

RELAÇÃO ENTRE ORIENTAÇÃO EMPREENDEDORA E MATURIDADE NA GESTÃO DE PROJETOS EM EMPRESAS BRASILEIRAS DE SOFTWARE

RESUMO

Este artigo tem como objetivo analisar a relação entre orientação empreendedora e maturidade em gerenciamento de projetos em empresas de software. Inicialmente, a literatura a respeito de ambos os temas é abordada. Então, um modelo conceitual que sugere que a orientação empreendedora é positivamente relacionada à maturidade em gerenciamento de projetos é proposto. Para avaliar o modelo, a técnica de modelagem de equações estruturais foi utilizada por meio do método de mínimos quadrados, usando uma amostra de 102 questionários respondidos por gestores de empresas brasileiras de software. O modelo foi validado e a hipótese do estudo confirmada. Os resultados revelam que há uma relação positiva entre orientação empreendedora e maturidade em gerenciamento de projetos nas empresas pesquisadas. Assim, a inovatividade, a assunção de riscos e a proatividade exercem um impacto positivo na maturidade em gerenciamento de projetos, a qual é caracterizada por gestão da integração, gestão do escopo, gestão do tempo, gestão dos custos, gestão da qualidade, gestão de recursos humanos, gestão da comunicação, gestão dos riscos e gestão de aquisições. Os resultados colaboram com as discussões teóricas sobre estes temas contribuindo para sanar lacunas na literatura de estudos que relacionem empreendedorismo e gestão de projetos. Como contribuições gerenciais, o estudo propicia a executivos e gestores uma visão a respeito dos benefícios que a orientação empreendedora exerce na maturidade em gerenciamento de projetos.

Palavras-chave: Orientação Empreendedora; Maturidade em Gestão de Projetos; Empreendedorismo; Empresas de Software.

RELATIONSHIP BETWEEN ENTREPRENEURIAL ORIENTATION AND PROJECT MANAGEMENT MATURITY IN BRAZILIAN SOFTWARE FIRMS

ABSTRACT

This paper aims to analyze the relationship between entrepreneurial orientation and project management maturity in software firms. Initially, the literature concerning both matters has been approached. Then, a conceptual model which suggests that the entrepreneurial orientation is positively related to the project management maturity, has been proposed. In order to evaluate this model, the Structural Equation Modeling technique has been adopted through the Partial Least Square method using a sample of 102 questionnaires given by managers of Brazilian software firms. The model was validated and the study hypothesis confirmed. The results of the study reveal that there is a positive relationship between entrepreneurial orientation and project management maturity in the surveyed firms. Thus, innovativeness, risk-taking and proactiveness exert a positive impact on the project management maturity, which is characterized by integration management, scope management, time management, cost management, quality management, human resources management, communications management, risk management and procurement management. The results collaborate with the theoretical discussions surrounding these subjects contributing to seal literature gap to combine entrepreneurship and project management. As managerial contributions, the study provides executives and managers to have a general view that the entrepreneurial orientation exerts beneficial impacts on the project management maturity.

Keywords: Entrepreneurial Orientation; Project Management Maturity; Entrepreneurship; Software Firms.

RELACIÓN ENTRE LA ORIENTACIÓN EMPRESARIAL Y MADUREZ GESTIÓN DE PROYECTOS EN LAS EMPRESAS BRASILEÑAS DE SOFTWARE**RESUMEN**

Este trabajo tiene como objetivo analizar la relación entre la orientación emprendedora y la madurez de gestión de proyectos en empresas de software. Inicialmente, la literatura sobre ambas cuestiones se ha acercado. Entonces, un modelo conceptual que sugiere que la orientación emprendedora está positivamente relacionado con la madurez de la gestión del proyecto, se ha propuesto. Para evaluar este modelo, la técnica de modelos de ecuaciones estructurales ha sido adoptada por el método de mínimos cuadrados parciales utilizando una muestra de 102 cuestionarios dadas por los gerentes de las empresas brasileñas de software. El modelo fue validado y la hipótesis de estudio confirmó. Los resultados del estudio revelan que existe una relación positiva entre la orientación emprendedora y la madurez de gestión de proyectos en las empresas encuestadas. Por lo tanto, la capacidad de innovación, la asunción de riesgos y proactividad ejercen un impacto positivo en la madurez de gestión de proyectos, que se caracteriza por la gestión de la integración, gestión del alcance, la gestión del tiempo, gestión de costes, gestión de calidad, gestión de recursos humanos, gestión de comunicaciones, gestión de riesgos y la gestión de las adquisiciones. Los resultados colaboran con las discusiones teóricas en torno a estos temas que contribuyen a sellar brecha de la literatura para combinar el espíritu empresarial y la gestión de proyectos. Como contribuciones de gestión, el estudio proporciona a los ejecutivos y gerentes tienen una opinión general de que la orientación emprendedora ejerce efectos beneficiosos sobre la madurez de gestión de proyectos.

Palabras clave: Orientación Empresarial; Madurez de Gestión de Proyectos; Emprendimiento; Las empresas de software.

Cristina Dai Prá Martens¹
Karoline Doro Alves Carneiro²
Mauro Luiz Martens³
Dirceu da Silva⁴

¹ Doutora em Administração pela Universidade Federal do Rio Grande do Sul - UFRGS. Diretora do Programa de Mestrado Profissional em Administração - Gestão de Projetos da Universidade Nove de Julho - PMPA-GP/UNINOVE. Brasil. E-mail: cristinadm@uninove.br

² Mestre pelo Programa de Mestrado Profissional em Administração - Gestão de Projetos da Universidade Nove de Julho - PMPA-GP/UNINOVE. Brasil. E-mail: k.carneiro@gmail.com

³ Doutor em Engenharia de Produção pela Universidade de São Paulo - POLI/USP. Pesquisador do Laboratório de Gestão Projetos da Escola Politécnica - POLI/USP. Brasil. E-mail: mauro.martens@gmail.com

⁴ Doutor em Educação pela Universidade de São Paulo - USP. Professor do Programa de Pós-Graduação em Administração da Universidade Nove de Julho - PPGA/UNINOVE. Brasil. E-mail: dirceus@uninove.br

1 INTRODUCTION

Entrepreneurship and project management are themes in which the development of research has grown, especially in the last thirty years. As two apparently distinct areas, research in these topics has been developed separately, but not merging both topics. Nevertheless, recent studies suggest the existence of a strong connection between entrepreneurship and project management, looking at both way as practical field and research areas (Kuuraa, Blackburn, & Lundin, 2014; Lundin et al., 2015). Although there are few studies working on the connection between both topics and showing the relevance of both to the organizational practice, there is a gap of studies that approach entrepreneurship and project management together.

In order to implement new ideas or to develop new opportunities, aspects inherent in entrepreneurship, project management can offer important insights with respect on business operationalization, especially when we take in account that aspects related to entrepreneurship can be seen as a project (Semolic & Kovac, 2008; Ajam, 2011). In turn, entrepreneurs can be considered leaders or project managers in certain stages of the development of their business (Kuuraa et al., 2014). In a study which has investigated the relationship between entrepreneurship and project management, these last authors identified topics that offer links between these fields of study. They pointed out, among other themes, organizational creation, innovation, products development, processes, skills, opportunities development and entrepreneurial orientation. In this study, we intend to contribute to development of the connection between entrepreneurship and project management through the study of entrepreneurial orientation and project management maturity.

The entrepreneurial orientation represents the organizational-level entrepreneurship (Lumpkin & Dess, 1996) and is characterized by innovativeness, risk-taking and proactiveness (Miller, 1983; Convin & Slevin, 1989; Miller, 2011). In the scope of entrepreneurship study, entrepreneurial orientation is one of the few areas with a cumulative body of knowledge in development (Rauch, Wiklund, Lumpkin, & Frese, 2009; George & Marino, 2011; Wales, Monsen, & Mckelvie, 2011). This concept has been widely adopted in the strategy and entrepreneurship literature (Basso, Fayole, & Bouchard, 2009), having received substantial attention in both conceptual and empirical terms (Lumpkin, Cogliser, & Schneider, 2009; Covin & Lumpkin, 2011).

The search for excellence in projects addresses the idea of project management maturity (Kerzner, 2009). The maturity of the organization is associated with the development of the project, meaning that such

development is better when the organization is at a higher maturity level (Skulmoski, 2001). The more mature organization should offer resources, adapt strategies, disseminate project results, act sensitized to project management (Carvalho & Rabechini Jr., 2005). It also addresses to the need for organizations to become more flexible and respond more quickly to market demand.

The popularization of the project-based structure is also related to the constant development of new products, processes or services, and the rapid technological expansion (Meredith & Mantel Jr., 2008). Thus, the focus on projects contributes so that organizations may respond more quickly to the market through innovative designs, and therefore, project management can be considered one of the critical factors in the pioneer ability (Thieme, Song, & Shin, 2003) which refers to the relationship between project management and entrepreneurial orientation.

