Research Article

Entrepreneurial Orientation as support in solving the challenges of Agile Methods adoption: A case study in a Brazilian startup

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Abstract

Study objective: empirically evaluate how the dimensions of Entrepreneurial Orientation (EO) can help solve the challenges of Agile Method adoption (AM). **Methodology/approach**: single case study in a software startup. **Key findings**: confirmation of challenges in adopting AM across three dimensions (people, processes, and management and organization) in the studied startup, and identification of which dimensions of EO contribute most to solving these challenges. **Relevance/originality**: although EO and its dimensions are recognized by the interviewees as potential actions to solve the challenges of AM adoption, they are not encouraged when the team is allocated at the client's site due to cultural influence. This research is relevant as it aims to help understand these challenges and suggest ways to overcome them. **Theoretical/methodological contributions**: as an academic contribution, this study advances research on the adoption of AM and EO, as well as the relationship between these topics. **Social/management contributions**: understanding the inherent challenges in adopting and using AM and promoting actions that can assist in solving these challenges through the utilization of EO concepts.

Keywords: Agile Methods. Entrepreneurial Orientation. Startup.

Orientação Empreendedora como apoio na solução dos desafios da adoção de Métodos Ágeis: Um estudo de caso em startup brasileira

Resumo

Objetivo do estudo: avaliar empiricamente como as dimensões da Orientação Empreendedora (OE) podem auxiliar na solução dos desafios da adoção de Métodos Ágeis (MA). **Metodologia/abordagem**: estudo de caso único em uma startup de software. **Principais resultados**: confirmação da existência de desafios para a adoção dos MA em três dimensões (pessoas, processos, e gestão e organização), na startup foco do estudo, e de quais dimensões da OE mais contribuem para a solução desses desafios. **Relevância/originalidade**: embora a OE e suas dimensões sejam reconhecidas pelos entrevistados como possíveis ações para solucionar os desafios para a adoção de MA, elas não são incentivadas quando o time é alocado no cliente, por influência cultural. A pesquisa é relevante, pois tem a finalidade de ajudar a compreender tais desafios e de sugerir formas para os resolver. **Contribuições teórico/metodológicas**: como contribuição acadêmica, este estudo avançou nas pesquisas sobre a adoção de MA e a OE, bem como acerca da relação entre os tópicos. **Contribuições sociais/para a gestão**: entendimento dos desafios inerentes à adoção e à utilização dos MA, e incentivo de ações capazes de auxiliar na solução desses desafios, a partir da utilização dos conceitos de OE.

Palavras-chave: Métodos Ágeis. Orientação Empreendedora. *Startup*.

INTRODUCTION

Agile Methods (AM) can be defined as a set of methods based on iterative and incremental development, which promotes adaptive planning, evolutionary construction, and delivery, while encouraging a quick and flexible response to change (Beck et al., 2001; Silva et al., 2020).

The movement that created the Agile Manifesto - the foundation for all AM frameworks - recognized the need for organizations to deal with volatile management environments (Beck et al., 2001).

Since then, AM has become popular among companies aiming to create high-quality products in less time (Serrador & Pinto, 2015) and stands out in project management because it requires more speed (Söderlund & Geraldi, 2012), a focus on open communication, and intense interaction and collaboration with customers (Li et al., 2011). Prioritization, simplified development processes, increased predictability, and accelerated product delivery are, therefore, some of the motivations for adopting AM (Beck et al., 2001).

Agile Methods (AM) reflect the organizational culture; therefore, while the opportunities and benefits of AM are appealing, organizations must exercise caution in their adoption or integration into existing practices, evaluating whether they are ready to deal with the provided agility (Nerur et al., 2005). Such agility requires support from top management due to the level of entrepreneurship and the risks involved in achieving flexibility, adaptability, and empowerment of the project team - factors necessary to meet the demands of AM's change requests (Sheffield & Lemétayer, 2013).

Challenges related to organizational cultural issues continue to be the primary impediment to the adoption and scaling of AM (Version One, 2020). These challenges are not inherent characteristics but rather barriers, primarily caused by their people-centric nature (Gandomani & Nafchi, 2016).

In the context of entrepreneurship, agility is associated with creativity, initiative, and the ability to set and achieve goals, helping to gain a competitive advantage (Ragin-Skorecka, 2016). At the organizational level, entrepreneurship conceptualized as Entrepreneurial Orientation (EO) can contribute to the adoption of AM (Garcia, Martens et al., 2021; Garcia et al., 2022; Kaufmann et al., 2020).

In this sense, EO can be understood as the mindset of key decision-makers within an organization, which can characterize it as a culture of entrepreneurial decision-making. Among the subjects studied in the fields of entrepreneurship and management, EO emerges as one of the most relevant and crucial topics in the organizational context (Frare et al., 2021).

According to Garcia, Martens et al. (2021), there is evidence in the literature that there are common characteristics between AM and EO, with EO favoring the incorporation of agile practices - the foundation of agile project management.

In the literature, the application of AM is primarily focused on small, medium, and large established companies, resulting in few studies involving software development startups (Souza et al., 2019).

According to Paternoster et al. (2014), the term startup still lacks a single, universally accepted definition within the scientific community, but it is not related to the size or age of the company. However, there is consensus regarding the encouragement of an environment for the development of new products and/or services (Noronha et al., 2022). This study adopts the concept that describes startups as evolving companies with development and processes focused on product and service innovation.

Software startups are characterized by various challenges, highly uncertain conditions, lack of resources, and operating in rapidly growing markets (Paternoster et al., 2014). Similar to AM, software startups aim for rapid product delivery to their customers (Kalyanasundaram, 2018). Therefore, AM holds value in providing startups with improved software development practices (Souza et al., 2019).

In recent years, startups have attracted increasing attention, both from entrepreneurs seeking to capture new business opportunities and from large companies aiming for rapid growth to become more agile (Silva et al., 2020).

Despite entrepreneurship being one of the central topics addressed in research on startups (Noronha et al., 2022), studies that focus on supporting the activities of these companies, particularly in providing guidance to professionals in decision-making to avoid choices that could lead to business failure, are still scarce (Paternoster et al., 2014).

