in their processes tend to adopt this type of PMS.
- **Innovation** system - points to the strategic focus on strategic differentiation through constant innovation of products and services, besides emphasizing that differentiation can be achieved through excellence in innovation and a high degree of creativity. Firms with this type of PMS are focused on generating efforts for the creation of new markets and the satisfaction of already served markets.
- **Entrepreneurship and Intrapreneurship** system - highlights the concern with obtaining competitive advantage in differentiation and efficient process economics. Leadership excellence and a high degree of entrepreneurial autonomy are the main focuses of the organizations that lie within this scenario.

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As the classification of organizations in each quadrant/system must meet certain criteria, some of which may be related to the elements of each EO dimension, it is possible to bring the two theoretical poles together in light of the Strategic PMS Model. Also, with regard to EO, it is possible to list some characteristics peculiar to each dimension:

- **Innovativeness** concerns the use of creativity and activities that promote innovation to develop products, services, and organizational processes (Lumpkin & Dess, 1996; Lumpkin, Moss, Gras, Kato, & Amezcua, 2013).
- **Risk-taking** is related to a non-conservative view of decision-making (Venkataraman, 1989), and the achievement of the organization's objectives, which tend to be uncertain and often require high investments (Miller, 1983; Covin & Slevin, 1989; 1991).
- **Proactiveness** refers to the anticipation of market action, by the inclusion of new products/services or by making changes in the environment (Lumpkin & Dess, 1996; Lumpkin et al., 2013).
- **Competitive Aggressiveness** describes the manner in which the firm responds to competitors' actions, often with certain aggressiveness (Lumpkin & Dess, 1996), defending itself and reacting to the actions of competition (Lumpkin & Dess, 2001).
- **Autonomy** relates to independent action without organizational pressure, carried out individually or in groups, in order to disseminate or develop a particular business (Lumpkin & Dess, 1996; Lumpkin, Cogliser, & Schneider, 2009; Lumpkin et al., 2013).

The presence of the EO dimensions in an organization can vary depending on combinations of individual, organizational, and environmental factors, which influence the how and why of entrepreneurship in every organization (Lumpkin & Dess, 1996). Based on Lumpkin and Dess (1996), and adopting software organizations as the context of study, Freitas et al. (2012) proposed elements that allow us to identify the manifestation of the EO dimensions within a practical context. Based on the elements proposed by Freitas et al. (2012) and the criteria of the PMS model (Cooke-Davies, Crawford, & Lechler, 2009), Figure 1 was created to illustrate the relationship between the themes.

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Strategic PMS Model		EO Dimensions				
Systems	**Criteria**	**IN**	**RT**	**PR**	**CA**	**AU**
Ad hoc	The organization believes that PM creates neither value differentiation nor efficiency in process economics.	N	N	N	N	N
	The organization is basically operational.	N	N	N	N	N
	The organization's actions are focused on business continuity	N	N	Y	S	N
Classic PM	The organization works with complex projects that require a radical learning process to achieve efficiency in its processes.	Y	Y	N	N	Y
	The organization obtains competitive advantage through operational excellence and high efficiency.	N	N	N	N	Y
Innovation	The organization's strategic focus is on strategic differentiation through innovative products and services.	Y	Y	N	N	N
	The organization works with projects focused on generating efforts both to create new markets and to satisfy markets already served by it.	Y	Y	Y	N	N
	Differentiation can be achieved through excellence in innovation and a high degree of creativity.	Y	Y	N	N	N
Entrepreneurship/ Intrapreneurship	There is a concern with obtaining competitive advantage in differentiation and efficiency in process economics	Y	Y	N	N	N
	The organization's main focus is to achieve excellence in leadership and a high degree of autonomy.	N	N	Y	Y	Y
	The project manager identifies and explores market opportunities.	Y	Y	Y	N	N
	The organization's actions aim to combine economic results with the need for creativity and innovativeness in meeting its objectives and in the way these are achieved.	Y	Y	N	N	N
	The PM has a high degree of complexity.	N	Y	N	N	N

Figure 1. Conceptual relationship model between the PMS and EO dimensions

Source: Prepared by the authors, based on Cooke-Davies, Crawford, & Lechler (2009), Lumpkin, & Dess (1996) and Freitas et al. (2012). Legend: IN = innovativeness; RT = risk-taking; PR = proactiveness; CA = competitive aggressiveness; AU = autonomy; Y = identified dimension; N = unidentified dimension.

