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Organizational Ambidexterity and Innovation: propositions for the advancement of theory and practice

Priscila Pagliarini Sartori[1]
priscisartori@gmail.com| 0000-0001-6682-6962

Ivan Lapuente Garrido[1]
igarrido@unisinos.br | 0000-0003-3741-7961

ABSTRACT

This study addresses the relationship between organizational ambidexterity and innovation. It aims to present propositions for advancing theoretical and practical knowledge, in the face of different contextual conditions and the different industries in which organizations operate. By means of a narrative literature review, covering recent empirical studies, limits of knowledge in this field were identified, giving rise to propositions for its advancement, in theoretical and managerial aspects. As a first contribution, a systematization of the concepts and their relationships is presented, for the study of innovation as a result of the ambidextrous capacity, allowing a broad view of the field. Subsequently, four propositions are highlighted as contributions resulting from the study, based on contextual factors, such as the speed of changes in the environment, the transformation in business models and the leadership orientation towards innovation, given the diversity that characterizes each industry, capable of changing the balance between exploration and exploitation (E&E) over time in organizations.

KEYWORDS

Organizational ambidexterity, innovation, exploration, exploitation

[1]Universidade do Vale do Rio dos Sinos – Campus de Porto Alegre – Administração, Porto Alegre, RS, Brazil

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1. INTRODUCTION

Ambidextrous organizations are those capable of balancing the dimensions of exploration and exploitation (E&E) activities, which allows for competition both in markets where flexibility, autonomy, and experimentation are necessary; with a focus on long-term results, as well as in markets where efficiency, control, and incremental improvement are needed; with a focus on short-term returns (O'Reilly & Tushman, 2013). For Levinthal and March (1993, p. 105), "the basic problem faced by organizations is to engage in exploitation enough to guarantee their current viability and, at the same time, to dedicate enough energy to exploration to guarantee their future viability".

In complex, dynamic competitive environments, with a high level of uncertainty and competition based on innovations, strategically orienting oneself towards the new, aiming at sustainability, while, at the same time, remaining competitive in current businesses and aiming at short-term advantages, are processes that demand capacity for innovation and ambidexterity (Birkinshaw et al., 2016; O'Reilly & Tushman, 2016). Recent studies have addressed the relationship between ambidexterity and innovation (Rosing & Zacher, 2017; Lin et al., 2017; Revilla & Rodríguez-Prado, 2018; Lennerts et al., 2020), in which the balance between E&E proved to be an organizational challenge which could be managed in different ways and under different conditions.

From this perspective, E&E are considered activities with different objectives, in which the simultaneous execution by the organization, business unit, team or individuals, generates a set of tensions in practice (Papachroni et al., 2016). These tensions are based on the allocation of resources, the short-term view as opposed to the long-term view, and the condition of stability and predictability as opposed to adaptability (Lavie et al., 2010).

Such tensions are persistent over time, as they are resolved in organizational practice based on management mechanisms capable of accommodating E&E simultaneously, reappearing in later stages due to changes in the environment, which consequently requires new strategic responses (Birkinshaw et al., 2016; Papachroni et al., 2016; Zimmermann et al., 2018).

The different competitive contexts in which companies can act associated with constant evolutions in strategies, practices, and organizational forms, in response to changes in the environment, result in different adaptation mechanisms. These mechanisms comprise organizational solutions implemented for the management of E&E over time (Papachroni et al., 2016), in a condition of dynamic equilibrium.

Observing the heterogeneity condition, both of contextual, competitive, and organizational factors, a knowledge gap was identified in the literature to be filled. This was on how organizations can balance their E&E levels to achieve ambidextrous capacity, producing different types of innovations in the face of changing conditions (Wilden et al., 2018; Birkinshaw et al., 2016; Benitez et al., 2018). As highlighted by Ahmadi et al. (2017), organizations can vary in their ability to deal with the challenges inherent in the simultaneous search for E&E.

To reduce this gap, this paper focused on presenting propositions for the advancement of theory and practice on the relationship between organizational ambidexterity and innovation, given the complexity and environmental dynamics faced at different levels and in different industries. In applied terms, in environments with higher levels of uncertainty in relation to the industry context, ambidexterity proved to be more important for services and high technology, compared to the manufacturing industry. A possible explanation is related to the high level of environmental dynamism in knowledge-intensive services and high-tech industries (O'Reilly & Tushman, 2013), for example.

Other studies (Zimmermann et al., 2018; O'Reilly & Binns, 2019; Campanella et al., 2020) focused on the impact of contextual factors, such as competition for scarce resources and leadership characteristics, on ambidexterity and on the interaction between E&E, producing different types of innovation, allowing organizations to be innovative and flexible without compromising their stability and efficiency (Khan & Mir, 2019; Simsek, 2009). This reinforces the idea that ambidexterity and innovation have been pursued and managed in different ways, as processes responsible for the sustainability of organizations over time.

With the expansion of the number of studies in recent years, covering topics from different perspectives, knowledge has been presented in an abundant and fragmented way. Thus, a literature review is based both on the large amount of information available and on the need to systematize knowledge (Mendes-da-Silva, 2019). Based on a narrative literature review, this study contributes to the systematization of knowledge about ambidexterity and innovation, identifying limits that justify the construction of propositions for theoretical and practical advancement.

2. *EXPLORATION, EXPLOITATION, AMBIDEXTERITY AND INNOVATION: CONCEPTS AND RELATIONSHIPS*

This section presents the theoretical-conceptual basis on E&E, ambidexterity and innovation, resulting in a theoretical framework that organizes and synthesizes the relationships between concepts, supporting the construction of propositions.