There is a growing emergence of startups involved in software development, and limited studies have linked the failure of these businesses to product creation flaws, without investigating the factors that affect the selection or adoption of AM, as these ventures often lack the use of appropriate methodology (Mkpojiogu et al., 2019; Silva et al., 2020). In this regard, it is worth noting that, according to Silva et al. (2020), the majority of research on AM published recently is descriptive, with few case studies and rare empirical applications.

To empirically evaluate how dimensions of Entrepreneurial Orientation can assist in addressing the challenges of Agile Methods adoption, this study begins with the following question: How can the challenges of Agile Methods adoption be solved with the dimensions of Entrepreneurial Orientation?

To answer the research question and achieve the proposed objective, a single case study was conducted in a software startup. The study proposes that the dimensions of EO can assist in addressing the challenges of AM adoption.

LITERATURE REVIEW

Challenges of Agile Methods (AM)

The adoption of AM in an organization is a growing challenge, as agility, despite being a difficult concept to define, should be based on the values and principles stated in the Agile Manifesto (Gregory et al., 201). Even when following such a manifesto, AM is not a one-size-fits-all approach, with differences mainly in team size, duration of each cycle, emphasis on activities, and feedback for change (Nerur et al., 2005).

There is a multitude of frameworks and agile practices to adopt or adapt, with some deserving special mention. Scrum, one of the main ones, is composed of feedback loops where development is done by a self-organizing team for incremental deliveries, initiated by planning and concluded with reviews (Schwaber & Sutherland, 2011).

ScrumBan, on the other hand, is a hybrid methodology (combining Scrum and Kanban) that allows teams to utilize waste elimination concepts from Kanban and adapt to the requirements and interests of stakeholders, similar to Scrum (Ladas, 2009).

Kanban is a part of the Toyota Production System's Just-In-Time (JIT) system from the 1950s, aiming to do only what is necessary, when necessary, and in the necessary quantity (Sugimori et al., 2007).

In Lean Startup, which aims to assist innovation-oriented entrepreneurs through the development and launch of new products in the market, the riskiest parts are identified, and a minimum viable product (MVP) is provided to be systematically tested, planning modifications for the next iteration (Ries, 2008; 2011).

Finally, there is Xtreme Programming (XP), a development methodology widely used in startups due to its reduced process costs and low documentation requirements (Paternoster et al., 2014).

Organizational cultures that are conducive to innovation can adopt AM more easily than those mediated by bureaucracy and formalization (Nerur et al., 2005). Just like in large companies, the process of adopting AM in startups depends on the organizational environment, given the necessary adaptation to integrate AM into existing processes (Mkpojiogu et al., 2019). To assist startups in the challenge of managing innovation and validating the business model, certain AM are more suitable, such as Lean Startup (Silva et al., 2020).

Startups require flexibility in the application of methodologies to accommodate frequent changes in the development environment. As a result, AM have been considered one of the most viable ways for these companies, as they embrace changes and employ a rapid, iterative, and incremental approach (Paternoster et al., 2014). Consequently, AM are becoming increasingly common in software startups due to their flexible, lightweight, and adaptive nature, with a strong focus on close collaboration with the customer throughout the development process (Bosch et al., 2013).

Regarding the contribution of AM to the success of organizations, the choice and adaptation of the appropriate methodology can be highlighted as support for management, mindset, alignment, training, and coaching (Dikert et al., 2016).

It is important to note that tools alone cannot make software development successful; therefore, it is necessary to train the human capital of the company to use them correctly (Nerur et al., 2005), as each individual (or role/function in the organization) has a specific impact on an agile project (Coram & Bohner, 2005).

Entrepreneurial Orientation (EO)

Understood as a general or enduring direction of entrepreneurial thinking, an inclination towards the interests of the firm (Covin & Lumpkin, 2011), and the application or practice of entrepreneurship in the organizational context (Garçon & Nassif, 2021; Martens et al., 2016), EO facilitates the discovery of new opportunities and the creation of competitive advantage (Carmona et al., 2020).

Considering that businesses with higher EO tend to be more successful than those with lower EO, authors affirm that this orientation can positively influence the performance of an organization (Covin & Lumpkin, 2011; Martens et al., 2018; Oblog et al., 2010; Rauch et al., 2009).

EO can be reflected in methods, practices, and management or decision-making styles, according to the entrepreneurial posture (Freitas et al., 2012). According to Lumpkin and Dess (1996), there are important factors to characterize and distinguish entrepreneurial processes, grouped into five dimensions of a firm's EO: autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness.

The "autonomy" dimension is characterized by the presence of a culture that promotes independent action and the pursuit of opportunities without social constraints (Freitas et al., 2012). Autonomous behavior has been the subject of research in small businesses, investigating leadership centralization and authority delegation (Martens & Freitas, 2008).

The "innovativeness" of an organization can be observed through the amount of financial resources invested in innovation activities and the level of human resources committed to them, the number of new products/services, and the frequency of change in product/service lines (Freitas et al., 2012).

Innovation is more common when there are strong market pressures (Martens & Freitas, 2008), which is an important characteristic for the use of AM in organizations. According to these authors, innovativeness manifests as an individual act to innovate (Martens & Freitas, 2008), but as employees engage at the team level, knowledge sharing can increase and enhance decision-making for new ideas and new knowledge (Covin et al., 2020).

"Risk-taking" can be considered a mediator between risk preferences and risk behavior as it affects the likelihood of a person behaving more or less riskily (Lumpkin & Dess, 1996). This dimension is associated with (a) the degree of risk reflected in various resource allocation decisions, denoting a criterion and/or a pattern for decision-making at the organizational level (Martens & Freitas, 2008), and (b) how willing the firm is to break away from what is tried and tested to venture into the unknown in pursuit of high returns, seizing market opportunities (Wiklund & Shepherd, 2005).

The dimension of "proactiveness" is related to the future perspective and the market leader's opportunity search, as it drives organizations to forecast and act in anticipation of future demand in order to seize opportunities (Rank et al., 2015).