The first column of Figure 1 lists the quadrants/systems that make up the Strategic PMS Model (Cooke-Davies, Crawford, & Lechler, 2009). The second column lists the elements associated with each quadrant. The other columns are the five dimensions of EO (Lumpkin & Dess, 1996): innovativeness (IN), risk-taking (RT), proactiveness (PR), competitive aggressiveness (CA), and autonomy (AU).

These columns were defined based on the comparative analysis conducted by the authors of this article, between the elements associated with each quadrant/system and the elements of each dimension of EO, based on literature. It was determined that, in cases where there was a greater presence of elements from one dimension of EO, compared to each criterion of a system, this is manifested in the relevant criterion/system. The dimension expressed in a given criterion was then identified by the symbols "Y" (identified dimension) or "N" (not identified dimension), as shown in Figure 1.

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For the PMS classified under the Classic PM system, we suggest the existence of innovativeness, risk-taking, and autonomy dimensions. We consider innovativeness present in the criterion "the organization works with complex projects that require a process of radical learning to achieve efficiency in its processes", because complex projects tend to require creative and innovative processes, as well as the contribution of capital from third parties (Martens, Freitas & Andres, 2011).

The risk-taking dimension concerns the propensity to adopt high-risk projects; complex projects are generally considered high-risk (Lumpkin & Dess, 1996; Öreller & Taspinar, 2006). Autonomy, the third dimension identified in this quadrant, associated with the criterion "the organization obtains competitive advantage through operational excellence and high efficiency", refers to the fact that operational excellence is related to the organization's operating mode; it also involves the role played by its collaborators in improving productivity (Hart, 1992) and identifying probable business opportunities (Zahra & Covin, 1995).

In the third quadrant, Innovation, it is possible to suggest that the PMSs that fit here tend to have the dimensions innovativeness, risk-taking, and proactiveness. With regard to innovativeness, the criteria that refer to strategic differentiation through innovation, creation of new markets, excellence in innovation, and a high degree of creativity denote the presence of innovativeness elements such as differentiated innovative initiatives, innovation in markets and processes, and creativity practices (Freitas et al., 2012). In the case of the risk-taking dimension, the reference of some system criteria to strategic differentiation and satisfaction of already existing markets denotes the possibility of change in the organization's business strategy (Wiklund & Shepherd, 2005; 2011), leading it to consider the possible existence of decision-making, financial, and even business risks

The proactiveness dimension, in turn, is related to the criterion "organization works with projects focused on generating efforts to both create new markets and to satisfy markets already served by it". The search for identifying future market demands is evident (Lumpkin & Dess, 1996; Lumpkin et al., 2013), as well as innovativeness introducing new products to the market (Covin & Slevin, 1989).

Finally, in the quadrant called **Entrepreneurship and Intrapreneurship,** the five dimensions of EO can be evidenced. The presence of innovativeness is seen in three of the five criteria; they portray aspects such as differentiation, action to identify and explore market opportunities, and the need for creativeness and innovation in meeting goals and how they are achieved, confirming the studies by Covin and Slevin (1989, 1991), Lumpkin and Dess (1996) and Martens, Freitas and Andres (2011) on innovation in products, services, and organizational processes in order to achieve organizational goals.