2.1. E&E: THE TWO DIMENSIONS OF ORGANIZATIONAL ACTIVITY

March (1991) defined that exploration includes aspects such as research, variation, risk taking, experimentation, flexibility, discovery, and innovation, with uncertain and often negative returns, while exploitation focuses on refinement, productivity, efficiency, selection, implementation and execution, improvement, and expansion of existing skills, with positive and predictable returns. While exploration involves organizations and individuals in search and variation, exploitation improves productivity and efficiency by means of choice, execution, and variation reduction (Lavie et al., 2010).

Thus, E&E are concepts associated with learning, innovation, organizational design, competitive advantage, and sustainability (Wilden et al., 2018). Exploration results in a greater ability to adapt to change, supporting an organization's future viability. Exploitation, on the other hand, relies on the development and use of existing skills, supporting the company's current viability (March, 1991; Danneels, 2002).

Different approaches in the literature have explained the possible forms of interaction between exploration and exploitation, as two equally necessary dimensions of organizational activity, seen as two extremes of a *continuum* (competitors), or as orthogonal (complementary) (Gupta et al., 2006). The dynamics between E&E allows for different combinations and results along an organizational trajectory.

2.2. THE BALANCE BETWEEN E&E

Based on the dichotomy between E&E, Gupta, Smith and Shalley (2006) analyzed this interaction, highlighting that both the boundaries between these two dimensions of activities, and the vision of orthogonality versus continuity, offer useful lenses for understanding this balance.

On the other hand, Andriopoulos and Lewis (2009) analyzed how ambidextrous organizations manage tensions between E&E in a paradoxical approach, considering them complementary. These different approaches are described in the following subsections.

2.2.1. The continuum view

The adaptive process is used to explain the relationship between E&E (Piao & Zajac, 2016), as a sequence of adaptation steps, in which companies select an alternative over a set of alternatives (March, 1991). In this logic, choices with greater probability of short-term returns, generated by exploitation, tend to prevail, since possibilities generated by exploration have uncertain and distant returns, characterizing both dimensions as alternative choices (Piao & Zajac, 2016) or substitutive (Guisado-González et al., 2017).

Assuming that E&E compete for scarce resources in organizations, the more resources are dedicated to exploration, the less will be dedicated to exploitation and vice versa (March, 1991; Gupta et al., 2006). While exploitation focuses on technological improvement and current methods (Jansen et al., 2006), which generate higher, more immediate, and safer returns, exploration involves the search for new knowledge, technologies and processes (March, 1991), implying a significant increase in the necessary investments, generating a tendency of reduction in the performance (Guisado-González et al., 2017).

This approach considers that the execution of routines in the exploration dimension, excluding the exploitation dimension, can lead to an excess of undeveloped ideas and insufficient distinctive competence (O'Reilly & Tushman, 2013), characterized as overexploration (Levinthal & March, 1993). On the other hand, exploitation without exploration can create a "competence trap" (March, 1991), characterized as overexploitation (Levinthal & March, 1993).

In practice, both overexploitation and overexploitation negatively impact performance (Wang & Li, 2008). The joint search for the two dimensions should improve long-term performance, in a way that allows the organization to be innovative, flexible, and effective without losing the benefits of stability, routinization, and efficiency (O'Reilly & Tushman, 2013; Swift, 2016).

2.2.2. The orthogonal view

In this approach, E&E are seen as interrelated or complementary processes (Lubatkin et al., 2006; Papachroni et al., 2016). The orthogonal view of E&E allows the analysis of the interrelationship between the two dimensions, given that the exploration of existing knowledge in the company and the search for new knowledge are not mutually exclusive, being seen as processes that equally contribute to organizational learning (Wang & Li, 2008).

Cao et al. (2009) highlighted the potentially positive effects of exploration on exploitation, in which a high degree of effort in exploitation can impact effectiveness in exploring new knowledge and developing new products and markets. Although, in these dimensions, there may be competition for resources in the short term, there is a recognition that they are mutually reinforcing for long-term success (He & Wong, 2004), supported by organizational learning (Andriopoulos & Lewis, 2009).

In the orthogonal view, a high degree of effort in exploitation can improve effectiveness in exploration, by seeking new knowledge and developing resources that support new products and markets, in which there is a positive effect of the combination of the two types of activity on organizational performance (Cao et al., 2009). Empirical studies (He & Wong, 2004; Jansen et al., 2006; Katila & Ahuja, 2002; Lubatkin et al., 2006; Guisado-González et al., 2017; Campanella

et al., 2020) tested this interaction model confirming its applicability. The relationship between E&E was identified as complementary, reinforcing the argument that the achievement of the ambidextrous capacity is conditioned to the development of these two activities simultaneously.

Gupta et al. (2006) summarized this discussion about the possible relationships between E&E in three aspects: (i) the scarcer the resources needed for E&E, the greater the probability that the two will be mutually exclusive, corroborating the view of March (1991), with E&E as ends of a continuum; (ii) within a single domain, such as an individual or a subsystem, E&E tend to be mutually exclusive; (iii) in different and poorly connected domains, E&E will generally be orthogonal, as high levels of both in one domain can coexist with high levels of both in another organizational domain. The relationship and balance between E&E are dependent on contextual factors. The solution to this balance may lie in the continuous commitment of organizations to boost and adjust them along the competitive dynamics (Piao & Zajac, 2016). Table 1 summarizes the main aspects explored in this subsection, on the two approaches to the relationship between E&E.