For proactiveness to occur, the organization must allow and encourage employees to take action for value creation. Trust and commitment are no longer focused solely on the manager but rather on goals and objectives for improved performance (Covin et al., 2020). Management is crucial in this context, as an entrepreneurial manager seeks the organization's growth with vision and imagination to explore emerging opportunities (Martens & Freitas, 2008).

Lastly, "competitive aggressiveness" refers to a company's propensity to directly and intensely challenge its competitors to gain entry or ascend in the market (Lumpkin & Dess, 1996). Some evidence of competitive aggressiveness can be seen in managerial behavior by allocating resources to gain market positions more quickly than competitors (Martens & Freitas, 2008).

In the context of small businesses, performance improvement relies on an orientation toward innovation, the willingness to take risks, and the encouragement of employee proactivity (Wiklund & Shepherd, 2005).

Approximation between AM and the dimensions of the EO

The reviewed literature clearly identifies a significant relationship between the characteristics (values and principles) of AM and the dimensions of EO. Recent research has also provided evidence of a positive relationship (Garcia, Martens et al., 2021; Garcia et al., 2022; Garcia, Martens & Martens, 2021). Furthermore, companies with EO operate in contexts characterized by uncertainty and learning orientation (Covin & Wales, 2019), which are ideal for the use of MA.

Autonomy is positively related to the practices used in AM (Tripp et al., 2016), which encourage members of organizational teams to engage in activities that increase their level of autonomy (Tripp et al., 2016). In this regard, the way leaders facilitate team autonomy significantly impacts task completion (Maruping et al., 2009).

Several best practices associated with AM are linked to self-organization, shared leadership, and proactiveness (Salin, 2017). To overcome the challenges associated with implementing AM, active members need to have proactive profiles, future-focused attitudes, self-monitoring abilities, and enhanced self-awareness (Mustafa & Sönmezisik, 2020).

Proactive organizations monitor trends, identify future customer needs, and anticipate changes in demand or problems (Martens & Freitas, 2008). They exhibit flexibility, measured by a team's efforts to create something easily modifiable in case

of changing requirements (Conboy, 2002). Thus, even if change is not actually initiated, measures can be taken to anticipate it, minimizing its negative impact, and maximizing the potential for benefiting from it (Conboy & Fitzgerald, 2004).

In general, companies that use AM empower people, have a results-oriented approach, exhibit entrepreneurial and innovative leadership, and embrace risk-taking (Strode et al., 2009). Regarding business risks, practices for risk management are recommended for the Product Owner (PO), while the development team is responsible for managing technical risks (Tavares et al., 2019). In the context of startups, similar to risk-taking, there is uncertainty and resource commitment in launching a new product (Linton, 2019).

AM are used in complex adaptive systems, where individuals interact to create innovative outcomes (Highsmith & Cockburn, 2001). This interaction, within an innovative and entrepreneurial organizational culture, is manifested through the pursuit of opportunities, entrepreneurial leadership, the creation of collaborative cross-functional teams, and informal communication flows (Ghezzi & Cavallo, 2020). Additionally, as AM involve adaptive systems, flexibility, and quick response to changes in requirements are necessary conditions to sustain and enhance competitive advantage (Siakas et al., 2005).

Considering the interconnection between the topics, a review was conducted to shape the research questions and emphasize points for the case study. The review helped conceptualize the research and build a theoretical framework to support its development (Yazan, 2015) (Table 1). The relationship between the presented concepts and the proposition of this study is depicted in Figure 1.

Figure 1

Modelo conceitual do estudo
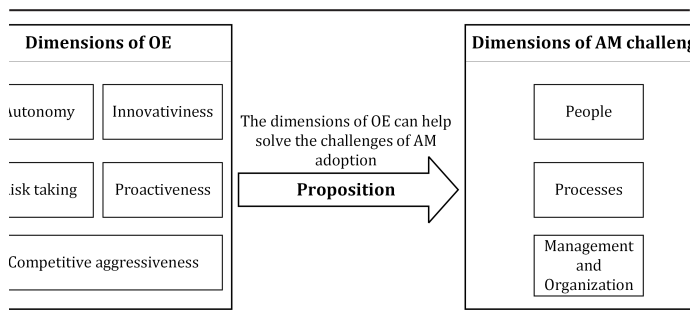
Note: Elaborated by the authors.

RESEARCH METHOD

This article employed an exploratory case study method (Yin, 2015) conducted in a software startup. A single case study can be used in the preliminary stages of developing a new theory when relevant variables are still being explored, especially when there are many situations where studying a particular aspect sheds light on valuable insights about a specific situation (Mariotto et al., 2014).

According to Miller (2011), the specificity of the context may limit generalization; however, as a positive aspect, it can generate more refined and empirically valid knowledge.

Table 1

Conceptual framework: EO dimensions and AM challenges

Dimensions	Concepts	Authors
Entrepreneurial Orientation		
Autonomy	Freedom to individuals and teams who can exercise ideas and creativity so entrepreneurship can occur. It can be an independent action, by an individual or team, aiming to advance a business concept or vision considering intrapreneurial teams or individuals.	
Innovativeness	Tendency to engage and support new ideas, experiments, and creative processes, which may result in new products, services, or processes.	Freitas et al. (2012); Lumpkin e Dess (1996).
Risk Taking	It can be considered as a mediator between risk preferences and risky behavior, affecting a person's likelihood of behaving in a more or less risky manner.	Lumpkin e Dess (1996).
Proactiveness	Opportunity seeking that involves introducing new products or services ahead of the competition, acting in advance to create change and shape the environment.	Lumpkin e Dess (2001).
Competitive Aggressiveness	Refers to a firm's propensity to directly and intensely challenge its competitors to gain entry or improve position, i.e., to outperform industry rivals in the marketplace.	Lumpkin e Dess (1996).
Challenges in adopting agile methods		
People	Teamwork; Competence and skills; Customer relationships; Transparency; Business knowledge; Social skills; Openness to changes; Collaboration; Communication.	Conboy et al. (2011); Coram e Bohner (2005); Gregory et al. (2016); Nerur et al. (2005).
Processes	Short, iterative, test-driven development that emphasizes adaptability; Managing large and scalable projects; Selection of the appropriate agile method; Technology (Tools and Techniques); Adequacy of existing technology and tools; Technical abilities; Understanding values and principles of agile, not just the practices; Appropriate selection of suitable projects agile methods; For many contracting companies, what must be done by contractors is determined by a statement of work that defines key requirements and tasks.	Coram e Bohner (2005); Dikert et al. (2016); Gregory et al. (2016); Nerur et al. (2005).
Management and Organization	Organizational culture; Management style; Software development knowledge management; Reward systems; The need for agile-compatible performance measurement; Lack of specific recruitment policies for agile; Appropriate training; Executive managers are focused on risks and opportunities	

Note: Elaborated by the authors.