This article seeks to approach the topics of entrepreneurship and project management, aiming to **analyze the relationship between entrepreneurial orientation and project management maturity in Brazilian software firms**. The software industry is regarded as a dynamic sector due to the rapid and constant technological change and its growth has been exceeding several sectors of the economy (ABES, 2012a). These firms are typically associated with features of entrepreneurship and innovation (Roselino, 2007). Furthermore, software firms are potentially organized by projects, where the decision-making process and the generation of income are associated with the development of them (PMI, 2013). These are some aspects that justify the choice of field defined for this study.

For the development of this study, we proposed and validated a model of relationship between the themes through the analysis of structural equations based on responses of 102 questionnaires. The formulated hypothesis was confirmed signaling that the entrepreneurial orientation has positive relation with the project management maturity. In academic terms, the results contribute for the development of studies in both research areas (entrepreneurship and project management), and of the relation between both one. In terms of organizational practice, the study provides executives and managers with a general view that the entrepreneurial orientation, featured by innovativeness, risk-taking and proactive behaviors, exerts beneficial impacts on the project management maturity.

Following this introduction, we present a conceptual review on entrepreneurial orientation and project management maturity; soon after, a conceptual approach between the main topics and the hypothesis is developed. After, we describe the research method that involved in the application of survey and analysis of structural equations. Finally, we discuss the results and present the final considerations.

2 LITERATURE REVIEW

2.1 Entrepreneurial Orientation

The concept of entrepreneurial orientation can be defined as the management of the entrepreneurial process, depicted in methods, practices and management styles or decision-making process used for entrepreneurial action (Lumpkin & Dess, 1996). Originally from studies on organizational-level entrepreneurship (Miler, 1983; Covin & Slevin, 1989), the entrepreneurial orientation is most commonly characterized by three dimensions: innovativeness, risk-taking and proactiveness (Miller, 2011).

The innovativeness can be conceptualized as the willingness to innovate, introduce new features through creativity and experimentation targeted at developing new products and services, as well as new processes (Lumpkin & Dess, 1996). According to Wiklund (1999), the innovative strategic posture is related to the performance of the organization in order to increase the chances of the firm to perceive advantages to move before its competitors and capitalize market opportunities.

Risk-taking reflects the tendency to act audaciously, for example venturing into new and unknown markets; trusting a large portion of resources to risk with uncertain results; getting bulky loans (Lumpkin & Dess, 1996). This dimension captures the degree of risk reflected in various decisions of resource allocation, added to the choice of products and markets, reflecting somehow a criterion, and a decision-making pattern on the organizational level (Venkatraman, 1989).

Proactiveness, in turn, is featured in the search for opportunities and consequent action involving the introduction of new products and services into the market (Lumpkin & Dess, 1996). It depicts the action of the anticipation of future demands to bring about change and shape the environment (Miller & Friesen, 1978). It suggests a perspective of looking forward, accompanied by innovative activities or new business.

In light of Lumpkin and Dess (1996), subsequent studies have proposed two new dimensions to tag to the entrepreneurial orientation construct, namely: autonomy and competitive aggressiveness, in addition to the three original dimensions. The competitive aggressiveness was discussed as a dimension, once regarded as a synonym or an element of proactiveness (Covin & Slevin, 1989). Autonomy, in turn, emerged from understanding the entrepreneurial independence.

On that account, the studies on entrepreneurial orientation rested on two approaches: the one with three and the one with five dimensions. Rooted in 51 studies on entrepreneurial orientation developed between 1983 and 2006, Rauch et al. (2009) reckoned the three-dimension approach was to prevail, having been used in 82% of the analyzed studies. This approach will be adopted in this study as well.

Studies show that organizations with greater entrepreneurial orientation tend to have better performance (Miller, 1983; Covin & Slevin, 1991; Zahra, 1993; Zahra & Covin, 1995; Wiklund, 1999; Wiklund & Shepherd, 2005; Rauch et al., 2009). Empirical evidence corroborate this literature signaling in Brazilian companies, which can be seen in the works of Mello et al. (2006) and Fernandes and Santos (2008).

A review of the literature on entrepreneurial orientation allows for the highlighting elements that may be used to check in organizational range. There is a variety of scales and measurement forms (Rauch et al., 2009), but the most well-known is Covin and Slevin (1989) scale, which proposes factors for the dimensions innovativeness, risk-taking and proactiveness. From that scale plus complementary studies (Venkatraman, 1989; Chen & Hambrick, 1995; Lumpkin & Dess, 1996 and 2001; Lee & Peterson, 2000; Dess & Lumpkin, 2005; Martens, Freitas, & Boissin, 2010 and 2011; Martens, Freitas, Boissin, & Behr, 2011; Freitas, Martens, Boissin, & Behr, 2012), the dimensions and components of entrepreneurial orientation are summarized (Table 1).

Table 1 - Dimensions and components of Entrepreneurial Orientation

DIMENSIONS	COMPONENTS OF ENTREPRENEURIAL ORIENTATION
Innovativeness	Releases and changes in products and services. Innovation in administrative processes, technology and market. Financial investments in P&D, new technologies, continuous improvement and innovation. Human resources involvement with innovation activities. Support to creative processes, experimentation and new ideas. Developing innovative differentiated market initiatives.
Risk-taking	Portrayal of a general risk behavior and strong tendency to high-risk projects. Strong and aggressive posture, with little conservative vision in decisions. Posture to assume financial risk. Posture to assume risk in business.
Proactiveness	Continuous monitoring of the environment and constant search for new opportunities. Market forecasting attitude, with shares to which the competitors respond. Decentralized and participatory control procedures, problem solving actions. Technological flexibility, availability and accessibility of people, resources and equipment to develop innovations.

Source: Elaborated by the authors

The next section presents some aspects on project management maturity in order to support the analysis proposed in this study.

2.2 Project Management Maturity

Project management can be defined as the process of applying knowledge, skills, tools, and techniques towards the activities of the projects in order to meet the requirements and expectations of the stakeholders (PMI, 2013). Since the projects have their own specifications, the project management approach should be chosen according to their characteristics and objectives (Shenhar & Dvir, 2007).

The project management maturity depicts the pursuit of excellence in this discipline by means of a progressive process of change facing perfection (Carvalho, Rabechini Jr., Pessôa, & Laurindo, 2005). It can be defined as the adoption of a standard methodology and monitoring processes in which there is a high probability of repeated successes (Kerzner, 2009). It portrays the ability of an organization to generate, select, implement and execute projects expertly (Söderlund, 2005).

The study of Paulk, Weber and Chrissis (1995) presents characteristics of the mature organizations: the projects are effectively completed; the processes are specified as well as documented and there is continuous improvement; there is support from strategic and managerial levels; the processes are accompanied and administered; there is measurement of product and process; and disciplined use of technology.

The work of Moraes and Laurindo (2008) presents a different proposal for the concept of

maturity. For them, the concept is multidimensional, so it is not safe to say that a group of organizations is more mature in project management than others. The changes from one group to another is the profile of the dimensions. The dimensions used in this analysis represent the processes contained in the knowledge areas suggested by the PMBOK (PMI, 2013).

The literature offers several models of project management maturity. They come as a structure that serves as a guide for comparison among the levels of development of the organizations, with regards to aptitude in managing projects (Cleland & Ireland, 2007). These levels are labeled levels of maturity. Commonly they are based on normative approaches, and each model of maturity must contemplate: a description about the managerial approach; a questionnaire to be filled out; patterns for comparative analysis; and a description of the analysis (Gareis & Huemann, 2007).

The first maturity model was developed by SEI - Software Engineering Institute in 1997 and named Capability Maturity Model (CMM). It suggests the analysis of maturity through an evolutionary cycle of five levels and pinpoints projects in the area of software development. Further evolutionary models of maturity were produced, most of them based on CMM. Carvalho, Laurindo and Pessôa (2003) claim that several models have been created, of which the most discussed are: the CMM; the Project Management Maturity Model (PMMM) created by Kerzner (2009); and the Organizational Project Management Maturity Model (OPM3) developed by PMI (2003).

The PMMM (Kerzner, 2009) proposes five levels for the study of maturity as well. The areas of knowledge presented by the PMBOK underpin both the

PMMM and the CMM. The work emphasizes that an organization will only evolve when the requirements outlined in the previous level are met.

The PMI (2003) published the OPM3, in an attempt to propose a model that allows organizations to diagnose the situation and make effective decisions in order to reach maturity. This model works with levels of maturity in three scopes: projects, programs and portfolios. Thereby, when dealing with portfolios of projects, this approach expresses concern for the strategic alignment of projects in organizational context. The OPM3 combines best practices in projects, organizational skills, results, and both quantitative and qualitative indicators to confirm the achievement of these results.

Despite proposing an evolutionary model of maturity as well (Project Management Maturity Model-PM3), Fincher and Levin (1997) unlike the other authors who have studied the subject, claim that the company does not necessarily need to achieve the highest level of maturity to run effective projects. By that means one realizes that it is of chief importance that companies understand how their project area is characterized, and how this relates to their goals, rather than simply organize to achieve maturity in projects.

Coming out of the evolutionary models, Andersen and Jessen (2003) initiate the discussion on maturity in their studies suggesting that measuring this variable may be more subjective than objective. However, as a result the authors refer to the studies of Skulmoski (2001) which deepen the discussion of maturity harnessed to the concept of competences, as a first step to reducing the subjectivity in this context.