Risk-taking seems evident in four of the five criteria of the quadrant under analysis. Because such criteria involve innovation in products, services, processes, and markets, and because new ventures involve some risk to a lesser or greater degree, there is no way to affirm that no risks are involved in this context (Lumpkin & Dess, 1996). The proactiveness dimension, in turn, is perceived in two criteria of the Entrepreneurship and Intrapreneurship system; achieving excellence in leadership and identifying and exploring new market opportunities related, respectively, to the assuming of responsibility (Morris, 1998) and to the adoption of a market anticipation

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attitude (Martens, Freitas & Andres, 2011).

The competitive aggressiveness and autonomy dimensions are evidenced in the criterion "the main focus of the organization is to achieve excellence in leadership and a high degree of autonomy". Leadership, in this case, refers to overcoming competitors, including competing aggressively (Venkataraman, 1989; Lumpkin & Dess, 1996; 2001). Autonomy, in turn, is clearly referenced and reflects a strategic orientation (Lumpkin, Cogliser, & Schneider, 2009) of these PMSs, encouraging individual initiatives (Hart, 1992), allowing freedom of choice (Bailyn, 1985) and promoting creativity to exploit new ideas and opportunities (Zahra & Covin, 1995).

It may also be suggested that the PMSs that are classified in the Entrepreneurship/Intrapreneurship system work with innovativeness; have propensity to take risks while working with complex projects; act proactively, but sometimes react aggressively to competition and market actions; and have characteristics that lead to autonomy, including that of their members. It is therefore considered that the PMSs in this quadrant are the most entrepreneurship-oriented. In contrast, PMSs that fall within the ad hoc quadrant can be considered the least entrepreneurship-oriented, and the presence of EO dimensions has not been identified in the analysis performed.

Based on Figure 1, we have developed the case study in order to investigate these aspects within a practical context.

3 METHOD

This research is an exploratory study (Kripendorff, 1980), considering that it has sought familiarity with the themes of PMS and EO in software companies and the search for a more precise definition that would, as a result, form the basis of a more comprehensive field study. It adopted a qualitative approach to perform analysis, interpretation, and description of phenomena, considering the concern with the processes involved.

The research strategies used were based on a bibliographical survey and single-case study. The choice of a single-case study seeks the understanding of a phenomenon within its real context (Yin, 2010): this study seeks to identify the manifestation of EO in PMSs and the validation of the conceptual relationship proposed between them. This is a pilot case study, conducted to seek early evidence that can support the development of future studies.

A company engaged in consulting and software development — called "Software Company" here — has been used as the unit of analysis, given the importance of the entrepreneurship and project management themes within the context of companies in this industry. The choice of the company has been made for convenience, respecting the following criteria: (i) it belongs to the software market; (ii) it provides consulting and software development work; (iii) it works with project management; (iv) it has a project office; (v) it has an annual gross operating revenue (2013 base year) of over 92,000,000 USD (July 2016); and (vi) it works with a large number of projects.

Data was collected using multiple sources of evidence (Yin, 2010). The semi-structured interview with the project office manager (referred to in this study as "Manager") has been adopted as a source of primary data; secondary data sources were: analyses of documents (announcements, proposals, reports, e-mails, and other internal documents), of records in files (statistical data for public use from CVM, the Brazilian Securities Commission), and other records (such as service and budget orders). Such tools and techniques enabled the integration of multiple data sources, which converged in a triangular way, thereby constituting a data analysis strategy (Yin, 2010; Martins & Theóphilo, 2009).

The interview was script-based, considering the EO elements and PMS criteria

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summarized in Figure 1. The script included closed questions aimed at characterizing both the firm and the respondent, also open questions (three have identified the type of PMS existing in the Software Company and six have identified EO elements and their dimensions in the company under study).