Therefore, following the proposal by Merriam (1998), this study went through the following stages: literature review, construction of a theoretical framework, identification of a problem to be investigated, formulation of research questions, and selection of the sample (intentional).

The company focused on in this study is a Brazilian software startup with over 15 years of operation and 80 employees. Its selection was based on several aspects that aligned with the research objective, namely, a company with a present entrepreneurial culture and challenges in understanding the adoption of AM in project management.

According to Yazan (2015), a case study should focus on a specific situation, event, program, or phenomenon. Most recent studies do not focus on startups because these companies typically do not adopt AM (Mkpojiogu et al., 2019). Therefore, this study, by encompassing the adoption of AM and entrepreneurship in startups, can contribute to the expansion of the literature on the subject.

To assess different perceptions, from project management operations to top management direction, interviews were conducted with professionals from three areas of the company: two professionals from each role established in the agile scrum framework (scrum master - SM, product owner - PO, and development team), two human resources analysts, and the two owner partners (Table 2).

Table 2

Characterization of respondents

Function	Uptime (years)	Where she/he is allocated
PO	8	Consultancy
SM	10	Consultancy
Developer	2	Consultancy
PO	10	Client
SM	15	Client
Developer	7	Client
HR Analyst 1	5	Consultancy
HR Analyst 2	4	Consultancy
Partner 1	15	Consultancy
Partner 2	15	Consultancy

Note: SM = *Scrum master*. PO = *product owner.* Note: Elaborated by the authors.

In this research, data collection was conducted through semi-structured interviews, which were carried out in person at the location where the professionals work, either at the consultancy or at the client's site. This type of interview allows the researcher to follow a set of predefined questions in the context of an informal conversation, with the main advantage being the possibility of obtaining a better sample of the population of interest (Boni & Quaresma, 2005).

As a data collection tool in a case study, interviews should follow a script, considering the introduction of the interview, the interaction between the interviewer and the respondent, the recording, and the transcription process (Yazan, 2015).

To facilitate the flow of the interviews in this study, they were divided into three parts: (1) characterization of the interviewee; (2) presentation of the main challenges of AM and dimensions of EO; and (3) identification of the dimensions of the EO that the interviewees consider most important for addressing the challenges of AM in the company. The data were then subjected to content analysis (Bardin, 2004), a technique that considers the interviewer's perspective, the context, and the intended effects, aiming to derive interpretations from inferences.

All interviews were recorded with the permission of the interviewees, and the confidentiality of the obtained information was ensured. The "Dictate" tool in Microsoft Word was used for transcription, which listens to the recording and transcribes it into a document.

The analysis of the interviews was conducted by the researchers, based on the concepts presented for the challenges of AM and dimensions of EO. All transcriptions were analyzed in Microsoft Excel, with the separation and categorization of key excerpts that aligned with the concepts of AM challenges and EO dimensions, as found in the literature. These excerpts were organized in spreadsheets for the assessment of convergence of the collected information.

RESULTS ANALYSIS

The analysis of the results was divided into three parts, aiming to: (1) analyze the presence of AM challenges within the company, (2) examine the EO dimensions, and (3) explore the alignment of EO dimensions to understand their contribution to addressing AM challenges.

Agile methods (AM) challenges

In this section, the challenges of AM are presented within the selected dimensions for this study: people, processes, and management and organization.

People

The challenges of AM related to the "people" dimension (according to the Conceptual Framework - Table 1 and theoretical model - Figure 1) were pointed out by the interviewees working in agile teams of both project types (client-based and consultancy-based) and by the business owners. The HR analysts did not mention any challenges in this dimension, suggesting that leaders closer to project execution have a better understanding of the people-related challenges than these analysts.

"Competencies and skills" were identified as challenges by the PO and SM based at the client's site and one of the business owners, who believe that people, in general, lack maturity in terms of AM requirements.

The aspect of "collaboration" was mentioned as a challenge only by the SM based at the consultancy. According to this interviewee, despite being one of the principles of AM, the team members at the company still lack the appropriate profiles and do not work collaboratively with each other.

Finally, "communication" was considered a challenge by the developer based at the consultancy, but only when he was working at the client's site. The challenge ceased to exist after he relocated. Figure 2 presents some excerpts from the interviews that highlight the challenges related to people.

The items related to "openness to change" and "teamwork" were presented as positive aspects in the company. On the other hand, the items related to "teamwork," "customer relationship," "transparency," and "business knowledge" were not identified as major challenges by any of the interviewees.

In the comments, solutions were also suggested, such as behavioral training programs aimed at bridging the maturity gap for the proper adoption of AM. A starting point for implementing such training in the organization could be the study by Garcia, Martens, and Martens (2021), which lists the personal, interpersonal, and technical knowledge characteristics necessary to overcome the challenges of using and adopting AM by connecting with the dimensions of EO.

Among the employees, the behavior of not wanting to assume the roles required by agility was highlighted. Acquiring new skills and knowledge through engagement in something different from the usual can generate a commitment that was previously avoided. Empirically, when the organization promotes behaviors related to the "innovativeness" dimension, people tend to be more dedicated (Martens & Freitas, 2008). Therefore, a possible solution to this problem may lie within this dimension. People's openness to change aligns with practical elements in modifying product/service lines (Martens & Freitas, 2008).