The study of Andersen and Jessen (2003) suggests the level of excellence in project management combined with the expertise in this area, be studied under the following dimensions: attitude, knowledge and action. The analysis of the actions, attitudes and knowledge in project management is then made under three levels: project management (individual projects); program management and portfolio management (projects and programs which do not share the same objectives). The authors work under the hypothesis that some companies may have their dimensions in projects (action, attitude and knowledge) more advanced than others.

Among the maturity models focused on project-oriented organizations, Gareis and Huemann (2007) propose a model with five levels of evolution for each dimension of maturity: project management; program management; quality assurance in project and program management; assignments of a project or program; coordination of project portfolio and relationships among projects; organizational design; human resource management; and process management. Unlike other evolutionary models, Gareis and Huemann (2007)

criticize the representation of maturity in levels, as it may come across as quite strict. They suggest a spider's web-shaped representation to describe the necessary skills to organizations, proposing that each organization ought to have different levels of maturity for each dimension in projects.

Still in the range of project-oriented organizations, the study of Söderlund (2005) suggests a basic conceptual model for understanding and explaining the variables that build and support the competence in projects. This model assumes that the competences consist of a number of sub-processes or activities. From an initial empirical study, the author proposes some variables labeled building blocks of project competence: generation of project, project organization, project leadership and teamwork in the project.

The model proposed by Söderlund (2005) relates the development and support of competence in projects with different types of designs developed by the company; with both proactive and reactive actions settled to meet the needs of the market and new technologies; and with the development and dynamics of the building blocks of project competence. This approach does not characterize the construction of skills through an evolutionary model, but rather through an analysis of variables that model the project management of the organization.

Once the models and studies on project management maturity discussed here are analyzed, one realizes that most work uses the concepts suggested by the PMBOK (PMI, 2009) as a reference, whether to a greater or lesser degree, apart from the Söderlund (2005) study, which aims at the concept of competence in project-oriented organizations. On that note, the use of processes in project management for the characterization of project management maturity was adopted in this study. A similar approach has been adopted in the study of Moraes and Kruglianskas (2010), justified among other aspects, by the relevance and acceptance in the international arena, proposed by the PMBOK processes.

The project management process groups proposed by PMBOK are following (PMI, 2013): initiating processes, planning, executing, monitoring and controlling, and closing. In this range, ten knowledge areas are covered: project integration management, project scope management, project time management, project cost management, project quality management, project human resource management, project communications management, project risk management, project procurement management and project stakeholder management. In addition, all knowledge areas present sets of processes, according to Table 2.

Table 2 - Project Management Knowledge Areas

KNOWLEDGE AREAS	PROCESSES
Project integration management	Develop the project's opening term; Develop the project management plan; Direct and manage project execution; Monitor and control project work; Perform integrated change control; Close the project or phase.
Project scope management	Collect the requirements; Define the scope; Create the WBS (work breakdown structure); Validate the scope; Control the scope.
Project time management	Define activities; Sequence activities; Estimate activity resources; Estimate durations of activities; Develop the schedule; Control the timeline.
Project cost management	Estimate costs; Determine the budget; Control costs.
Project quality management	Quality plan; Perform quality assurance; Perform quality control.
Project human resource management	Devise the human resources plan; Hire or mobilize the project team; Develop the project team; Manage the project team.
Project communications management	Identify stakeholders; Plan communications; Distribute information; Manage stakeholders' expectations; Report performance.
Project risk management	Risk management plan; Identify risks; Perform qualitative risk analysis; Perform quantitative risk analysis; Plan responses to risks; Monitor and control the risks.
Project procurement management	Plan procurement; Drive procurement; Manage procurement; Close procurement.
Project Stakeholder Management	Identify stakeholders; Plan stakeholder management; Management stakeholder engagement; Control stakeholder engagement.

Source: adapted from PMI (2013)

Given by the authors of this work, the following section takes in account a first approximation between the constructs entrepreneurial orientation and project management maturity, which underpin the development of the succeeding empirical study presented.

2.3 Conceptual approach of the themes and hypothesis

The relationship between entrepreneurial orientation and project management can be found in literature still in preliminary stages (Semolic & Kovac, 2008; Kuura, 2010; Kuura et al., 2014; Lundin et al., 2015). Moreover, some concepts have been permeated the research field on entrepreneurship as well as project management, and this allows to identify possibilities in order to connect both topics. In this work section, some of these concepts are presented to contribute to the development of approaching between entrepreneurial orientation and project management maturity.

The entrepreneurship has opportunity as the central element (Shane & Venkataraman, 2000). When dealing with the relationship between entrepreneurship and project management, Semolic and Kovac (2008) claim that project management is crucial to the identification and development of opportunities. These authors claim that "the successful manager must be able to simultaneously manage the problems and challenges of entrepreneurship and strategic and project

management" (p. 412). Com isso, eles deixam clara a relação existente entre empreendedorismo, gestão de projetos e gestão estratégica da organização.

Another relevant topic on entrepreneurship is innovation (Miller & Friesen, 1982). Innovativeness, dimension of the entrepreneurial orientation, is a tendency for an organization to innovate, and there is a consensus in the literature it is a main concept in the entrepreneurial orientation context (Freitas et al., 2012). According to Thieme et al. (2003), one of the critical factors for the ability of innovating is the knowledge and the project management practice. A study developed by Gordon and Tarafdar (2007), shows that project management composes the group of skills in information technology which contributes to the development of the process of innovation (initiation, development and implementation). In this sense, it is possible to understand the decision of organizations to adopt a structure based in projects. These organizations have the objective to become flexible, promoting fast answers through innovative projects (Hobday, 2000).

Kuura (2010) presents the existence of an inherent linkage between project management and innovation, and between innovation and entrepreneurship, which leads to the relation between the topics of entrepreneurship and project management through innovation. Figure 1 presents the mutual relation proposed by Kuura (2010). Lundin et al. (2015) reinforce this approach when they claim

innovation and the organizational creation are paramount themes to develop the convergence between entrepreneurship and project management. An

analogous relationship can be made with entrepreneurial orientation and project management.

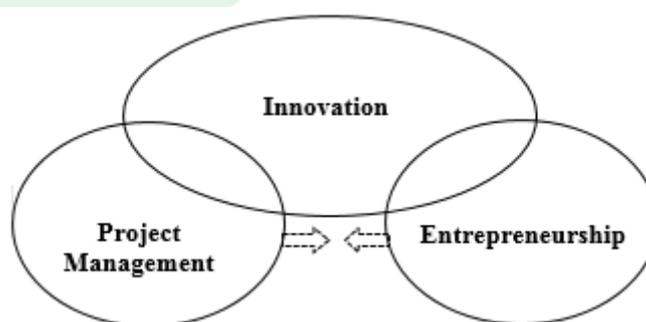


Figure 1 – Mutual relation between innovation, project management and entrepreneurship

Source: Kuura (2010, p. 143)

Themes of project management and entrepreneurship also can be analyzed at individual levels. Thus as an entrepreneur can be considered a project manager in some stages of business development (Kuuraa et al., 2014), as for example of the implementation of the company (Ajam, 2011), we also can consider in this function the leader that works on the entrepreneurial orientation context, where organizational actions are permeated by innovativeness, risk-taking and proactiveness. Another view can be made looking at the entrepreneurship as one of the characteristics of the project manager (Kerzner, 2009). In addition, it is expected that the project manager has boldness to find the better solution for the business problems (Rabechini Jr., 2005). Corroborating with this idea, the study given by Russo and Sbragia (2007) highlights that the entrepreneurship trend of the project managers has positive participation on innovative project success.

When dealing more specifically with project management maturity, aspects of processes and practices in project management are addressed, touching more on how developed such practices are in the organizational range. Kuura et al. (2014) emphasize process and innovation as important links between entrepreneurial orientation and projects. Consequently, this relation can be proposed between entrepreneurial orientation and project management. The same authors still show that planning, cost control and delivery performance are key factors in the best practices of entrepreneurship firms and in projects. These aspects of projects and indicators lead to practices of project management, which can be outlined from the set of processes of the knowledge areas proposed by PMBOK (PMI, 2013).

The relation between entrepreneurial orientation and maturity in project management is still rarely explored in the literature. Previous studies have given the first steps in this way: Carneiro and Martens (2012)

developed a preliminar proposal of conceptual approach between project management maturity and entrepreneurial orientation; Julio and Piscopo (2013) studied the relation between project management maturity and strategic entrepreneurship. This last study, of empirical nature, suggests that the level of project management maturity affect the actions of strategic entrepreneurship in the organizations.

By relating the project management maturity with the entrepreneurial orientation, based on the literature, it is possible to suggest some previous relations with innovativeness, risk-taking and proactiveness, dimensions of the entrepreneurial orientation. In this sense, there are some reflections in the next paragraphs.

With regard to innovativeness, fostering new ideas or creative processes that result in new products or services is what features support for the development and project management. In other words organizations where an innovative strategy posture is assumed, can devote efforts to defining project management methodologies, to targeting people to take part in activities of innovation or projects, to investing in new useful technologies to this process, and to developing creative abilities of managers and teams to search for positive results in that range. It is worth highlighting that innovativeness is related to an organization's strategic posture, which might contribute to the development of activities related to projects.