The interview with the corporate manager of projects and governance was held in December 2014, in two stages: the first in person; and the second via Skype to clear up questions that emerged over the transcript of the interview and also when examining records in files and documentation. In all, there were about 5 hours of conversations, making up about 45 transcript pages. The choice of the respondent was a result of his experience: he has worked with the company for over 16 years, including 14 years in the project area, and more specifically 9 years in the project office; he has IT training and expertise in project management.

With regard to the other data collection sources, official documents have been used as well as public data, including statistical data, budgets, websites, and other sources that were necessary to seek evidence regarding both the PMS and the characteristic elements of EO.

Data analysis was done using the data reduction technique, followed by presentation, design, and search for conclusions (Martins & Theóphilo, 2009). The strategy of case description was also applied in order to develop a descriptive analytical framework to organize the case study; and the analytical pattern matching technique (Yin, 2010) was used to compare the procedures adopted in the case with the conceptual basis of the study. The next section presents the results.

4 PROJECT MANAGEMENT SYSTEMS AND ENTREPRENEURIAL ORIENTATION IN A SOFTWARE COMPANY

The firm examined by this study has been operating in the software market for over 20 years. Its main business is software development, but it also provides IT consulting services, works with Information Technology Outsourcing (ITO), and carries out projects in the IT field, among other activities. With over 10,000 employees, the company seeks to constantly be a strategic partner recognized and admired by all its customers and stakeholders, national or international.

Endowed with a "strong entrepreneurial streak", according to the respondent's words (Manager), the Software Company encourages its employees to propose new project ideas, businesses, products, and services which, if well accepted by the group, can turn into new firms. The respondent also said that, "whenever anyone has a very good idea, it will be funded". The next steps of the firm are focused on technology and software solutions to develop cloud-based and mobile applications, and on the importance of information in business decision-making.

Technology solutions and innovation are the core business of the company studied, an explicit aspect of its mission. Present in posters, brochures, advertisements, and other documents, the mission reflects its strategy, as one such document explains:

> Specializing in technology since it was established, the [Software Company] has as its main engine the innovation of its products and services.
> Innovation, identified as essential for the sustainable growth of the company, is continually directing [its] actions [...] invested in the development of innovative solutions [...]

The importance of innovation can also be found in the diversity of its products and services. The company has over 20 development centers around the world in addition to software factories, and operates on several fronts, including mobile platforms, business solutions, development environments, applications, and web servers.

Endowed with a diversified strategy, it is possible to emphasize that its main focus is on differentiating itself through innovation in products and services, combined with acquisitions of

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other technology companies from other countries, thereby expanding its target market. To proactively meet the expectations and needs of customers, satisfying them and keeping them, is also one of its most relevant guidelines.

4.1 The Project Management System

The firm under study has well-defined strategic objectives, which are reflected in its choice of projects, in general complex and large. The Software Company uses the term "project" only when over 1,000 hours are spent for implementation.

The following excerpts, taken from the Manager's testimony, illustrate this scenario.

> [...] Just to give you an idea, of the 10 largest [Brazilian] banks, five are our clients. So, we have to adapt to customer type, customer methodology. (Manager)
>
> We do not handle small projects normally [...]. In fact, we call them projects when they consume more than 1,000 hours. (Manager)
>
> [...] complex projects implemented by the [Software Company], such as the whole defense system of the Armed Forces, Itaú and Bradesco bank systems [...] (Manager).

Through its projected structure, the firm can have a holistic view of the projects that it adopts (Patah & Carvalho, 2002; 2009). The existence of corporate governance for projects, consisting of projects, programs, project offices, sponsorship, and portfolio management, gives the company a systemic view of all of its projects (Too & Weaver, 2014).

It is possible to see the adoption of structures, rules, and procedures for systematic work with projects (Cooke-Davis; Crawford; & Lechler, 2009), from which the Software Company's project management system emerges. In this regard, the Manager said that the company aims to create value through its executed projects, seeking to offer solutions that make it differentiated and unique, and that are aligned with the strategic objectives of its clients. There is also an effort to improve its internal processes, according to an excerpt from an internal document of the company: "We are focused on exceeding customer expectations by applying methodologies for continuous improvement and governance, in a structured way".