Table 1
Relationships between dimensions E&E

	Exploration x Exploitation	Practical implications
Continuum View	– It considers exploration and exploitation as alternative choices; – Conflict view, competition for scarce resources; – Although essential for long-term survival, the two dimensions of activities are considered to be fundamentally incompatible; – It is assumed that the more resources are dedicated to exploration, the less can be dedicated to exploitation and vice versa.	– Substitutive but cyclical relationship – The alternative with more certain and short-term returns tends to prevail – There is a limited range of combinations between the two dimensions in which the company will outperform; – The relationship between exploration and exploitation makes the performance resulting from the simultaneous implementation of both activities superior, compared to the performance resulting from the sum of their separate implementations.
Orthogonal View	– It considers exploration and exploitation as complementary activities that interact positively; – Vision of interrelated processes; – It disregards the scarcity of resources as an exclusive condition;	– In this view, organizations can maintain a high level of both activities, making the search for a balance between exploration and exploitation unnecessary; – Exploration and exploitation are seen as distinct knowledge, but not mutually exclusive, as processes capable of contributing equally to organizational learning.

Source: prepared by the authors.

E&E also stand out as possible ways of categorizing innovation, in which the first is associated with the expansion of the product portfolio and market presence, through the launch of new generations of products, or serving a new market. In the same way, the second focuses on improving the efficiency and productivity of current product offerings by creating ways to better meet the needs of today's customers (Sariol & Abebe, 2017). This discussion is deepened in the following subsection, expanding the understanding of how E&E interactions impact innovation.

2.3. Exploration, Exploitation, and Innovation

In organizational practice, E&E are seen as distinct innovation strategies, in which the first implies breaking an existing search logic to overcome limitations, while the second is based on routine learning. (Enkel et al., 2017). Exploration activities involve the search for knowledge beyond the existing technological domains, also allowing the production of innovations by combining new technologies with existing ones, which can result in innovations of a revolutionary nature (Nelson & Winter, 2005; Cho & Kim, 2017). Innovations in exploitation consist of leveraging existing knowledge within a known technological trajectory, making organizational learning more reliable, thus generating short-term results that are also more predictable (Cho & Kim, 2017).

Innovations in exploration can be scaled as new technologies, products or services that can potentially make existing ones obsolete and uncompetitive, while innovations in exploitation focus on improving existing products and services, and improving the efficiency of existing distribution channels (Enkel et al., 2017). Figure 1 summarizes aspects related to both exploration and exploitation innovation—with regards to the technological dimension and the market dimension—as two possible ways of classifying innovation (Jansen et al., 2006). The technological dimension encompasses proximity to existing technology and products and services, while the market dimension encompasses proximity to existing customers or market segments (Jansen et al., 2006).

Although exploration can promote innovations with greater potential for future financial returns, the development of technologies in an unknown domain increases the risks, the need for investments and the complexity of the process. Although the risk is inherent to the management process and can be managed by the decision-making process (Severgnini et al., 2019), investing efforts in technologically distant trajectories generates variations in immediate performance, compromising short-term profits (He & Wong, 2004; Cho & Kim, 2017).

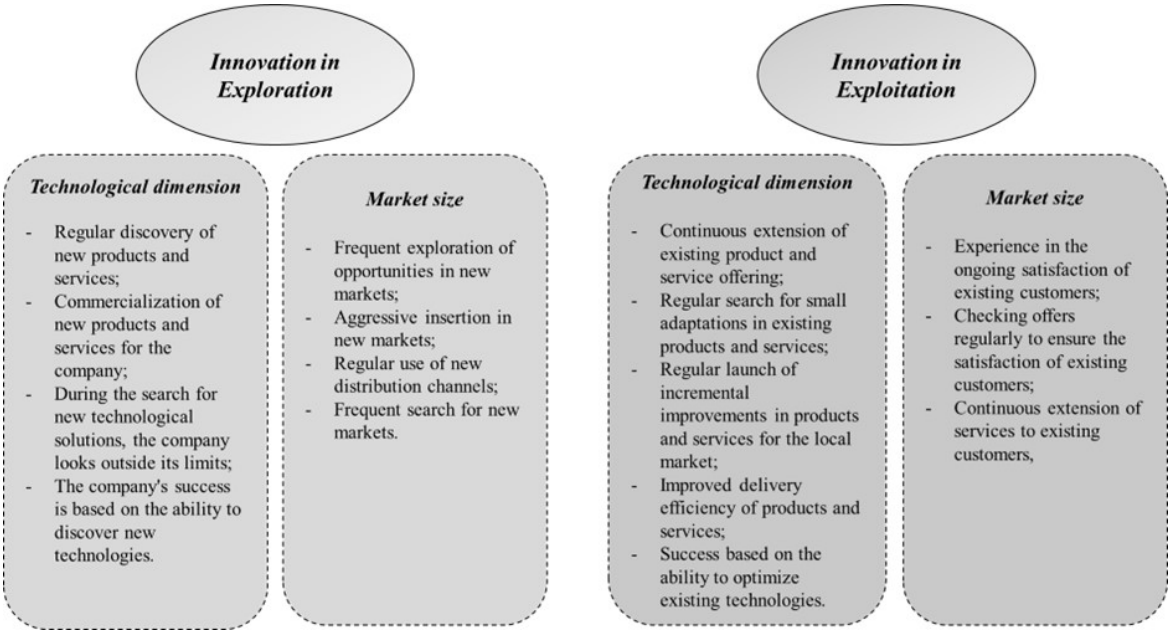

Figure 1. Aspects related to innovations in E&E

Source: prepared by the authors, based on Jansen et al. (2006) and Enkel et al. (2017).