As far as risk-taking is concerned, an organization bound to be daring is advised to assist in the development of project-related activities. The existence of indicators of successful projects added to the capacity of managers and teams to deal with the levels of uncertainty are highlighted in this context.

The concepts concerning proactiveness of the organization, those bearing on the search for promising opportunities and the change foretaste, may be primarily related to the skills of managers and staff, who come across as indicators of a proactive behavior.

Such aspect draws the organization's strategy, and may encourage not only the project activities but also the other dimensions discussed. Furthermore, the proactiveness of the organization may also suggest the existence of indicators that reflect the success in both projects and their management, underpinning the control of the organizational situation to the environment in which it is placed.

The literature review and the previous reflection allow us to propose the hypothesis of this study:

H01: The entrepreneurial orientation of software firms presents positive relation on project management maturity.

The following we present the methodological procedures.

3 RESEARCH METHOD

As of the literature review, one might suggest that project management maturity and its variables (project management processes) represent a reflective model. To that extent, project management maturity leads to the characterization of their processes in project management.

The relationship between entrepreneurial orientation and its dimensions are discussed in the studies of George and Marino (2011) and Covin and Lumpkin (2011). There is no consensus in the literature of the area regarding reflective or formative form of entrepreneurial orientation. Nevertheless, both studies indicate that it is a real phenomenon and should be measured through reflective models.

It is also fair to say that the entrepreneurial orientation represents an exogenous construct as it is not caused by any other construct in the model (independent variable). The literature review and the previous reflection held in this study suggest that project management maturity represents an endogenous construct (dependent variable), that can be affected by exogenous construct entrepreneurial orientation (Byrne, 2010; Hair, Black, Babin, Anderson, & Tatham, 2009; Brei & Liberali Neto, 2006).

As strategy for data collection, the survey has been chosen. The base of associates of Brazilian Association of Software Enterprises (ABES - Associação Brasileira das Empresas de Software) has been used, and it represents approximately 85% of the Brazilian software market (approximately 7,200 companies) (ABES, 2012a). Organizations operating in consulting, development and software integration were selected, due to having its management, generally under the project spotlight. This database accounts for approximately 700 records (ABES, 2012b). It was possible to reach 481 firms which have been kept on participating in the research. After phone contact and data collection from the respondents, the link to access

the questionnaire was forwarded via email. The amount of replies came to 102 valid questionnaires. The data collection began in August and was completed in November/2012. The size of the sample was assessed through the evaluation of the power test (Cohen, 1988) using the G*Power 3.1.9.2 software (Faul, Erdfelder, Buchner, & Lang, 2009), which took into account the effect size of .15 (average value), and it was obtained a power of 0,9721.

The questionnaire was presented in three main sections: the first refers to the characterization of project management maturity (18 observable variables); the second section deals with the entrepreneurial orientation (16 observable variables); lastly, the third section, of a more optional aspect, deals with information about the organization and about the respondent. The issues of sections 1 and 2 are of the closed type, which offers the option of marks between 0 and 10 to each question, representing what better described the processes of project management or the entrepreneurial orientation, in each one of the sections; and section 3 presents both closed multiple-choice questions and open questions.

The basis for drafting the section on project management maturity utilized some of the processes of representative project management of project knowledge areas proposed by PMBOK (PMI, 2009). Having analyzed the literature, two processes were chosen to each of the nine project knowledge areas. Although the latest edition of PMBOK has 10 knowledge areas (PMI, 2013), this study was conducted before the release of this Edition, which adopts the 9 processes submitted in 2009, without the stakeholder management area, that was included in the fifth edition of 2013. The final ratio of processes has been compared with the suggested in the research tool tested and used in the study of Moraes and Kruglianskas (2010). Upon comparison, the conclusion is that the final relation of processes regards the processes suggested by Moraes and Kruglianskas (2010), and supplements with more 4 processes.

To develop the questionnaire section that aims at characterizing the entrepreneurial orientation, measurement scales already explored have been used as foundation for the literature of the area (Covin & Slevin, 1989; Lumpkin & Dess, 2001; Lumpkin et al., 2009) and elements discussed in studies of Martens et al. (2010 and 2011a), Martens et al. (2011b) and Freitas et al. (2012), as elements present in organizational practice of software organizations. From the review and analysis of these studies, 16 observable variable deriving from different studies have been casted, representing the 3 dimensions of entrepreneurial orientation altogether.

The Table 3 presents the latent (entrepreneurial orientation and project management maturity) and observable variables.

Table 3 - Variables of the study

OE – Entrepreneurial Orientation			
In1	Financial investments in innovation	Ar2	Audacious attitudes
In2	Releases of products and services	Ar3	Risk measurement
In3	Changes in products and services	Ar4	Boldness decisions
In4	Experimentation and solve problems	Ar5	Agility for potential solutions
In5	Innovation in process	Pr1	Anticipation of market
In6	External financial resources for innovation	Pr2	Pioneer in innovations
In7	Human resources for innovation	Pr3	Monitoring of the environment
Ar1	Tendency to high-risk projects.	Pr4	Anticipation of competitors
PMM – Project Management Maturity			
GInt1	Management, monitor and control project work	GQu2	Quality control
GInt2	Control change project work	GRh1	Recruitment or mobilization of staff
GEs1	Requirement scope	GRh2	Team management
GEs2	Scope change control	GCo1	Identification of stakeholders
GTe1	Physical and financial schedule	Gco2	Information for stakeholders
GTe2	Control schedule	GRi1	Identification and analysis of risks
GCu1	Budgeting process	GRi2	Monitoring and control risks
GCu2	Control costs	GAq1	Purchases of goods and services
GQu1	Quality planning	GAq2	Administer procurements

Source: Elaborated by the authors

Prior to data collection, the instrument was subjected to a pre-test with two experts and was applied to three software organizations, chosen conveniently, which also opined on the document.

Due to the causal relations between two constructs or latent variables (LV), the Structural Equation Modeling (SEM) was used for data analysis. SEM has two major paths: (1) Covariance Based; (2) Correlation Based. The first path has multivariate normality assumptions and the second allows the use of data from many natures (Hair, Hult, Ringle, & Sarstedt, 2014).

In this study, the option was for the second path, also known as Partial Least Square (PLS), because an initial exploratory study showed that data did not meet the conditions of the first path of models (Ringle, Silva & Bido, 2014). Therefore, the software SmartPLS 2.0 was used and for the adjustment of the model eight procedures was considered:

- a) Convergent validity: the values of Average Variance Extracted (AVE) – that show how much of the data are explained by each LV SEM model. As criterion values above .50 are accepted (Fornell & Larcker, 1981).
- b) Calculating scale reliability Cronbach's Alpha (CA) and Composite Reliability (CR): indicate whether the data are tendencies or

bias free. Values above .70 are accepted (Hair et al., 2014).

- c) Assessment of Pearson's coefficients of determination (R^2 or RSquare). In Social Science values above .26 are considered satisfactory (Cohen, 1988).
- d) Discriminant Validity: assessed by the root squares of AVEs and compared to Pearson's correlation coefficients (r) among the LVs. Indicates whether the LVs are independent. Acceptance criterion $\text{rsqAVE} > r$ (Hair et al., 2014).
- e) Effect Size (f^2): assesses how the withdrawal of each construct worsens the general model. Values above .35 are seen as large effects (Cohen, 1988).
- f) Predictive Relevance (Q^2): assesses the accuracy of the fitted model. Values greater than zero are adopted as criterion (Henseler, Ringle, & Sinkovics, 2009).
- g) Goodness-Of-Fit (GoF): It is a score of overall quality of the fitted model. For models in which all constructs are reflective (Tenenhaus et al., 2005). Values above .36 are suitable (Wetzels, Odekerken-Schöder, & Oppen, 2009).
- h) T-test for the factorial loads and path coefficient: These Student's t-tests are calculated to certify there is independence

between each variable and its respective constructs, besides independence among the constructs themselves. Values are significant (Pvalue <.001) when t-values are greater than 1.96 (Hair et al., 2014).

4 DATA ANALYSIS

At first, this section presents information regarding the profile of the software firms participating in the study (102 valid questionnaires) and typifies the entrepreneurial orientation and project management maturity. Following, the quantitative data obtained are analyzed for validation of the proposed model.

4.1 Characterization of software firms

The survey comprised a sample of Brazilian software firms. From the total of 102 responses, 61% are firms located in the state of São Paulo, Brazil, and 19% do not indicate the location. Data from ABES (2015) show that the southeastern part of Brazil presents bigger participation in hardware, software and services investments (around 60%), reinforcing the importance of this region in Brazilian software and services market. Approximately 17% of the participating organizations have less than 10 employees, 23% have between 10 and 49, 15% between 50 and 99 employees, and 23% have more than 100. Thus, out of the 78 (de 102) firms that indicated the number of employees, roughly half of them (40) have less than 50 employees.