The way the business is managed contributes to gaining competitive advantage over its competitors. The firm encourages creativity, as it tends to help generate innovation and differentiation. The company has created the BR Project, which is focused on encouraging its employees to have and present ideas, which can be turned into new products and services, or even spun off into new businesses, as outlined by the Manager in our interview:

> A very cool thing we do is that we encourage people to create, to give ideas, to think a little differently. So, whenever anyone has an idea, they have sponsorship to implement it and we see the result [...] We turn some good ideas into prizes [...]. We create the company; the person who had the idea becomes a partner with a stake and receives an investment or a contribution for some time to generate results (Manager).

With regard to policies and procedures, there is a set of guidelines that must be followed in all projects. According to the Manager, its collaborators may be dismissed if they do not follow all of the directives, standards, or company policies, as highlighted by the following excerpts.

> [...] We really cherish the issuing of directives, policies. For example, in projects, no one is allowed to do anything that is not within the scope [...] they cannot do that. It is a policy. If they do it, they can even be fired. (Manager)
>
> [...] Appropriate documentation and formal approval are prerequisites for project kick-off. No manager can do something that is not: first, documented; second, approved by the client (Manager).

It is noteworthy that the Software Company relies on a well-defined project management system and on a project office that not only incorporates project-related functions, but also those related to corporate governance. According to data submitted by the company, over 1,000 projects per year are carried out and delivered, accounting for about five million

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hours of work devoted to projects.

Based on the Strategic SGP Model proposed by Cooke-Davis, Crawford, and Lechler (2009), it is possible to suggest that **innovation** is the project management system used by the company. There is evidence that: (i) its strategic focus is on strategic differentiation through innovation of products and services; (ii) it works with projects focused on generating efforts to create new markets and maintain the current ones; and (iii) it can obtain differentiation through excellence in innovation and a high degree of creativity.

4.2 Entrepreneurial Orientation

Entrepreneurship is part of the Software Company culture studied here. The greatest evidence of this is the creation of the BR Project to encourage the generation of new ideas that lead to the development of new products and services. This is also demonstrated by, encouraging the proactive approach of its employees in order to anticipate the expectations and needs of customers and the availability of R & D facilities. The firm is constantly looking for new markets, broadening its horizons, and is considered one of the most represented Brazilian IT companies in the international market. That can be seen in the following excerpts from documents and company records.

> [...] develops solutions and innovations worldwide.
> Specializing in technology since it was established, [...] has as its principal conduct the innovation of its products and services.
> [...] Acts proactively and to anticipate the needs and perspectives of clients.

With over 20 units focused on development, located in different countries, the Software Company aims to meet all its customers' needs by conducting research, creating new software and other goods and services, and developing and implementing projects of different sizes and varying levels of complexity, which reflect in different types and levels of risk. The term innovation is not just a slogan for the company; it is synonymous with competitiveness and can secure its position in the market, ahead of the competition. However, as pointed out by the Manager, the difference between the company and its competitors can be found in how the former manages the business.

Given this scenario of entrepreneurial practices in the Software Company, it is possible to suggest that it features elements that make it possible to consider it entrepreneurship-oriented, as seen in the following excerpts.

> I would say yes [...] the area is all focused on entrepreneurship [...] we are always open to people giving new ideas. And good ideas are implemented. [...] The entire company encourages employees to have new ideas, to propose cool things for the company (Manager).

The presence of **innovativeness**, the first dimension of EO, is reflected in different actions of the company. It fosters the adoption of innovative practices that lead to new products, services, or processes. Employees are encouraged to create innovative ideas and carry out innovations. The Manager's testimony confirms the presence of the innovativeness dimension.