On the other hand, exploitation innovations allow an increase in efficiency supported by available technologies, reducing errors and failure rates, making short-term performance more predictable. Lennerts et al. (2020) provided empirical support for the notion of an asymmetrical and complex relationship between E&E. The results showed that the performance of incremental innovation was driven by an asymmetric interaction between the two dimensions, with this being higher when exploitation interacts with an intermediate level of exploration, rather than an equally high or opposite level.

The set of tensions that permeate the search for innovations in E&E demonstrates the need for organizations to design a combination, or balance, between the two dimensions, in order to accommodate them in organizational practice. This depends on factors such as availability of resources and dynamism in the competitive environment (Guisado-González et al., 2017). Tensions between E&E are presented in the next subsection.

2.4. The tensions between E&E

E&E are activities that, to a certain degree, compete for organizational resources, leading to the generation of tensions (March, 1991), namely:

(i) Resource allocation: Organizations make conscious choices to support E&E activities, regarding resource allocation and based on expected results. They can give up short-term productivity in exchange for greater long-term innovation, supporting the pursuit of new knowledge and potential opportunities, rather than apply available knowledge to meet immediate needs (March, 1991; Lavie et al., 2010; Revilla & Rodríguez-Prado, 2018).

(ii) Long-term versus short-term: The organization will be able to allocate resources to improve existing technologies, methods, and products, leveraging current competencies at the expense of developing new skills and capabilities, achieving immediate results, but compromising future viability (Lavie et al., 2010). The returns from generating ideas are less certain and more distant, although potentially greater compared to implementing ideas with higher levels of certainty and closer returns (Revilla & Rodríguez-Prado, 2018). Thus, the tension is established between efficiency and effectiveness, between immediate profit and future sustainability (Lavie et al., 2010).

(*iii) Stability versus adaptability*: Flexibility and change are associated with exploration, while stability and inertia are associated with exploitation, factors that hinder organizational adaptation in the face of environmental changes (Lavie et al., 2010). This tension can also be described as stability versus flexibility (March, 1991; Revilla & Rodríguez-Prado, 2018).

The temporality factor is relevant for the analysis of tensions between E&E, due to the characteristic of persistence that permeates such conflicts in organizational life (Smith & Lewis, 2011; Putnam et al., 2016). The paradoxical view offers a useful perspective for understanding how tensions between E&E persist over time and how they can be accommodated in organizational practice (Putnam et al., 2016).

2.4.1. The paradoxical view

In rapidly changing competitive environments, organizational processes become more complex, and contradictory demands become increasingly relevant and persistent (Lewis, 2000). Paradoxes arise especially in environmental conditions characterized by plurality, change, and scarcity of resources, factors seen as tensions responsible for putting pressure on organizational systems that perform E&E (Raisch & Birkinshaw, 2008; Putnam et al., 2016).

Paradoxes are considered contradictory yet interrelated elements that exist simultaneously and persist over time (Smith & Lewis, 2011). This vision implies the continuous adjustment of decisions and actions by the management, in the face of the conflicting pressures of paradoxical forces, which in other words means a dynamic management of tensions and imbalances (Ricciardi et al., 2016).

The paradox view connects to the relationship between E&E when considering a logic of simultaneity between the two dimensions of activities and the tensions generated, in which the ambidextrous capacity is seen as a possible solution to accommodate them. By adopting a paradoxical lens, research has highlighted that organizational success depends on simultaneous E&E strategies (Gibson & Birkinshaw, 2004; Raisch & Birkinshaw, 2008), by the logic of conciliation between such strategies.

Birkinshaw, Crilly, Bouquet and Lee (2016) analyzed, by means of a longitudinal study, how companies manage strategic dualities in practice, in a paradoxical perspective. The authors showed how the initial tensions in the organization were gradually resolved in a process of change. The results showed that the process of resolving a set of tensions led to another set of emerging tensions, demonstrating the dynamics and persistence of tensions over time.

Empirical studies with a paradoxical approach to tensions between E&E (Ricciardi et al., 2016; Papachroni et al., 2016; Knight & Paroutis, 2017) They sought to understand how organizations can meet competing demands simultaneously. Although choosing between competing tensions has the greatest impact on short-term results, the paradoxical perspective demonstrates that in the long term, business sustainability requires continuous efforts to meet multiple and divergent demands (Birkinshaw et al., 2016).

Expanding the understanding of how organizations achieve ambidextrous capacity, by managing the tensions between E&E to generate different types of innovations, the analysis of their antecedents as conditions that allow their reach is relevant, as shown in the following subsection.

2.5. Background of organizational ambidexterity

Some factors are capable of altering the logic of balance between E&E, such as antecedents of ambidextrous ability. Such factors can be external or internal to the organization and, together, are able to influence the propensity for exploration or exploitation or the search for a balance between them (Lavie et al., 2010).

External factors refer to environmental dynamism, sudden and unexpected changes, such as transformations that make existing technologies and skills obsolete, and the competitive dynamics itself, characterized by the intensity or speed with which changes occur in the competitive environment (Raisch & Birkinshaw, 2008; Lavie et al., 2010).