As for the general aspects of the sample, a concentration with regard to billing tracks is possible to be perceived. Among the 77 firms that responded to the question about billing, 48 firms (62%) with annual revenues below \$1,528,000.00 stand out, they are classified in Brazil as micro and small businesses. Isso retrata uma característica do setor no país, que é liderado por micro e pequenas empresas (ABES, 2015). This portrays an industry characteristic in the country,

which is led by micro and small firms (ABES, 2015). Finally, the departmental functional structure stand out in about 40% of organizations, tailed by the object-oriented structure projects with near 30%. It is safe to say that, broadly the sample includes organizations with different types of organizational structure.

4.2 Characterization of entrepreneurial orientation and project management maturity

The characterization of entrepreneurial orientation in the software firms searched is presented in Table 4. The mean of responses in the evaluation of entrepreneurial orientation was 6.5 (on a 0-10 scale), and the general standard deviation was 2.6, which inferred a variation in the allocation of marks. This may suggest that software organizations have a moderate level of the entrepreneurial orientation. Furthermore, the dimension proactiveness stands out with an average of 6.6, followed by risk-taking (6.5) and innovativeness (6.3).

Some aspects from this table merit highlight. The two elements of entrepreneurial orientation which appear with bigger indicators are of the innovativeness dimension: 'Experimentation and solve problems' with greater average (7.7) and smaller standard deviation (sd 1.8) between all, and in following, 'Innovation in process' (mean 7.2, sd 2.3). Following of that, others three elements appear with same mean, being two of the risk-taking dimension – 'Audacious attitudes' (mean 7.1, dp 2.0) and 'Risk measurement' (mean 7.1, sd 2.1) – and one of the proactiveness dimension – 'Anticipation of competitors' (mean 7.1, sd 2.6). In contrasting of that, two elements are highlighted as the smaller indicators, being both of the innovativeness dimension: 'External financial resources for innovation' (mean 3.7, sd 5.5) and 'Human resources for innovation' (mean 5.5, sd 2.9). In general, it is observed a equilibrium of the dimensions of entrepreneurial orientation in the searched organizations, without predominance of one in particular.

Table 4 - Entrepreneurial orientation in the sample surveyed

Dimension Innovativeness	Mean	Standard deviation	Median
In1 - Financial investments in innovation	6.8	2.9	7
In2 - Releases of products and services	6.8	2.7	8
In3 - Changes in products and services	6.4	2.9	7
In4 - Experimentation and solve problems	7.7	1.8	8
In5 - Innovation in process	7.2	2.3	8
In6 - External financial resources for innovation	3.7	3.1	4
In7 - Human resources for innovation	5.5	2.9	6
Total	6.3	2.7	
Dimension Risk-taking	Mean	Standard deviation	Median

Ar1 - Tendency to high-risk projects.	6.1	2.5	6
Ar2 - Audacious attitudes	7.1	2.0	7
Ar3 - Risk measurement	7.1	2.1	8
Ar4 - Boldness decisions	6.1	2.5	6
Ar5 - Agility for potential solutions	5.8	2.5	6
Total	6.5	2.4	
Dimension Proactiveness	Mean	Standard deviation	Median
Pr1 - Anticipation of market	6.1	3.1	7
Pr2 - Pioneer in innovations	6.4	2.9	7
Pr3 - Monitoring of the environment	6.8	2.4	7
Pr4 - Anticipation of competitors	7.1	2.6	7
Total	6.6	2.7	

Source: Research data

With regard to the project management maturity in organizations of sample, the Table 5 shows the characterization per knowledge areas in project management according to the PMBOK (PMI, 2009). The mean of responses (in scale of 0-10) was 7.0 which represents the level of the existence and implementation of processes for project management. Note also that the answers ranged, on average, 2.4 points on the scale.

Software organizations examined feature three knowledge areas with highest mean: communications

(7.8 and 7.9), procurement (7.5 and 7.3), time (7.2 and 7.1), one indicator of scope (7.4), one indicator of human resources (7.2) and one indicator of integration (7.1). The management of communications in projects, beyond it was obtained the bigger index, it also gathered the smaller standard deviation; in its two indicators, the smaller received response (in Likert scale from 0 to 10) was 4, suggesting that the communication is the knowledge area better structured in the searched firms, between the others knowledge areas.

Table 5 - Project management maturity in the sample surveyed

Project Mangament Knowledge Areas		Mean	Standard deviation	Median
Integration	GIn1 - Management, monitor and control project work	7.1	2.1	7.0
	GIn2 - Control change project work	6.4	2.7	7.0
Scope	GEs1 - Requirement scope	7.4	2.0	8.0
	GEs2 - Scope change control	6.7	2.3	7.0
Time	GTe1 - Physical and financial schedule	7.2	2.6	7.0
	GTe2 - Control schedule	7.1	2.5	7.0
Cost	GCu1 - Budgeting process	6.7	2.7	7.0
	GCu2 - Control costs	6.7	2.7	7.0
Quality	GQu1 - Quality planning	6.7	2.1	7.0
	GQu2 - Quality control	6.3	2.5	7.0
Human Resources	GRh1 - Recruitment or mobilization of staff	6.3	3.2	8.0
	GRh2 - Team management	7.2	2.5	8.0
Communication	GCo1 - Identification of stakeholders	7.8	1.8	8.0
	GCo2 - Information for stakeholders	7.9	1.7	8.0
Risk	GRi1 - Identification and analysis of risks	6.9	2.4	7.0

	GRI2 - Monitoring and control risks	6.6	2.4	7.0
Procurement	GAq1 - Purchases of goods and services	7.5	2.3	8.0
	GAq2 - Administer procurements	7.3	2.3	7.0
	Total	7.0	2.4	

Source: Research data

4.3 Study model: evaluation and validation

Data has been analyzed preliminarily, under the following aspects: data lost, atypical observations and normality test. Lost data is what is not available for analysis (Hair et al., 2009). To this survey they have been analyzed regarding the type and extent. The manipulation of the data was performed by the SmartPLS software. The lost data was not substantial (percentages lower than 10%, according to Hair et al., 2009), and to that extent, no variable is a candidate for elimination. Additionally, the Mardia's Pk test (Hair et al., 2009) proved to be significant, that is, the data does not meet a multivariate normal distribution.

Coming into statistical analyses, we started calculating both models: measurement model and

structural model. First of all, it was analyzed the measurement model that relates constructs with their variables. After the first round of the data treatment, it was necessary to exclude from the model one variable named In6 (External financial resources for innovation), because it was found out that its intern consistency was below .6 and classified as non satisfactory. Intern consistency is used to show the reliability of manifest or observable variables (Hair et al., 2014; Henseler et al., 2009). The second round of data treatment in smartPLS Software has shown factorial loads greater than .6 and it were considered adjusted for the model. Figure 2 show the values obtained from the measurement model.

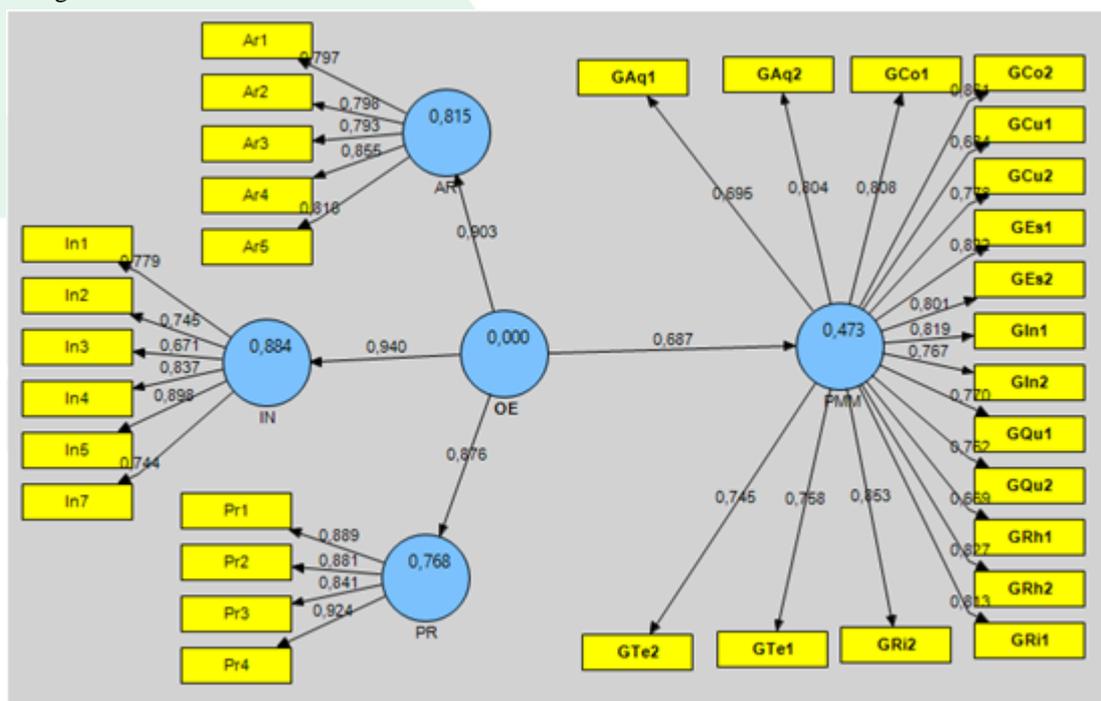


Figure 2 - SEM – measurement model of the study

Source: Research data extracted from SmartPLS 2.0.M3 (Ringle, Wende, & Will, 2005)

Regarding values from internal consistency showed in Figure 2, values of Average Variance Extracted (AVE) has evidenced satisfactory results greater than .5 (showed in Table 6), as recommended to indicate convergent validity (Henseler et al., 2009; Hair et al., 2014). According to these authors, AVE bigger than .5 shows that a latent variable (LV) is able to

explaining more than 50% of the variation of its variables or indicators (Henseler et al., 2009; Hair et al., 2014). Table 6 presents obtained values from the general adjust of the measurement model.