> [...] various services, various products, which are always created by the team, by any team member, precisely for us to be able to deliver more results.
> [...] Is a way of encouraging the staff to have even more ideas, to participate, think really differently (Manager).

The creation of the BR Project illustrates how the company motivates its employees to innovate, also rewarding the best ideas. The Manager described a case where a certain company was created. It arose from an employee's idea of developing a new software package. This employee then received the financial support of the Software Company and became one of the partners.

Other aspects that confirm the presence of innovativeness relate to: (i) the adoption of

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unique approaches and experimentation to solve problems, such as the "creation of a robust project, of great national impact, which makes a difference in highly competitive markets, such as the online video project" (record on file); (ii) obtaining of third-party funds to carry out innovation projects, as seen in the excerpts "whenever anyone has a very good idea, it will be funded" (Manager) and "2013 was a year of changes, investments [internal and external]..." (record on file); and (iii) the existence of human resources (internal or external) dedicated to innovative activities, since the company has a "board of innovation" (Manager) and performs internal events that aim to "form groups to create ideas to improve our results and transform some good ideas into valuable prizes" (Manager).

Evidence of the manifestation of the **risk-taking** dimension can be found in the very nature of the projects developed by the Software Company, most of which involve a high risk. This level of risk may arise from the constant search for innovation, the uncertain environment where the company operates, and the types of decisions involved, among other factors.

According to the Manager, every project — and its risks — is monitored and controlled by the project office, through the use of indicators to decide whether or not to take the risks that arise. The use of such indicators denotes the assumption of calculated risks. Financial risks and business risks are present in the day-to-day business, mainly because of its dealings in the international market.

> [...] In projects, no one is allowed to do anything that is not within the scope [...] the analyst suddenly negotiates something there and will not charge for his services ... He cannot do that. It is a policy (Manager).

The company's guidelines clearly mention **proactiveness**, the third dimension of EO. All of its employees need to act proactively to meet the expectations and needs of its customers, thereby contributing to achieving competitive advantage.

Proactive participation was identified in actions taken by the company, which contribute to a better strategic position with regard to its competitors. According to the Manager, for example, the project office is encouraged to carry out continuous monitoring of the environment by means of indicators, which allows for the detection of new products and services, business opportunities, and even the creation of innovative ideas.

The development centers and the BR Project are examples of proactive actions in the search for new ideas and products. Some elements that refer to proactiveness are contained in the following excerpts, transcribed from an interview with the Manager.

> The office has created tools, techniques and models to support, monitor and treat these elements [which lead to the success of the projects] ... We were able to deliver more results to our stakeholders and reached a level of over 90% satisfaction.
>
> The role of the PMO with stakeholders has helped the company to identify customer needs and explore new markets.
>
> We have one of the highest maturity levels [in project management], level 5. Nevertheless, we are always trying to find new things (Manager).

Regarding the **competitive aggressiveness** dimension, the Software Company performs financial competition based on profitability and efficiency, as stated by the Manager. In order to maintain its privileged and highly competitive position among its competitors, the company has intensified the acquisition of new companies and the entry into the more economically mature Asian markets, which certainly require a large volume of services.

One of the actions that shows the existence of competition in terms of business is its internationalization, since the company is present in more than 25 countries and believes that "international presence translates into an important differentiator for the company" (record on file). No effective participation of the company was identified in the undertaking of aggressive actions in marketing new projects or products, nor was there further evidence of the competitive aggressiveness dimension analyzed company's actions.

The fifth dimension of EO, **autonomy**, is present in the actions of the Software Company. In this sense, it appears that the Manager has autonomy to decide about the projects carried out, provided that such decisions fall within the corporate strategy and the guidelines

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related to projects.

The positioning toward acting autonomously affects not only the Manager but also the project office members in the search for new product ideas, services, and projects, as well as new business opportunities. Stakeholders are challenged to incorporate behaviors that lead to innovation and the creation of ideas and opportunities, among other so-called entrepreneurial attitudes; they occupy a prominent position in the process of identifying and selecting projects and business opportunities for the company, according to the following excerpts from the interview with the Manager.