Figure 2

Analysis of the challenges dimension of AM: People

Competences and skills

People, in general, are not prepared, but with training, it is possible to improve the profile (but it is linked to seniority). Here, there is technical developer training, but no behavioral training." (PO allocated to the customer)

There is a lack of maturity to make agile work. (SM allocated to the client)

Hiring does not have a high level of competence, as we have the profile of training professionals, due to the difficulty of hiring people who already have the right profile. (Owner partner 2)

Social skills and collaboration

There are many problems with the technical solution team and personal relationships. People assume new responsibilities with little collaboration, as there are many people who do not like to assume the profiles that agile methodologies need. (SM allocated within consultancy)

Communication

No client had problems with communication because it was person-centric. (Developer assigned to the consultancy)

Note: Elaborated by the authors.

Processes

The challenges of AM related to the "processes" dimension (Table 1) were identified by interviewees working in agile teams for both types of projects (client-based and consultancy-based) and one of the owners. Once again, none of the HR analysts identified this as an existing AM challenge in the company. This perception may have been influenced by the technical aspects that significantly impact the day-to-day work of project implementers.

"The need for understanding agile values and principles, not just practices" was mentioned by both POs from the teams, indicating a misalignment with both the client and the company itself regarding the requirements for proper AM adoption.

Both POs from the teams, the SM, and the developer working at the client site, mentioned the importance of appropriately selecting projects suitable for AM usage. According to the interviewees, there is a hybrid approach that combines traditional and AM but does not fully align with either.

Regarding the item "For many client companies, what should be executed by contractors is determined by a work statement that defines the main requirements and tasks," one of the owners mentioned it. He believes that the client is interested in working with AM but still does not feel comfortable doing so. Figure 3 presents excerpts from the interviews that highlight the challenges related to processes

The items "short, iterative, and test-driven development that emphasizes adaptability," "managing large and scalable projects," "technology (tools and techniques)," "fitting existing technology and tools," and "technical skills" were not mentioned as existing challenges in the company.

A more in-depth analysis of the interviewees' comments reveals that most of the challenges in this "processes" dimension are related to a lack of knowledge and experience in correctly using practices and frameworks. This finding is supported by research that links EO and AM, and possible solutions are addressed by

presenting how the convergence between these topics can be encouraged (Garcia, Martens et al., 2021; Garcia et al., 2022). These aspects also influence the appropriate selection of projects and the level of trust from client companies regarding the contractors' ability to deliver requirements.

Figure 3

Analysis of the challenges dimension of AM: Processes

Understanding the values and principles of agile, not just the practices

Not everyone has theoretical knowledge about the agile methodology and what is expected. We are not aware of the type of profile and expected behavior for this type of project. (PO allocated to the customer)

It doesn't have a definition, it's always adapting to the customer and doesn't strictly follow agile because it doesn't have experience. (PO allocated within the consultancy)

He had experience working with agile, but it didn't work out, because it turned into a cascade. People don't know how to work agile, because they don't know what they need to do or the roles and responsibilities. (SM allocated within consultancy)

Appropriate selection of suitable projects' agile methods

It doesn't work 100% agile because the client doesn't have the culture, but they try to be part of the team to plan the week's tasks. There's a lot of bureaucracy that makes adopting agile difficult. (PO allocated to the customer)

The client isn't ready for the methodology 100%, so it's cascaded down to the client and they work internally with an adaptation of agile for planning the week. (SM allocated to the client)

Formally we work traditionally for the client and internally with agile execution. The client still asks for a lot of documentation which can bureaucratize the delivery. So, one of the deliveries is the documentation. (Developer allocated to the client)

The methodology needs to mature on deliveries. You have to know that some deliveries don't fit in agile, so you should try to run a pilot project 100%, but we couldn't due to lack of time and priority in people's tasks. (PO allocated in the consultancy)

For many contracting companies, what must be done by contractors is determined by a statement of work that defines key requirements and tasks

The problem we encounter when we are selling is that the customer understands that it is a blank check. So, the client does not understand this form of methodology, it only works in companies with internal development. (Owner partner 1)

Note: Elaborated by the authors.

Among the highlighted positive aspects are: (a) the use of AM through "short, iterative, and test-driven development that emphasizes adaptability", and (b) "the existence of tools that support the technical skills of employees", aiming to meet market needs not only for the consultancy but also for its clients by adapting AM practices and frameworks. This is a trend in the current business environment, with reduced product life cycles and business models (Wiklund & Shepherd, 2005).

Following this line of reasoning, elements related to the "risk-taking" dimension of the EO can be identified, where a variety of actions are taken to achieve the company's objectives, and the "innovativeness" dimension, which involves engagement and support for new ideas, experiments, and creative processes (Martens & Freitas, 2008).

Management and Organization

The challenges of AM related to "management and organization" (Table 1) were pointed out by interviewees who work in agile teams for both types of projects (client-based and consultancy-based) and by HR analysts. The company's owners do not see this dimension as challenging in terms of using AM in project management. This perception makes sense because this dimension requires direct actions from top management, which further confirms the importance of interviewing employees at all levels of the company.

"The lack of specific recruitment policies for agile" was mentioned by the POs in both types of projects, the SM in the consultancy, and one of the HR analysts. This is due to the perception that professionals working with AM should have a distinct profile focused on behavioral aspects, not just technical skills.

"Recruitment" should therefore take this characteristic into account. The same applies to career development planning. For this purpose, there is a need for performance evaluation that aligns with AM, as suggested by the PO and SM in the consultancy and the HR analyst1.

"Reward systems" are recognized as a challenge by HR analyst1, and "adequate training" indicated by the PO in the consultancy is a way of sharing knowledge, considering the work experience with AM by some employees who can disseminate their knowledge to others through training.

"Organizational culture" was highlighted by HR analyst1 and the developer in the consultancy, given the understanding that there are divergences between the management styles of the company and its clients. In Figure 4, excerpts from the interviews are presented, illustrating these challenges.

The item "executive managers" was associated with risk and opportunity focus by the SM in the consultancy. This is because, although the executive management takes risks, the professionals executing the project do not have the same approach, which poses a challenge to working with AM.

"Adequate training" was indicated by HR analyst1 as a positive factor, as there is specific training for interns according to each individual's profile. Thus, it is believed that it is possible to correctly direct the professional to work in the company sector where they are likely to perform better and have greater learning opportunities.