Environmental dynamism is one of the main factors responsible for formulating strategies, both based on monitoring trends and opportunities in the competitive environment and on mechanisms that allow for rapid alignment and adaptation. This scenario requires agility in the dissemination of information and decision-making, in addition to putting pressure on the reorganization of business processes and the reintegration of internal processes, affecting the capacity in E&E (Lennerts et al., 2020) and demonstrating the importance of ambidextrous ability in dynamic environments (Wang & Li, 2008).

Internal factors, on the other hand, explain the trends of heterogeneity in E&E among organizations, and are associated with accumulated resources, capabilities, structures, culture, age, and size of companies, aspects that make up the history and identity of organizations. (Lavie et al., 2010). Absorptive capacity is also highlighted as an antecedent of ambidexterity (Lavie et al.,

2010; Enkel et al., 2017; Crescenzi & Gagliardi, 2018), as an ability to seek external knowledge, to internalize it, and to apply it (Cohen & Levinthal, 1990).

Raisch and Birkinshaw (2008) pointed out the organizational context, leadership, and structure as internal factors capable of altering the balance between E&E. The organizational context comprises an environment favorable to the promotion of a behavioral orientation that allows the combination of E&E, with high performance, supported by discipline and flexibility, in addition to social support, based on support and trust (Gibson & Birkinshaw, 2004). This context allows the search for ambidexterity, encouraging individuals to integrate conflicting demands of alignment and adaptability into their task routine. (Gibson & Birkinshaw, 2004; Simsek, 2009).

To become ambidextrous, organizations need to reconcile the tensions and conflicting demands in the task environment (Raisch & Birkinshaw, 2008). The search for balance or even the resolution of conflicts and tensions between E&E may fundamentally require different organizational structures, strategies, and contexts (Raisch & Birkinshaw, 2008). For companies to be successful over time, in the face of environmental and technological changes, structural alignments are necessary, and consequently adaptation (Tushman & O'Reilly, 2002; O'Reilly & Tushman, 2013).

2.6. Models of organizational ambidexterity: managing tensions between E&E

Initially, the literature focused on three broad models of ambidexterity: (i) structural, in which E&E activities are carried out in different organizational units; (ii) contextual, allowing the two activities to be developed within the same unit; and (iii) based on leadership, making top management responsible for reconciling, and responding to tensions between the two activities, by means of strategic integration (Raisch & Birkinshaw, 2008).

In addition to these three models, summarized by Raisch and Birkinshaw (2008), another possible approach to managing tensions between E&E was identified which is considered as punctuated equilibrium (Burgelman, 2002; Lavie et al., 2010). While ambidexterity refers to the simultaneous search for both E&E, punctuated equilibrium refers to the temporal separation between one type of activity and another (Gupta et al., 2006), consisting of alternating periods of E&E (Simsek, 2009).

The structural and sequential approaches to ambidexterity are relatively less complex to implement, as each involves a single impulse: the structural and temporary division of tasks, respectively. In contrast, contextual ambidexterity, which involves creating a scenario in which individuals divide their attention between competing goals, is more complex, as it employs multiple impulses simultaneously (Birkinshaw et al., 2016). In summary, the ambidexterity models can be considered different ways of organizing activities and managing the tensions inherent to the simultaneous execution of E&E activities, with advantages and disadvantages, as shown in Table 2.

2.7. Theoretical-conceptual framework: exploration, exploitation, ambidexterity and innovation

This section presents a conceptual theoretical framework (Figure 2), which synthesizes and systematizes the aspects listed so far for the study of the relationship between E&E, ambidexterity, and innovation.

Figure 2 presents factors considered antecedents, external, and internal, capable of impacting the ambidextrous capacity of an organization and the ambidexterity models, as different ways of managing tensions between E&E. E&E is related as dimensions of activities, which, due to their simultaneity, allow organizations to reach ambidexterity, even though the tensions generated present themselves as paradoxes to be managed over time. As a result, superior performance, growth, business sustainability, and different types of innovations stand out.

Table 2
Organizational ambidexterity models

Ambidexterity model	Concept	Benefits	Disadvantages	References
structural ambidexterity	– Structural division of tasks; – Dual structures; – Ambidexterity is achieved by means of distinct units that are united by a strategic intente, a broad set of values and linkage mechanisms necessary to leverage shared assets.	– Less implementation complexity.	– It can lead to isolation and failure of individual units to productively unite their efforts;	O'Reilly e Tushman, 2013; Benner e Tushman, 2003; O'Reilly e Tushman, 2008; De Visser et al. (2010).
Contextual ambidexterity	– Creating a setting or context in which individuals divide their attention between competing goals.	Dynamic perspective on adjusting conflicting demands over time.	– Need for multiple impulses simultaneously; – Greater implementation complexity.	Gibson & Birkinshaw, 2004; Gurtner & Reinhardt, 2016; De Clercq, Thongpapanl & Dimov (2013); Balboni et al. (2019); Gonzalez & De Melo (2018).
Leadership-based ambidexterity	– Focus on exploration and exploitation performance and on the role of key leaders in organizations, promoting ambidexterity; – Ambidexterity is supported and facilitated by leadership.	– Dynamic perspective on adjusting conflicting demands over time; – Greater flexibility.	– Greater implementation complexity.	O'Reilly & Binns (2019); Rosing, Frese & Baush (2011); O'Reilly & Tushman (2011).
Sequential ambidexterity	– Temporal division of tasks; – Alternation between exploration and exploitation in the trajectory of companies, realigning their structures and processes in response to changes in the competitive environment.	– Dynamic perspective on adjusting conflicting demands over time; – Less implementation complexity; – By oscillating between organizational modes such as centralization and decentralization, the organization can dynamically increase the levels of exploration and exploitation.	– Difficulty in delimiting *exploration* and *exploitation*.	Patel & Husairi, 2018; Lavie, Stettner & Tushman, 2010; Boumgarden, Nickerson & Zenger, 2012.