Table 6 is also showing adequate values for composite reliability which is the internal consistency measure of manifest variables and the degree in which

they measure the respective latent variables (Götz, Liehr-Gobbers, & Krafft, 2010). For that, all values found were over .7, as recommended by Hair et al. (2014). Another important measure is the Cronbach's alpha of the constructs. Cronbach's alpha show how a

set of manifest variables can measure a latent variable VL (Chin, 2010). According to the adjusted data showed in Table 6, all of Cronbach's alpha results are over than .7, as expected by Hair et al. (2014) and Cronbach and Meehl (1955).

Table 6 - General structural model specification

	AVE	Composite Reliability	R Square	Cronbachs Alpha	Predictive Relevance (Q ²)	Effect Size test (f ²)
AR	.659365	.906285	.815396	.870683	.530237	.659272
IN	.611782	.903608	.884001	.87086	.529944	.611785
OE	.554941	.948895	---	.941869	.545431	.545431
PMM	.610842	.965662	.472609	.962105	.282188	.617352
PR	.782032	.934791	.767671	.906698	.59692	.782057
Referential values*	AVE>.50	CR>.70	R ² >.26	CA>.70	Q ² >0	f ² >.35

Source: Research data extracted from SmartPLS 2.0.M3 (Ringle et al., 2005)

* For more details view Ringle et al. (2014) p. 72.

In addition to that, it was evaluated the Discriminant Validity in order to indicate whether constructs or latent variables are independent from others (Fornell & Larcker, 1981; Tenenhaus et al., 2005; Chin, 2010; Götz et al., 2010; Hair et al., 2014; Ringle, Silva, & Bido, 2014). Two tests were suggested (Fornell & Larcker, 1981; Tenenhaus et al., 2005; Chin, 2010; Götz et al., 2010): the first one showed factorial loads of the observable variables bigger in its respective construct or latent variable, instead of the factorial loads related to any other latent variable of the model through the cross loadings criterion; the second test verified whether the AVE square of each construct or latent variable is higher than the all correlations of remaining constructs. This last test, specifically, did not present satisfactory results.

Through the results obtained for the measurement model using SmartPLS software - analyzing the internal consistency, the composite reliability, the convergent validity, and the discriminant validity - we suggest that the structural model presents adequate adjustments (Fornell & Larcker, 1981; Tenenhaus et al., 2005; Henseler et al., 2009; Chin, 2010; Götz et al., 2010; Hair et al., 2014; Ringle et al., 2014).

In order to validate the structural model of the equation model using the smartPLS, five kinds of tests were assessed. In Table 6, it is possible to see the coefficients of Person's determination test (R²) which shows the variance percentage of the dependent latent variable that is explained by the independent latent variable. In this test, all of latent variables presented R² over .26, classified by Cohen (1988) as enough.

Another test that was performed was the Effect Size test (f²), showed in Table 6. It evaluates how useful each construct is to adjust the model (Cohen, 1988). In the same breath, the Predictive Relevance (Q²) evaluates the accuracy of the adjusted model with values over zero, as recommended by Henseler et al. (2009) and Hair et al. (2014). These two tests show that the constructs and their variables compose an adjusted and adequate model.

After this analysis, the Goodness-Of-Fit (GoF) value was calculated in order to test the global quality and validity of the model. This result show us .71 (higher than .36), indicating that the model has satisfactory quality and validity (Wetzels et al., 2009).

Last but not least, this study applied the Student t-test (Götz et al., 2010; Hair et al., 2014), which has the goal of evaluating the relationship between the main constructs of the conceptual model, in this case OE and PMM. According to Figure 3, the results present a value of 10.39 (p-value < .001), that gives evidence of the high significance of the causal relation between the cited constructs. Likewise, this value validates the Hypothesis H01 that **the entrepreneurial orientation of software organizations presents positive relation with project management maturity**. Moreover, it evidences that 47.3% of all effects on project management maturity are explained by entrepreneurial orientation variables. According to Hair et al. (2014), values over 1.96 indicates that the model, and its relations, has significance and can be analyzed. In addition of that, it can indicate a strong causal relationship between constructs. Figure 3 is showing the final structural model of this study.

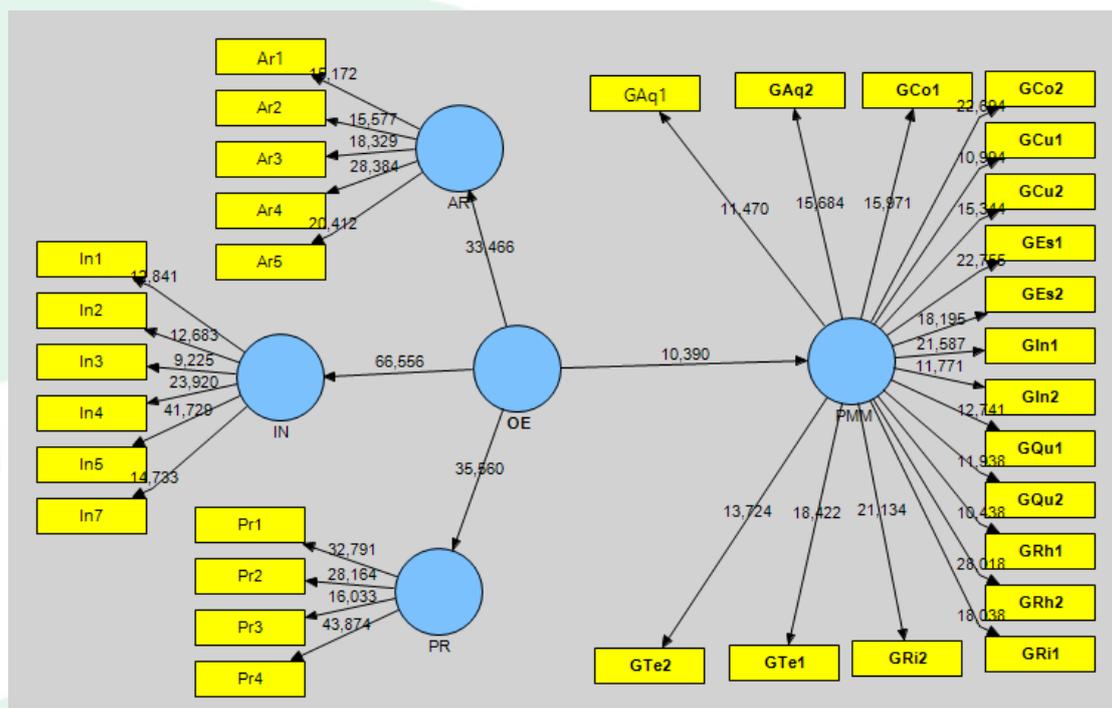


Figure 3 - SEM – structural model of the study

Source: Research data extracted from SmartPLS 2.0.M3 (Ringle et al., 2005)

5 DISCUSSION

Entrepreneurship and project management have proven to be important elements in the management of organizations in the current competitive environment. The relation between both topics has been discussed in the literature of initial form, however it is seen as a promising field for the development of studies (Semolic, & Kovac, 2008; Kuura et al., 2014; Lundin et al., 2015).

This study shows empirical evidences of the existence of the positive relationship and significant between entrepreneurial orientation and project management maturity. This relationship is explained by two test that confirm the Hypothesis 01: the first one, the high significance of the causal relation between the constructs given by the T Student test (10.390), that is bigger than 1.96 (Hair et al., 2014); the second one, the test of Coefficient of Pearson (R^2) or explained variance, which shows that 47.3% of the effects on the dependent variable (project management maturity) are explained by the independent variable (entrepreneurial orientation) (Cohen, 1988).

The relationship between entrepreneurial orientation and project management maturity can also be corroborated by the value of the GoF - *Goodness of Fit* Indicator (Tenenhaus et al., 2005), calculated from the Pearson Determination (R^2) and AVE, unlike that the result shows 71% of quality and validity of the model evidencing a good fit of the structural model.

The results of this study indicate that project management maturity can be increased through the development of entrepreneurial orientation in the organizations of the searched sample. That is, the time that the firms have incorporated entrepreneurial orientation, the practices of project management tend to be increased. The firms of software studied have a level of entrepreneurial orientation, showing presence of innovativeness, risk-taking and proactiveness in the organizational context.