"Management style" did not directly appear in the responses as a challenge; however, it was mentioned alongside other topics considered challenging, such as the case of "executive managers being focused on risks and opportunities".

Some of the aspects presented here were also mentioned in previous dimensions of challenges. This result can be related to a common characteristic in entrepreneurship in small companies, where the personality of the leader influences the company culture (Miller, 1983, 2011).

The challenges related to "people management" ("specific recruitment policies for agility", "performance evaluation compatible with agility", and "reward system and training") can be addressed by recognizing the personal, interpersonal, and technical knowledge required to perform agility roles ("business/products", "technical and leadership"), as well as "organizational and process practices" useful for project execution. With this, companies can incentivize the right needs and be more successful in adopting AM (Garcia, Martens et al., 2021).

Contributions of the EO dimensions in the adoption of AM

In this section, the contributions of EO are addressed in its dimensions: "autonomy", "innovativeness", "risk-taking", "proactiveness", and "competitive aggressiveness", aiming at the adoption of AM.

Autonomy

"Autonomy" appears in the responses of interviewees working in agile teams of both project types (client-based and consultancy-based), HR analysts, and company owners as a potential solution to the challenges of adopting AM.

Figura 4

Analysis of the AM challenges dimension: Management and Organization

Lack of agile-specific recruitment policies

There is still a formality because, until the moment you can be agile, some ends are tied in the traditional. Today there are few professionals in the market and that brings the challenge of training people. Finding them in the market, and training them. If I brought 5 guys who have the right level to run the project, we would be much faster. (PO allocated to the customer)

We have already had attempts at an agile methodology suggested by the client, but it was not possible to follow it because it was not able to carry out people management. (PO allocated within the consultancy)

Putting the right people to do the tasks according to the profile is difficult for HR. (PO allocated within the consultancy)

Regarding recruitment, the profiles are specified for the technical part and not for AM skills. It is very difficult to find suitable senior technical and soft skills profiles. (SM allocated within consultancy)

Recruitment policy is in the minds of managers and directors. An analysis of the profile is carried out with a technical bias, which is why sometimes it does not work correctly with the necessary profile. With interns, there is more time to evaluate the profile, so the selection works better for the profile for the type of project. (HR Analyst1HR Analyst1)

The need for agile-compatible benchmarking

Today there is no formal evaluation, it is pending that some people have the sensitivity to recognize the highlights. (PO allocated within the consultancy)

There is no career plan, but there should be so people know what is expected. Vacancy allocations are made according to the request of the area manager, often the company director defines, hires, and carries out the entire process. As well as all the follow-up of people. (HR Analyst1HR Analyst1

Reward systems

An evaluation plan and motivating goals are being started. (HR Analyst1)

There is a reward system that is not standardized, some goals are linked, but they are not monitored in the same way and with different periods. Next year will have a calendar to present the goals, evaluation, and closing, like corporate calendars. As a reward system, everyone will have a variable linked from that. (SM allocated within consultancy)

Adequate training

There's a new project manager who understands agile and we'd like him to give us a presentation. There is a search for maturity to know the 3 methodologies: scrum, traditional, and agile. (PO allocated within the consultancy)

Organizacional Culture

The methodology is adapted to the client, it is based more on the client's profile than on the company, which is why there are different perceptions between the teams allocated to the client and within the company. (HR Analyst1)

There was an outsourced company and everything we asked for that was a little out of line was stopped, because the client was very blocked and their culture had an impact. The way I work here at the company is more like agile, but in terms of methodologies we get stuck in the client. (Developer assigned to the consultancy)

Executive managers are focused on risks and opportunities

The governing body assumes risks as a management style, but the team fails to map the risks. Things are done, but without the proper mapping. (SM allocated within consultancy)

Note: Elaborated by the authors.

In general, the interviewees understand that autonomy can bring many benefits, such as the creation of new products or services and the expansion of knowledge. However, some consider maturity as a necessary condition for granting autonomy.

According to the developer's perception, not all managers encourage autonomy, and when they do, the encouragement does not last.

Another point raised is that the lack of encouragement from some managers can lead to dissatisfaction within the team, resulting in the departure of employees whose profiles were promising for working on projects that use AM.

In Figure 5, excerpts from interviews are highlighted, which provide evidence for the analyses presented here.

Therefore, it can be stated that all the points presented can be addressed through the dimension of EO, with empirical actions related to coordinating activities by measuring and monitoring the activities of autonomous work teams (Martens & Freitas, 2008).

Figure 5

Analysis of the EO dimension: Autonomy

Excerpts from interviews that address autonomy

I don't really believe in autonomy for someone just starting out. I like this surprise and I have examples here that are people who came and are exceptional, they manage to learn very quickly because they already have practice, they have knowledge of other fronts, and they added a lot. (PO allocated to the customer)

Now imagine if someone has an idea for a new application and the consultancy embraces the idea and this guy earns an amount from the sale of this product and becomes a partner in the product. This is a motivator. Google already has this concept that you, part-time in the week, dedicates yourself to your projects, and Google joins as a partner. Today we have the partners thinking about the future of the company, so imagine 55 consultants thinking. (SM allocated to the client)

There is a lack of incentive for employees to participate in events about new knowledge, we have some professionals out of the curve. The more mature professionals have this characteristic, but the company's profile is new people. (PO allocated within the consultancy)

Working within the consultancy is cool, I have more autonomy. I'm going to say what I think and they're listening to me. I think they encourage it, but not all managers. Here they expect to solve the problem. (Developer assigned to the consultancy)

There are profiles within the company that help with challenges. There is interest in provoking the entrepreneurial profile, but it doesn't happen until the end. It's a very collaborative company and people help each other a lot. It's a young company and they're always learning and that's encouraged. (HR Analyst1)

I can say that I have a lot of autonomy here today to manage a project in the way I think is right, reporting to my management, I think this issue of autonomy is what we have most here today, to be able to touch our projects. They trust our work a lot, give us freedom, are flexible, and complement us with some competence that we don't have. I consider myself an entrepreneur here because I have the autonomy to put my ideas into practice. (HR2 analyst)

Yes, it is encouraged, but we don't have people with the maturity to accept this responsibility. I consider this characteristic to be the most important to solve the challenges. (Owner partner 2)

Note: Elaborated by the authors.