Source: Prepared by the authors.

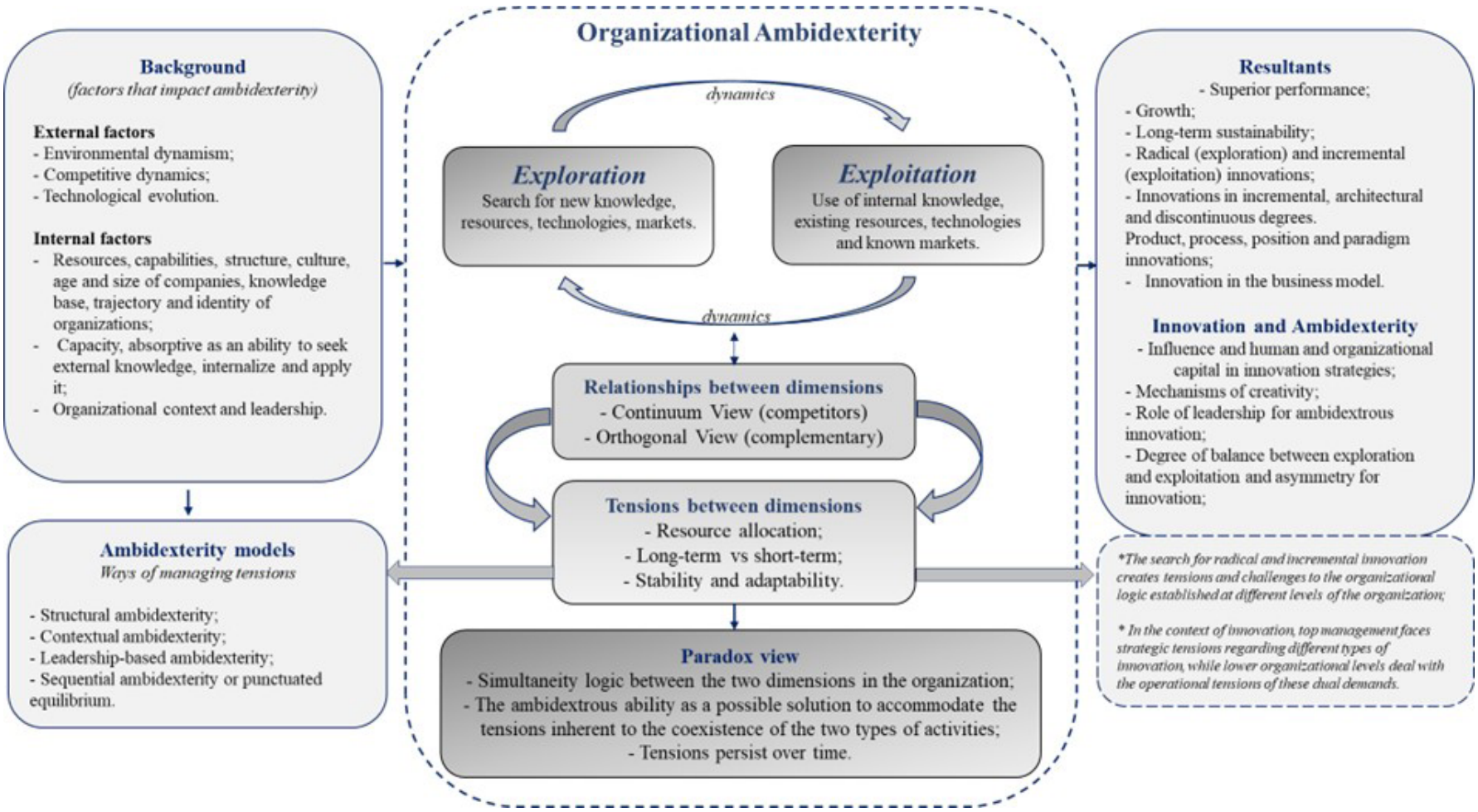

Figure 2. E&E, ambidexterity and innovation: concepts and relationships

Source: prepared by the authors.

3. METHOD

A narrative literature review applies to general debates on a given topic, discussion of previous work, and identification of current gaps in the field of knowledge, as opportunities for future research, by addressing broad questions and presenting literature syntheses (Mendes-da-Silva, 2019). The adoption of inclusion and exclusion criteria for studies, focusing on a specific set with relevant selection criteria, gives methodological rigor to this type of review (Ferrari, 2015; Mendes-da-Silva, 2019).

The studies reviewed in this narrative were selected from the Web of Science database, with a search based on the terms "ambidexterity" AND "innovation" AND "exploration AND exploitation", considering the period of the last 5 years (2016-2020), in the areas of "management" and "business", resulting in 305 articles. As a selection criterion, a more specific search was carried out to identify, based on the state of the art in empirical research on ambidexterity and innovation, how this relationship has been analyzed, its limits of knowledge and how new propositions could contribute to the advancement of knowledge in this field, according to criteria shown in Table 3.