Referring to innovativeness, the ‘Experimentation and solving problems’ is the indicator highlighted. ‘Process Innovation is also presented with evidence, and in general, it makes sense when we consider firms that handle with services. In addition, ‘Making Changes in products and services’ appears with a bit less intensity. These three indicators of innovativeness portray the focus of companies as the innovation in process, product and services, and the search for solving problems. The innovativeness presence suggests the search for the best practices in project management, since the competence in project management enhances the process of innovation (Gordon & Tarafdar, 2007). The support of new ideas or creative processes that result in new products or services can characterize the support of the development of project management. Meredith and Mantel Jr. (2008) state that the project-based structure is related to development of new products, processes or services, and the rapid technological expansion. These ideas are corroborated by Rabechini Jr., Carvalho and

Laurindo (2002), who argue that skills in projects are paramount to firms that search for competitive advantage from innovation.

Risk-taking remains more evident with the presence of the indicators of 'Risk measurement' and 'Audacious attitudes'. The tendency to take risks in an organization can be decisive in the project selection process (Kerzner, 2004). The author claims that the attitude of the organization then influences the quality of the selected projects. In this sense, it is suggested that the propensity of the risk of the organization can influence the selection and quality of projects and that the trend to act in daring ways can offer on the development of projects skills. In turn, the risks assumption can demand processes that contribute to the identification, analysis, monitoring and control of project risks, looking at what is proposed by PMI (2013).

Proactiveness, in turn, is highlighted in the indicator 'Anticipation of competitors'. The project manager is supposed to be daring enough to find the best solution to the problems of the enterprise (Rabechini Jr., 2005). Proactive thinking is expected from an outstanding project manager (Kerzner, 2004). In this way, it is suggested that the firm that searches for opportunities and anticipation for changes tends to encourage the development of a proactive behavior of managers and project team members, including the search for the best practices in project management.

In conclusion, the entrepreneurial orientation characterized by innovativeness, risk-taking and proactiveness permeating the actions and decisions of managers on the strategic level, exert a positive impact on the project management maturity, which is characterized by integration management, scope management, time management, cost management, quality management, human resources management, communications management, risk management and procurement management.

6 FINAL CONSIDERATIONS

This study contributes to the discussion on entrepreneurship and project management jointly, more specifically the relationship between entrepreneurial orientation and project management maturity in software firms. Such relationship has been tested and confirmed in the investigated sample. This outcome confirms the hypothesis of the study and responds to the research question. Thus, it is suggested that, for the software firms surveyed which in general operating in areas of software development, consulting and TI services, the project management maturity is positively affected by the entrepreneurial orientation.

This study contributes to the theory and the practice managerial. In academic terms, it collaborates to seal literature gap to combine entrepreneurship and project management. Supporting the hypothesis of the

study and legitimizing the model may be of assistance with theoretical discussions involving project management maturity and entrepreneurial orientation, providing subsidies for new studies to be carried out and delve further into the thematic.

To the organizational practice, the study results may have an impact on decision-making and management of software organizations. The study provides executives and managers with a general view that the entrepreneurial orientation, featured by innovativeness, risk-taking and proactiveness behaviors, exerts beneficial impact on the project management maturity. It hints that organizations working with projects can consider entrepreneurial orientation as an important element which, in turn, might contribute to the better management of projects.

From the hypothesis that the entrepreneurial orientation can affect the project management maturity in the range of software organizations, the decision-making process is likely to acknowledge and encourage elements of the entrepreneurial orientation, as a step to seek excellence and success in projects. Soon, the furtherance of innovation, risk-taking and proactiveness, under these circumstances may lead to more well-managed projects in terms of integration, scope, time, cost, quality, human resources, communications, risk and procurement. In turn, it would also represent a contribution to business practice in the project management range.

The study present limitations when looking at the non-parametric sample used. This characteristic does not allow the results to be generalized. It is also worth mentioning the absence of studies approaching the nature of construct project management maturity as reflective or formative. The definition of the construct as reflective was made from the analysis of the literature. As of this finding, studies for the discussion of this topic are suggested to be conducted in order to ripen the related concepts.

Further empirical studies which aim to analyze relationships between constructs in different sectors and organizational contexts are recommended to be carried out as well. Therefore, the contribution of the study could be extended to the management of organizations in general. New studies with this conjoint approach can contribute to the development of knowledge in project management, as well as for entrepreneurship field.

REFERENCES

- ABES, Associação Brasileira de Empresas de Software (2012a). *Brazilian Software Market: scenario and trends, 2012*. São Paulo: ABES. Retrieved 01 Jul 2015 from http://central.abessoftware.com.br/Content/UploadedFiles/Arquivos/2012_Publicacao_Mercado_ABES.pdf.
- ABES, Associação Brasileira de Empresas de Software (2012b). *Associados*. Retrieved 13 Jun 2012 from <http://www.abessoftware.com.br/associados/socios>.
- ABES, Associação Brasileira de Empresas de Software. (2015). *Brazilian Software Market: scenario and trends, 2015*. Retrieved 01 Jul 2015 from <http://central.abessoftware.com.br/Content/UploadedFiles/Arquivos/Dados%202011/ABES-EstudoMercadoBrasileirodeSoftware-2015-Resumida-Port-Jun-2015.pdf>.
- Ajam, M. (2011). Entrepreneurship & Project Management - The Missing Link. Retrieved 17 Jul 2015 from <http://www.scribd.com/doc/51369423/Entrepreneurship-Project-Management-The-Missing-Link>.
- Andersen, E. S., & Jessen, S. A. (2003). Project maturity in organizations. *International Journal of Project Management*, 21(6), 457-461.
- Basso, O., Fayolle, A., & Bouchard, V. (2009). L'orientation entrepreneuriale : Histoire de la formation d'un concept. *Revue Française de Gestion*, 195, 175-192.
- Brei, V. A., & Liberali Neto, G. (2006). O uso da técnica de modelagem em equações estruturais na área de marketing: um estudo comparativo entre publicações no Brasil e no exterior. *Revista de Administração Contemporânea*, 10(4), 131-151.
- Byrne, B. M. (2010). *Structural equation modeling with AMOS: basic concepts, applications, and programming*. 2 ed. New York: Routledge.
- Carneiro, K. D. A., Martens, C. D. P. (2012). Proposição de um modelo teórico para análise da relação entre maturidade em gerenciamento de projetos e orientação empreendedora. In: SGIT. Simpósio de Gestão da Inovação Tecnológica, 2012, Salvador - BA. *Anais...* Rio de Janeiro: ANPAD, 2012.
- Carvalho, M. M. D., Laurindo, F. J. B., & Pessoa, M. S. D. P. (2003). Information technology project management to achieve efficiency in Brazilian companies. In: Kamel, S. (Ed.). *Managing globally with information technology*. 2003. Hershey: IRM Press, 260-271.
- Carvalho, M. M., & Rabechini Jr., R. (2005). *Construindo competências para gerenciar projetos*. 2 ed. São Paulo: Atlas.
- Carvalho, M. M., Rabechini Jr., R., Pessoa, M. S. D. P., & Laurindo, F. J. B. (2005). Equivalência e completudeza: análise de dois modelos de maturidade em gestão de projetos. *Revista de Administração*, 40(3), 289-300.
- Chen, M. J., & Hambrick, D. C. (1995). Speed, stealth, and selective attack: how small firms differ from large firms in competitive behaviour. *The Academy of Management Journal*, 38(2), 453-482.
- Chin, W.W. (2010). How to Write Up and Report PLS Analyses. In: Vinzi, V.E., Chin, W.W., Henseler, J., Wang, H. (Eds). *Handbook of Partial Least Squares*, pp.655-690. Berlin: Heidelberg.
- Cleland, D. I., & Ireland, L. R. (2007). *Gerenciamento de projetos*. 2 ed. Rio de Janeiro: Editora LAB.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. 2 ed. New York: Psychology Press.
- Covin, J. G., & Lumpkin, G. T. (2011). Entrepreneurial orientation theory and research: reflections on a needed construct. *Entrepreneurship Theory and Practice*, 35(5), 855-872.
- Covin, J. G., & Slevin, D. P. (1991). A conceptual model of entrepreneurship as firm behavior. *Entrepreneurship Theory and Practice*, 16(1), 7-25.
- Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal*, 10(1), 75-87.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct Validity in Psychological Tests. *Psychological Bulletin*, 52, 281-302.
- Dess, G. G., & Lumpkin, G. T. (2005). The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship. *Academy of Management Executive*, 19(1), 147-156.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.G. (2009). Statistical Power Analyses Using G*Power 3.1: Tests for Correlation and Regression Analyses. *Behavior Research Methods*, 41(4), 1149-1160.