Innovativeness

"Innovativeness" was highlighted by the interviewees who work in agile teams of both types of projects, as well as by HR analysts and business owners. Different perceptions are observed among team members in projects allocated to the client and those in the consultancy. For those in the consultancy, actions related to innovativeness are being encouraged, considering the selection of suitable profiles for such initiatives, as well as rewards. However, for professionals allocated to the client, the perception is not the same, meaning that there is no encouragement for innovation. The organizational culture of the project's execution location may explain this fact. Despite the encouragement of innovativeness, according to both business owners, caution must be exercised due to the company's size.

This result, obtained from the evidence (Figure 6) in the interviewees' responses, can indeed be explained by the cultural differences between industries (Lomberg et al., 2017). In short, there is a variation in the importance of dimensions and their shared effects depending on the organizational context in which they occur (Lomberg et al., 2017; Miller, 2011).

Risk-taking

The "risk-taking" appears in the responses of interviewees working in agile teams allocated to consultancy, HR analysts, and the company's owners. Although it is considered a positive factor for addressing the AM challenges in the company, this dimension of EO was highlighted primarily by those allocated to consultancy.

Figure 6

Analysis of the EO dimension: Innovativeness

Excerpts from interviews that address innovativeness

It is not blocked, but it is not encouraged. Within the challenges of the project, it would help a lot, but I think the strongest word is 'motivate'. We have a test team here that could create a product that is homologated as a new product in the company or the creation of a new customer relationship area. There is no need to reinvent the wheel, we look at what is happening and plant the seed. Any consultant or project manager who sells a product or more hours, is rewarded, is an entrepreneurial vision, it comes out of its box and opens horizons. (SM allocated to the client)

They are starting internal innovation projects and some people were selected according to their profile who like a challenge. There is a free university and bootcamp events to engage professionals, but there is a lack of encouragement to pass this news on to others. It has difficulty retaining resources, as the market is heated. That is why an academy was created with training to teach interns and new employees about basic concepts, during training it is possible to identify talents, and every 3 months they give a prize for highlights. (PO allocated within the consultancy)

This is the characteristic that would help us the most with the challenges we have. (SM allocated to consultancy)

Yes, within the company it is encouraged. (HR Analyst1)

The characteristic that can help you in the challenges is the process innovation in some demands, a clearer methodology that is more adequate to reality. (HR2 Analyst)

There is a great need for innovation and as the next steps, this will be encouraged with awards. In general, all these entrepreneurial characteristics are encouraged and are important for the company's performance, but not everyone in the management area is encouraged. (Owner partner 1)

It is not encouraged; we are conservative because we see that we are not big enough to act that way. (Owner partner 2)

Note: Elaborated by the authors.

In general, mistakes are not punished, but the assumed risks are related to uncertainties within the company rather than the client. A point emphasized by the consultancy-allocated SM is the excessive assumption of risk, a perception that may be motivated by the low level of risk assumption on the part of the contracting client, as mentioned by one of the HR analysts. In Figure 7, excerpts from the interviews that generated the analysis of this dimension are presented.

Figure 7

Analysis of the EO dimension: Risk-taking

Excerpts from interviews that address risk-taking

What is most important is risk-taking, even if it is sometimes unnecessary. (SM assigned to the consultancy)

When you make a decision to take risks, you are not punished. (HR Analyst1)

It would help if the client took risks together with us, we take it on daily when the technician has the autonomy to suggest new ideas. Risk-taking is accepted, yes, there are even situations in which people make mistakes, make mistakes again, are guided, that they learn and always a chance is given again. If the person entered an area and did not fit in, he dedicated himself, he made a mistake, but it gives a chance, an opportunity to guide, as long as the person is also in the mood, it is something that is acceptable. (HR2 Analyst)

Note: Elaborated by the authors.

Practical actions related to this dimension can help in addressing the existing challenges in the company, such as providing formal encouragement to take risks both in business and personal contexts. This can happen if managers adopt a less conservative approach in decision-making and exhibit risk-taking behavior (Martens & Freitas, 2008).

Proactiveness

"Proactiveness" was mentioned by interviewees working in agile teams of both project types and by the company's owners. Although it was considered highly important for addressing AM challenges, it is not among the most encouraged by managers or found in the profiles of professionals allocated to projects at the client or within the consultancy, according to the interviewees. Additionally, none of the HR analysts mentioned it in their responses.

The evidence that generated this analysis is found in the excerpts from the interviews reproduced in Figure 8.

Figure 8

Analysis of the EO dimension: Proactiveness

Excerpts from interviews that address proactiveness

You have to be interested, seek information, like the subject, be proactive, but take risks. It's the guy who reads, researches, tries to ask a question, takes the test, does a simulation, and has that interest in navigating a little more alone. It's what I look for more in people, I value more, which I think works best. The one who can think about the whole, see the consequences of a certain attitude. That, for me, is what works best. It's just that in my team there are some people that we brought who are like that, but I don't know if they are like that or if I encourage that in them. (PO allocated to the customer)

If you provide non-technical training, you can have big surprises, you can leverage entrepreneurs within the company. I think it's interesting for us to have this product within the organization to have this treatment and then you create your range of market performance. (SM allocated to the client)

Leaders don't have a proactive profile. What I miss most is proactivity. (SM allocated within consultancy)

Within the company, proactivity is not penalized. (Owner partner 2)

Note: Elaborated by the authors.

This result is in line with one of the characteristics of empirical actions in the "proactiveness" dimension of EO: the encouragement of continuous market monitoring (Martens & Freitas, 2008), considering that continuous learning can occur in various ways (formal or informal) (Garcia, Martens & Martens, 2021).

Competitive Aggressiveness

"Competitive aggressiveness" appeared in the responses of HR analysts and company owners. The interviewees directly involved in project execution did not consider this dimension relevant to addressing AM challenges - a perception that can be explained by the fact that this EO dimension is more related to top management.

Among the company owners, there is a divergence of perception due to each person's style, conservatism, and the size of the company. The excerpts from the interviews that allowed this analysis are presented in Figure 9.