Table 3
Searches carried out on the Web of Science to select the articles analyzed

Research 1 – Ambidexterity and Innovation	Research 2 – Innovation and Exploration and Exploitation
Results: 44 (from Web of Science Core Collection) Title: (innovation) AND; Title: (ambidexterity). Web of Science Categories: (Management OR Business) AND; Document Types: (Article); Time frame: Last 5 years; Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI.	Results: 29 (from Web of Science Core Collection) Title: (innovation) AND; Title: (exploration AND exploitation). Web of Science Categories: (Management OR Business) AND; Document Types: (Article); Time frame: Last 5 years; Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI.

Source: prepared by the authors (2021).

As an inclusion criterion, we considered the impact factor of the journals in which the studies were published (above 1.4), selecting studies with the most relevant contributions, which directly addressed the relationship between ambidexterity and innovation and belonging to quadrant Q1, according to the *Scimago* ranking. The final selection resulted in 38 empirical articles as the initial basis for the narrative literature review.

The review also included the selection of theoretical and empirical studies, based on March's reference (1991), using the snowball technique, with the identification of references that supported the construction of knowledge in the field. In addition, searches were carried out in the Google Scholar and EBSCO databases to access such studies. In total, 67 articles were reviewed. The following section presents the results of the analysis and propositions.

4. ORGANIZATIONAL AMBIDEXTERITY AND INNOVATION: PROPOSITIONS

Based on research results and the limits of knowledge on the relationship between ambidexterity and innovation identified in the literature, when analyzing the conditions that allow a dynamic E&E balance along an organizational trajectory, due to the diversity associated with the context and characteristics of the industry, possibilities for new research agendas were identified. Propositions derived from these limits are relevant in the knowledge construction process.

Organizational ambidexterity corresponds to a task management capability, in which an organization must devote sufficient attention to managing and reducing tensions between E&E, ensuring its future and current viability (Levinthal & March, 1993; Revilla & Rodríguez-Prado, 2018). As a result, different types of innovations are expected from E&E (Bledow et al., 2009; Revilla & Rodríguez-Prado, 2018), being radical innovations or with a greater degree of impact for the business resulting from exploration and incremental innovations, with a focus on continuous improvement, resulting from exploitation (Chandy & Tellis, 1998; Lennerts et al., 2020).

The simultaneous search for these two types of innovation is characterized by tensions, paradoxes, and contradictions, which characterize the duality of innovation (Rosing & Zacher, 2017). Faced with the market dynamics that force organizations to undertake both radical and incremental innovations, aiming at sustainability and superior performance, ambidexterity presents itself as an antecedent of both innovation and performance (He & Wong, 2004; Raisch & Birkinshaw, 2008; Cao et al., 2009; Junni et al., 2013; Rosing & Zacher, 2017).

Recent studies have analyzed this relationship from different perspectives. D'souza et al. (2017) emphasized the need to contextualize the impact of E&E activities, based on market dynamics, recognizing that ambidexterity does not necessarily assume an ideal match between E&E in a predetermined way. Thus, ambidexterity is seen as an essential organizational skill for survival in dynamic environments (Anzenbacher & Wagner, 2020), in which E&E assume a condition of dynamic equilibrium over time, in response to changes in the environment (Papachroni et al., 2016).

Environmental forces are determining factors for both the design and the results of innovation strategies (Jansen et al., 2009). Environmental dynamism is characterized by technological changes, variations in customer preferences, changes in product demand and unpredictability of change (Jansen et al., 2006), considered one of the inducing aspects of innovation.

Environmental dynamism has been positively associated with ambidextrous innovation (Soto-Acosta et al., 2018), due to the impact of technological changes, whether due to the challenge of organizational adaptation, or by building and sustaining a competitive advantage over time (Patel & Husairi, 2018). Soto-Acosta et al. (2018) highlighted information technology, knowledge management and environmental dynamism as drivers of ambidextrous innovation in small and medium-sized companies. Additionally, Khan and Mir (2019) analyzed fators such as the role played by external forces, munificence and dynamism, and the internal resource base in the relationships between organizational culture and innovation results in Indian high-tech companies, finding a positive relationship.

The trajectory proved to be relevant for the analysis of the balance between E&E in this context (Putnam et al., 2016; Campanella et al., 2020), either through the vision of the paradox, through the construction of competences and capabilities over time, including ambidexterity, or through the impact of the speed of changes in the knowledge base. Such aspects are associated with the construction of ambidextrous capacity (Jensen & Clausen,

2017), as well as the results of innovation in E&E over time. (Papachroni et al., 2016). From the analysis of these factors, capable of altering the balance between E&E over time in an organization, proposition 1 emerges:

Proposition 1: The speed of changes in the competitive environment, whether driven by competitive dynamics or by new technological trajectories, alter the balance between E&E, generating different combinations over time in organizations.

Regarding the influence of industry characteristics on this dynamic, Bernal et al. (2019) analyzed the different impacts of the pace of market evolution and technological evolution in E&E, noting that an accelerated pace of market evolution has positive effects. Based on recent empirical results, the question remains whether different industries exhibit different patterns of E&E interactions (Piao & Zajac, 2016). As an example, Balboni et al. (2019) analyzed, in the startup scenario, how the initial business model, subsequent changes and contextual ambidexterity impacted the growth of startups in high-tech industries. The results showed that successive increases in the level of ambidexterity had a positive influence on the growth of startups (Balboni et al., 2019).