> To define tools to support project management, develop models to predict the future behavior of the project and optimize processes are some of our actions. [...] We encourage [entrepreneurial attitude] and the more people have it the better for the company (Manager).

The results obtained show the presence of the innovativeness, proactiveness, risk-taking, and autonomy dimensions in the Software Company, whereas that of competitive aggression is not a major factor.

4.3 Relationship evidence between Project Management Systems and Entrepreneurial Orientation

The company studied seeks to differentiate itself from its competitors by innovating in its products and services, allowing them a *high degree of differentiation* (Cooke-Davies, Crawford, & Lechler, 2009) while making efforts to improve its internal processes, referring to the *low need for efficiency in the process economics* (Cooke-Davies, Crawford, & Lechler, 2009). These features allow us to state that the **innovation** dimension is present in the company.

The identification of criteria that refer to the innovation dimension also contributed to classify the company's PMS in this quadrant. For example, the creativity of its employees contributes to innovation of its products and services and to differentiate itself from its competitors, as proposed by Cooke-Davies, Crawford, and Lechler (2009).

Regarding the identification of the EO dimension based on the elements listed by Freitas et al. (2012), our results show a greater presence of the innovativeness, risk-taking propensity, proactiveness, and autonomy dimensions in the analyzed company. Such dimensions have been expressed almost in their entirety, whereas only two elements of competitive aggression are expressed, depicting only some aspects of this dimension.

Figure 2 presents empirical evidence of manifestation of EO in the innovation process management system, considering the criteria characterizing it. This figure is intended to show only the portion related to the innovation system of the conceptual relationship model between PMS and EO that is proposed in this study and shown in Figure 1 (Section 2). Elements were added to each of the three innovation criteria, which show the presence of each EO dimension.

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<table>
<tr><th colspan="2">PMS Innovation</th><th colspan="5">EO Dimension – Evidence of its presence</th></tr>
<tr><th>Characterizing criteria</th><th>Evidence</th><th>Innovativeness</th><th>Risk-taking</th><th>Proactiveness</th><th>Competitive aggressiveness</th><th>Autonomy</th></tr>
<tr><td>The organization's strategic focus is on strategic differentiation through innovative products and services.</td><td>Focus on differentiation through innovation in their products and services.</td><td>Adoption of innovative practices that lead to new products and services.</td><td rowspan="3">Involvement in high-risk projects; risk monitoring and control; risk-related decisions result from risk indicators; financial and business risks have been associated with internationalization of the company.</td><td>Market monitoring to identify new products and services.</td><td>-</td><td rowspan="3">Managers and stakeholders are encouraged to act independently; managers can make decisions about the projects; freedom to optimize processes.</td></tr>
<tr><td>The organization works with projects focused on generating efforts both to create new markets and to satisfy markets already served by it.</td><td>Meeting customer needs and expectations, satisfying and keeping them; search for alignment between its interests and those of its customers.</td><td>Adoption of innovative practices that lead to new processes.</td><td>Market monitoring to identify business opportunities; identification of customer needs; exploration of new markets</td><td>Internationalization leads to business competition.</td></tr>
<tr><td>Differentiation can be achieved through excellence in innovation and a high degree of creativity.</td><td>Creativity as a contribution to the generation of innovation and differentiation; encouraging ideas that can be turned into new products or services; good ideas tend to be turned into new businesses, with an award for the idea creator.</td><td>Encouraging creativity; creation of different projects; sponsorship to bring up new ideas generated by employees; board of innovation; BR project's implementation.</td><td>Existence of development centers; BR Project implementation.</td><td>-</td></tr>
</table>

Figure 2. Empirical evidence of the presence of EO in the Innovation PMS
Source: Authors

In the case of the Software Company, it was possible to verify the presence of innovativeness, insofar as the firm adopts creative practices to promote innovation for developing new products, services, and processes (Lumpkin & Dess., 1996; Lumpkin et al., 2013). Risk-taking has been observed in its involvement in high-risk projects, a bold attitude among its employees also in relation to decision-making, and other elements (Lumpkin & Dess, 1996; Freitas et al., 2012). The fact that software development firms are inevitably linked with various degrees of uncertainty (Pedroso & Oliveira, 2013) reinforces the presence of this dimension in these companies.