Figure 9

Analysis of the EO dimension: Competitive aggressiveness

Excerpts from interviews that address competitive aggressiveness

Yes, employees are free to look at the market and come up with new ideas. (HR Analyst1)

In general, all these characteristics of entrepreneurship are encouraged and are important for the company's performance, but not everyone in the management area encourages them. (Owner partner 1)

It is not encouraged, we are conservative, as we see that we are not big enough to act that way. (Owner partner 2)

Note: Elaborated by the authors.

This result aligns with a characteristic of the "competitive aggressiveness" dimension of EO: managerial posture generally influences the level of competitiveness (Martens & Freitas, 2008).

List of EO dimensions for solving AM challenges

In this section, the alignment between EO and AM is established by presenting the dimensions of EO (autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness) that, according to the interviewees' perception, can contribute to addressing AM challenges, based on the previously presented concepts (Table 1).

The EO dimensions of "autonomy" and "proactiveness" were identified by the interviewees as helpful in addressing the challenge categorized as "people" in the adoption of MA. This perception is related to the need for maturity and competence in completing the work, the pursuit of knowledge, communication between teams and business areas, and a sense of ownership. This corroborates the assumptions of Conboy et al. (2011), Coram and Bohner (2005), Gregory et al. (2016), and Nerur et al. (2005).

Regarding the challenge dimension of "processes," the interviewees believe that the solution may lie in "competitive aggressiveness" an EO dimension. This perception is in line with the findings of Coram and Bohner (2005), Dikert et al. (2016), Gregory et al. (2016), and Nerur et al. (2005), emphasizing the correct use of AM processes, as frequent increments can create and deliver software products that better meet the actual needs of customers in a timely manner.

Regarding the "management and organization" challenge, the interviewees mentioned the characteristics presented in the EO dimensions of "risk-taking" and "innovativeness" as a solution. This perception may be related to the need for an innovative and entrepreneurial organizational culture, manifested through behaviors and actions such as seeking opportunities, entrepreneurial leadership, creating collaborative cross-functional teams, and informal communication channels. This finding aligns with the research of Coram and Bohner (2005), Dikert et al. (2016), Gregory et al. (2016), and Nerur et al. (2005), advancing the understanding that adopting AM requires a shift from command and control management to leadership and collaboration.

Based on the above, it can be stated that stimulating the dimensions of EO can have a positive impact on addressing the various challenges identified in the literature and encountered during the adoption of AM.

Furthermore, it is important to emphasize the need to analyze how these challenges occur in startups, specifically which topics within each dimension need to be addressed and how the characteristics of the EO dimensions can be encouraged through joint actions between top management, HR, and employees.

Figure 10 presents the response to the study proposition, i.e., the EO dimensions that can indeed assist in addressing the challenges of AM adoption. This conclusion was reached by linking the EO dimensions (Figure 1) with the research field's responses (Figures 2 to 9), aiming to encourage entrepreneurship in IT startups, considering their positive contribution to the adoption of AM by these companies.

Figura 10

Modelo conceitual do estudo
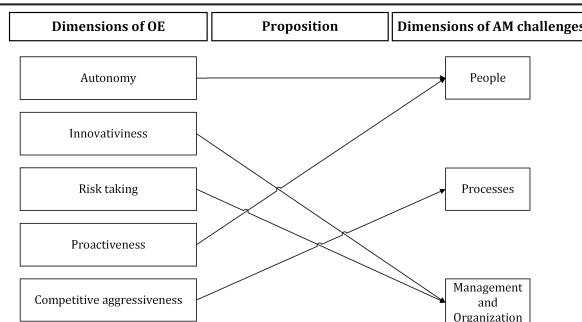
Note: Elaborated by the authors.

FINAL CONSIDERATIONS

This study achieved the objective of analyzing how the dimensions of Entrepreneurial Orientation can help address the challenges arising from the adoption of Agile Methods.

It was observed that there are different perceptions among "agile teams" regarding the challenges of AM adoption, depending on the context of allocation (client or consultancy).

The influence of "organizational culture" on the adoption of AM is highlighted by professionals working with clients. This was evident in all dimensions of AM challenges and EO, confirming the importance of this characteristic for both constructs, as this culture can motivate employee behavior and actions.

According to the interview responses, the dimensions of EO are recognized as important in addressing the challenges of AM, although they are not equally incentivized when the team is allocated with the client.

Furthermore, even with this agreement, each employee's responses may vary depending on what is allowed and encouraged by the EO. Therefore, for HR analysts, the major challenges related to the "management and organization" dimension, particularly in terms of hiring suitable profiles. On the other hand, for business owners, the client's expectations and the types of requested contracts are the most challenging requirements.

Considering these findings, this study has contributed to the advancement of literature on AM, EO, and the relationship between these topics in project management. The contribution for organizations lies in understanding the challenges inherent in the adoption and use of AM and reflecting on how encouraging specific actions can help solve problems associated with the AM, utilizing entrepreneurship concepts and, more specifically, EO.

This study had the limitation of not being able to extrapolate the results, as it adopted a single case study as the method. Following the viewpoint of Mariotto et al. (2014), we believe that researchers or practitioners can transfer the results to a new situation based on their knowledge and life experience and apply them to a new context. Therefore, generalization is left to the reader/researcher; if they choose to follow the same steps as this research, they may arrive at similar insights (Mariotto et al., 2014).

For future research, it is recommended to conduct more in-depth studies on the relationship between EO and the challenges of AM or to intervene in the study context by presenting the results and the resulting benefits.

Conflit of interest statement

The authors declare that there is no conflict of interest.

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Roles	Contributions			
	Garcia V. M.B.	Martens C. D. P.	Penha R.	Martens M. L.
Conceptualization	■	■	■	
Methodology	■	■		■
Software	■			
Validation	■	■	■	■
Formal analysis	■		■	■
Investigation	■	■		
Resources	■	■		
Data Curation	■	■		■
Writing - Original Draf	■	■		
Writing - Review & Editing	■	■	■	■
Visualization	■			■
Supervision		■		
Project administration	■	■		
Funding acquisition		■		

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