In the context of manufacturing industries, Mehrabi et al. (2019) highlighted that entrepreneurial orientation impacted the balance between E&E, in dynamic environments, where performance was superior by a combination of high levels of E&E. Thus, superior performing businesses, supported by ambidexterity, find different ways to meet their innovation and efficiency objectives, simultaneously, over time (Birkinshaw & Gupta, 2013; Balboni et al., 2019).

From these considerations, it is evident that contextual factors, which can be external or internal, are responsible for different patterns of combination between E&E over time (Piao & Zajac, 2016, Papachroni et al., 2016), and that such factors vary according to the type of industry in which the company operates. Thus, proposition 2 emerges:

Proposition 2: The contextual factors that change the balance between E&E over time in organizations vary according to the characteristics of each industry.

In more dynamic competitive environments, business model transformation has been seen as a type of innovation associated with ambidextrous capability. Ricciardi et al. (2016) pointed out the E&E interrelationship as essential to adaptive and successful innovation, allowing the renewal of business models over time in companies from different sectors, impacting business sustainability and performance.

From the findings in the literature (Ricciardi et al., 2016; Revilla & Rodríguez-Prado, 2018; Lennerts et al., 2020; Anzenbacher & Wagner, 2020) the development of new business models is evidenced as an inducer of ambidextrous innovation in organizations. The integration of new business models reflects a strategy of diversifying markets, revenue sources, and even the innovation portfolio, in a process that allows the renewal or transformation of these models, associated with the characteristics of the industry (Bernal et al., 2019), which can be more or less dynamic. Thus, the ability to dynamically balance E&E in response to perceived or constructed opportunities and changes in the competitive environment allows for the creation, transformation, or renewal of business models in a more agile way, giving rise to proposition 3:

Proposition 3: The balance between E&E changes over time in organizations, impacting the speed with which companies renew their business models, according to the characteristics of the industry.

Another aspect highlighted in recent empirical studies on ambidexterity and innovation is the role of leadership in E&E management (Hunter et al., 2017; Zimmermann et al., 2018), corroborating the view of Birkinshaw and Gupta (2013) that the essence of ambidexterity and its ability to add value are related to three aspects: (i) ambidexterity is achieved by managerial capacity, by providing a normative perspective on the functioning of organizations, by the choices of managers; (ii) it is a multilevel construct and (iii) the tension between competing objectives can be managed in different ways.

Thus, leadership assumes a decisive role in the dynamic balance between E&E, since leading towards innovation requires choices for the establishment of objectives, structures, and allocation of resources, undertaken in environments of change and uncertainty in which there is a conflict between production and exploitation, featuring a central paradox of creative work (Hunter et al., 2017). The role of leaders is to facilitate the coexistence of E&E, supporting organization members to move away from existing routines, allocating resources, and implementing differentiated organizational structures (Ahmadi et al., 2017).

Considering that there is no predetermined ideal combination between E&E for innovation and superior performance in an ambidextrous logic, the leadership in an organization becomes responsible for the strategic choices that determine the dynamic balance, which is altered in response to changes in the environment and due to contextual factors. From these considerations, emerges proposition 4:

Proposition 4: Leadership focused on innovation, in its greatest complexity, is a factor capable of changing the balance between E&E over time in an organization, especially in industries with dynamic and uncertain competitive environments.

5. FINAL CONSIDERATIONS

Based on the results of the narrative review presented, it was shown that the dynamic balance between E&E for the achievement of ambidextrous capacity and the different types of innovation associated, can be changed by different factors or events over time in an organization. This view, as argued by Ricciardi et al. (2016), in practice implies the continuous adjustment of decisions and actions, changing the levels of E&E, resulting in a dynamic management of tensions.

The literature presents external factors such as environmental and competitive dynamism and technological evolution, as well as internal factors such as resources and capabilities, as capable of impacting this dynamic along a trajectory. However, how does this dynamic change when considering the peculiarities of certain industries, in a vision beyond the comparison services versus manufacturing?

In order to contribute to the construction of knowledge in this field, efforts were concentrated on the presentation of propositions that allow an advance on this issue. Therefore, empirically analyzing which factors are capable of altering the logic or balance between E&E, identifying creative and non-predetermined forms of management, based on context, proved to be an opportunity for this advance.

How to survive and grow in complex, dynamic, and uncertain environments is the contemporary strategic challenge faced by most organizations. The conditions that make it possible to balance E&E, in a logic of dynamic equilibrium, for short and long-term innovation results, have been analyzed with greater emphasis in relation to the static view of the process of resolving tensions between these two dimensions (Zimmermann et al., 2018).

Based on the literature review presented, two central contributions of this study stand out: (i) the synthesis and systematization of the concepts and relationships between E&E, ambidexterity, and innovation, which allow a broad understanding of the field; and (ii) propositions built based on the limits identified in the analysis of the most recent studies that addressed the topic, offering a path for future research on ambidexterity and innovation.

Given the variety of organizational arrangements in the various industries, whether they are knowledge intensive, characterized by hypercompetition, or low technological intensity, for example. In addition, the balance between exploration and exploitation is shown to be an organizational paradox, and longitudinal studies have a potential to contribute to the understanding of this logic, such as Piao and Zajac (2016), Knight and Paroutis (2017), as well as procedural approaches Raisch and Tushman (2016). Finally, inductive approaches (Zimmermann et al., 2018) also point to this path, identifying new models from organizational practices capable of contributing to the understanding of this logic.

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AUTHOR'S CONTRIBUTION

PPS: Conceptualization, collection and analysis of data. ILG: Conceptualization, data analysis, review and final editing.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.