- Fernandes, D. V. D. H., & Santos, C. P. (2008). Orientação Empreendedora: um estudo sobre as consequências do empreendedorismo nas organizações. *RAE-eletrônica*, 7(1), Art. 6.
- Fincher, A., & Levin, G. (1997). *Project management maturity model*. Chicago: Project Management Institute.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
- Freitas, H. M. R., Martens, C. D. P., Boissin, J. P., & Behr, A. (2012). Elementos para guiar ações visando à orientação empreendedora em organizações de software. *Revista de Administração*, São Paulo, 47(2), 163-179.
- Gareis, R., & Huemann, M. (2007). Maturity models for the project-oriented company. In: Turner, J.R. (Ed.). *Gower handbook of project management*. 4 ed. Gower publishing limited, pp. 183-208.
- George, B. A., & Marino, L. (2011). The epistemology of entrepreneurial orientation: conceptual formation, modeling, and operationalization. *Entrepreneurship Theory and Practice*, 35(5), 989-1024.
- Gordon, S. R., & Tarafdar, M. (2007). How do a company's information technology competences influence its ability to innovate? *Journal of Enterprise Information Management*, 20(3), 271-290.
- Götz, O., Liehr-Gobbers, K., & Krafft, M. (2010). Evaluation of Structural Equation Models Using the Partial Least Squares (PLS) Approach. In: Vinzi, V.E., Chin, W.W., Henseler, J., Wang, H. (Eds). *Handbook of Partial Least Squares*. pp. 691-711. Springer. Berlin: Heidelberg.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Análise multivariada de dados*. 6 ed. Porto Alegre: Bookman.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Thousand Oaks: Sage.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, 20, 277-319.
- Hobday, M. (2000). The project-based organization: an ideal form for managing complex products and systems? *Research Policy*, 29(7-8), 871-893.
- Julio, L. R.; Piscopo, M. R. (2013). Maturidade em Gestão de Projetos e Empreendedorismo Estratégico em Empresas do Setor Financeiro. *Revista Gestão & Tecnologia*, 13(3), 178-208.
- Kerzner, H. (2009). *Project management: a systems approach to planning, scheduling and controlling*. 10 ed. New Jersey: John Wiley & Sons.
- _____. (2004). *Gestão de projetos: as melhores práticas*. 2 ed. São Paulo: Bookman.
- Kuura, A. (2010). A policy for development of project management. *Discussions on Estonian Economic Policy*, XVIII, 139-155.
- Kuura, A., Blackburn, R. A., Lundin, R. A. (2014). Entrepreneurship and projects – Linking segregated communities. *Scandinavian Journal of Management*, 30, 2014-230.
- Lee, S. M., & Peterson, S. J. (2000). Culture, entrepreneurial orientation, and global competitiveness. *Journal of World Business*, 35(4), 401-416.
- Lumpkin, G. T., Coglisier, C. C., & Schneider, D. R. (2009). Understanding and measuring autonomy: an entrepreneurial orientation perspective. *Entrepreneurship Theory and Practice*, 33(1), 47-69.
- Lumpkin, G. T., & Dess, G. G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance the moderating role of environment and industry life cycle. *Journal of Business Venturing*, 16(5), 429-451.
- Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *The Academy of Management Review*, 21(1), 135-172.
- Lundin, R. A., Arvidsson, N., Brady, T., Ekstedt, E., Midler, C., & Sydow, J. (2015). *Managing and Working in Project Society*. Cambridge: Cambridge University Press.
- Martens, C. D. P., Freitas, H. M. R., & Boissin, J. (2010). Proatividade em empresas de software empreendedoras: a voz dos executivos. *Gestão.Org*, 8(3), p. 327-354.
- Martens, C. D. P., Freitas, H. M. R., Boissin, J. P. (2011a). Risk-taking in software companies: a

- sector case study in Rio Grande do Sul. *Revista de Administração*, 46(3), 213-227.
- Martens, C. D. P., Freitas, H. M. R., Boissin, J., & Behr, A. (2011b). Elementos da inovatividade no setor de *software*: estudo exploratório em organizações empreendedoras do Rio Grande do Sul. *RAI: Revista de Administração e Inovação*, 8(1), p. 248-279.
- Mello, S. C. B., Júnior, F. G. P., Neto, A. F. S., & Lubi, L. H. O. (2006). Orientação empreendedora e competências de marketing no desempenho organizacional: um estudo em empresas de base tecnológica. *Organizações & Sociedade*, 13(36), 185-202.
- Meredith, J. R., & Mantel Jr., S. J. (2008). *Project management: a managerial approach*. 7 ed. ed. New York: John Wiley & Sons.
- Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science*, 29(7), 770-791.
- _____. (2011). Miller (1983) revisited: a reflection on EO research and some suggestions for the future. *Entrepreneurship Theory and Practice*, 35(5), 873-894.
- Miller, D., & Friesen, P. H. (1978). Archetypes of strategy formulation. *Management Science*, 24(9), 921-934.
- Miller, D., & Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic management journal*, 3(1), 1-25.
- Moraes, R. D. O., & Kruglianskas, I. (2010). Projetos de TI: maturidade x desempenho. *Revista de Administração e Inovação*, 7(2), 22-33.
- Moraes, R. D. O., Laurindo, F. J. B. (2008). Multidimensionalidade da maturidade em gestão de projetos de sistemas de informação. *Produto & Produção*, 9(2), 3-20.
- Paulk, M. C., Weber, C. V., & Chrissis, M. B. (1995). *The Capability Maturity Model: guidelines for improving the software process*. Massachusetts: Addison-Wesley.
- PMI, Project Management Institute. (2003). *Organizational project management maturity model (OPM3®)*. U.S.A.: PMI.
- _____. (2009). *A guide to the Project Management body of knowledge (PMBOK Guide) 5 ed.* Philadelphia: PMI.
- _____. (2013). *A guide to the Project Management body of knowledge (PMBOK Guide) 5 ed.* Philadelphia: PMI.
- Rabechini Jr., R. (2005). *O gerente de projetos na empresa*. São Paulo: Altas.
- Rabechini Jr., R., Carvalho, M. M. D., & Laurindo, F. J. B. (2002). Fatores críticos para implementação de gerenciamento por projetos: o caso de uma organização de pesquisa. *Revista Produção*, 12(2), 28-41.
- Rauch, A., Wiklund, J., Lumpkin, G. T., & Frese, M. (2009). Entrepreneurial orientation and business performance: an assessment of past research and suggestions for the future. *Entrepreneurship Theory and Practice*, 33(3), 761-787.
- Ringle, C. M., Silva, D., & Bido, D. (2014). Structural Equation Modeling with the Smartpls. *REMark - Brazilian Journal of Marketing*, 13(2), 56-73.
- Ringle, C. M., Wende, S., & Will, A. (2005). *SmartPLS 2*. Hamburg: SmartPLS. Retrieved 01 Jun 2015 from <<http://www.smartpls.com>>.
- Roselino, J. E. (2007). *Software – Relatório Preliminar Setorial. FINEP – Rede DPP 2007*. Available from: <http://www.finep.gov.br/PortalDPP/relatorio_setorial/impressao_relatorio.asp?lst_setor=17>. (accessed 20.01.08).
- Russo, R. D. F. S. M., & Sbragia, R. (2007). Tendência empreendedora do gerente: uma análise de sua relevância para o sucesso de projetos inovadores. *Gestão & Produção*, 14(3), 581-593.
- Semolic, B., & Kovac, J. (2008). Project management in connection to entrepreneurship and network organizations. In: Cleland, D., Ireland, L. (Eds.). *Project manager's handbook: applying best practices across global industries*. McGraw-Hill Professional, pp. 407-426.
- Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *The Academy of Management Review*, 25(1), 217-226.
- Shenhar, A. J., & Dvir, D. (2007). *Reinventing project management: the diamond approach to successful growth and innovation*. Harvard Business Press.
- Skulmoski, G. J. (2001). Project maturity and competence interface. *Cost Engineering*, 43(6), 11-18.

- Söderlund, J. (2005). Developing project competence: empirical regularities in competitive project operations. *International Journal of Innovation Management*, 9(4), 451-480.
- Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005). PLS path modeling. *Computacional Statistics & Data Analysis*, 48, 159-205.
- Thieme, R. J., Song, X. M., & Shin, G. C. (2003). Project management characteristics and new product survival. *Journal of Product Innovation Management*, 20(2), 104-119.
- Venkatraman, N. (1989). Strategic orientation of business enterprises: the construct, dimensionality, and measurement. *Management Science*, 35(8), 942-963.
- Wales, W., Monsen, E., & McKelvie, A. (2011). The organizational pervasiveness of entrepreneurial orientation. *Entrepreneurship Theory and Practice*, 35(5), 895-923.
- Wetzels, M., Odekerken-Schöder, G., & Oppen, C. et al. (2009). Using PLS path modeling for assessing hierarchical construct models: guidelines and empirical illustration. *MIS Quarterly*, 33(1), 177-195.
- Wiklund, J. (1999). The sustainability of the entrepreneurial orientation-performance relationship. *Entrepreneurship: Theory & Practice*, 24(1), 37-48.
- Wiklund, J., & Shepherd, D. A. (2005). Entrepreneurial orientation and small business performance: a configurational approach. *Journal of Business Venturing*, 20(1), 71-91.
- Zahra, S.A. (1993). A conceptual model of entrepreneurship as firm behaviour: a critique and extension. *Entrepreneurship: Theory & Practice*, 17(4), 5-21.
- Zahra, S. A., & Covin, J.G. (1995). Contextual influences on the corporate entrepreneurship – performance relationship: a longitudinal analysis. *Journal of Business Venturing*, 10(1), 43-58.