In relation to the proactiveness dimension, the analyzed company has been shown to encourage all its stakeholders to act proactively, including with respect to meeting customer needs and expectations (Lumpkin & Dess, 1996; Freitas et al., 2012). The presence of autonomy has been identified through both the autonomous behavior of its stakeholders, and the entrepreneurial behavior encouraged by the company, aimed at identifying new projects and business opportunities (Lumpkin & Dess, 1996; Freitas et al., 2012). Finally, the competitive aggressiveness dimension was evidenced in the participation in financial and business competition (Freitas et al., 2012).

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Jointly analyzing the results presented here allows identification of the presence of all the dimensions of EO in the PMS of the studied company, albeit in different degrees. In the innovativeness and proactiveness dimensions, the relationship with each innovation PMS criterion is abundantly clear. The dimensions of risk-taking and autonomy were identified more generally, without a clear definition of the relationship with each of the criteria. The competitive aggressiveness system was correlated with only one of the PMS criteria.

The theoretical model shown in Figure 1 suggests that companies that adopt the Innovation PMS potentially include the innovativeness and risk-taking systems, since the three characterizing criteria had elements associated with each of these dimensions. Less emphasis is given to the proactiveness dimension, since the theoretical model shows its presence in only one of the innovation system's criteria. The other EO dimensions (competitive aggressiveness and autonomy) were not highlighted in the aforementioned model.

By analyzing the theoretical model together with the findings presented in Figure 2, it can be seen that the results confirm the presence of the innovativeness, risk-taking, and proactiveness dimensions suggested in the model. However, the results also show the presence of the autonomy dimension in the case analyzed. One possible explanation for this result is the fact that this may be an inherent characteristic of the firm; another possible explanation may be in the company's sector.

Therefore, the presented outcome reinforces the need to develop new studies to further research the applicability of the proposed model and its configuration in terms of the EO dimensions according to the PMS type.

5. CONCLUDING REMARKS

This study aimed to analyze the manifestation of the EO dimensions in PMSs. As a result, a model that shows the relationship between the PMS types (ad hoc, classic PM, innovation, entrepreneurship and intrapreneurship) and the presence of the EO dimensions (innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy) was proposed. The empirical case analysis has enabled the validation of part of the model and indicates the need for further studies to analyze the full model and verify its applicability within the organizational context.

The study results present contributions to the academia and to organizational practice. In the academic context, it is a first step in studying and discussing the relationship between PMS and EO, with a proposed model. In terms of organizational practice, the study refers to the reflection on the relationship between entrepreneurship aspects within the context of different types of project management systems. With the analysis of the proposed model, managers can reap benefits with regard to aspects of entrepreneurship and innovation within the organizational context, especially that of project management.

Some of the limitations of this study include the fact that only one interview was conducted with the project office manager at the Software Company studied. The use of only one case study is also a limitation, given that the firm studied has its own type of PMS, which makes it impossible to analyze the manifestation of EO in different typologies.

Several future research suggestions emerge: empirical studies with a larger number of software companies, enabling the conduction of intercase analyses in order to compare different types of PMS and EO manifestations in each reality; and quantitative

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studies to test, in a representative sample of companies, the relationship between PMS type and EO dimensions. Finally, the proposed model can be useful for the development of studies in other sectors, enabling not only the verification of its applicability, but comparison in different contexts.

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