

ORGANIZATIONAL AMBIDEXTERITY: A PATH TO DIGITAL TRANSFORMATION IN SMALL AND MEDIUM ENTERPRISES

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ABSTRACT

The Organizational Ambidexterity (OA) has been perceived as an enabling capability for the Digital Transformation (DT) in organizations and includes the trade-off between its dimensions: exploration and exploitation. Its development involves management complexity and enough availability of resources, making it difficult implementation in small companies, a segment whose usual lack of organizational and cognitive assets also creates barriers to DT. Understanding such phenomena in small and medium enterprises (SMEs) contributes to identify initiatives to promote DT in this segment, which employs the majority of the world's population. Our research presents the context in the service sector, aiming to overcome the lack of studies that investigate OA in SMEs. Using multiple case studies, we investigated ambidextrous behaviors adopted by managers of small companies that favor DT. The findings identify combined characteristics of the Structural, Contextual and Leadership-Based Ambidexterity models that enable companies to satisfactorily take advantage of organizational resources in the context of DT. Our research identified a set of mechanisms whose adoption gives evidence of contribution on promoting DT in SMEs. Such aspects involve issues related to knowledge management, human resources, organizational structure and promotion of digital culture.

Keywords: Organizational ambidexterity. Digital transformation. SMEs.

RESUMO

A Ambidestria Organizacional (AO) tem sido percebida como uma capacidade facilitadora da Transformação Digital (TD) nas organizações e inclui o trade-off entre suas dimensões: exploration e exploitation. Seu desenvolvimento envolve

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complexidade gerencial e disponibilidade suficiente de recursos, o que dificulta sua implementação em pequenas empresas, um segmento cuja habitual falta de ativos organizacionais e cognitivos também cria barreiras à TD. Compreender esses fenômenos nas pequenas e médias empresas (PMEs) contribui para identificar iniciativas para promover o DT nesse segmento, que emprega a maioria da população mundial. Nossa pesquisa apresenta o contexto no setor de serviços, com o objetivo de superar a falta de estudos que investiguem o AO em PMEs. Usando estudos de casos múltiplos, investigamos comportamentos ambidestros adotados por gerentes de pequenas empresas que favorecem o DT. Os resultados identificam características combinadas dos modelos de ambidestria estrutural, contextual e baseada em liderança que permitem que as empresas aproveitem satisfatoriamente os recursos organizacionais no contexto do DT. Nossa pesquisa identificou um conjunto de mecanismos cuja adoção dá indícios de contribuição para a promoção do DT nas PMEs. Tais aspectos envolvem questões relacionadas à gestão do conhecimento, recursos humanos, estrutura organizacional e promoção da cultura digital.

Palavras-chave: Ambidestria organizacional. Transformação digital. PMEs.

1 INTRODUCTION

In recent years, the term Digital Transformation (DT) has been frequently used to refer to the transformations brought about by technology, which demand strategic responses to deal with changes in business processes, operational routines, and organizational capabilities (Scuotto *et al.*, 2021; Vial 2019). The emergence of new markets driven by technology highlights the need for organizations to adopt strategies to simultaneously operate in both new and established markets. The need to reconcile operations in both markets underscores the relevance of Organizational Ambidexterity (OA), a phenomenon traditionally associated with organizational and strategic literature, currently perceived as an enabler for DT in companies (Li *et al.*, 2017).

OA consists of balancing efforts between two dimensions (Junni *et al.*, 2013): exploration, which re-lates to experimenting with new alternatives, and exploitation, which relates to continuous and incremental improvement, refinement and extension of competencies, technologies, and existing paradigms (March, 1991). However, continuous adaptation requires resources that are not equally accessible to all business segments and sizes (Luger *et al.*, 2018). The complex management and high costs inherent in the ambidextrous process are especially challenging for Small and Medium-sized Enterprises (SMEs), favoring their focus on activities related to a single dimension rather than both simultaneously (O'Reilly & Tushman, 2013;

Mashahadi *et al.*, 2016).

In these firms, the lack of organizational and cognitive resources imposes constraints on achieving DT, making it even more relevant to develop managerial capabilities of social, human, and knowledge capital, as well as the ability to manage organizational capabilities to build, integrate, and reconfigure resources and competencies (Li et al. 2017). In Brazil, only 3% of SMEs are digital leaders, and 66% are in early stages of digital maturity. The lack of financial resources and knowledge are cited by Brazilian managers as the main barriers to DT (ABDI, 2021).

SMEs represent 90% of all businesses worldwide, responsible for 70% of jobs generated in emerging economies and can account for up to 40% of the Gross Domestic Product (GDP) in developing countries (WorldBank, 2021). In Brazil, SMES represent 90.5% of all companies, contribute to 30% of the Brazilian GDP, and are responsible for 54% of formal jobs in the country (Agência Sebrae, 2020; Data Sebrae, 2020).

The study aims to answer the question: Which initiatives adopted by small ambidextrous Brazilian service firms favor Digital Transformation? We conducted multiple case studies with 05 ambidextrous SMEs, based on the recommendation of experts. To validate the ambidextrous profile, the research uses semi-structured questions developed from the set of measures by Lubatkin et al. (2006). In order to observe the adoption of TD initiatives, 24 criteria were investigated, developed from Vial's (2019) study.

Despite the growing interest in OA and its relationship with TD, there is a scarcity of studies investigating the topic in EPPs from emerging countries. Research conducted on Web of Science, Scopus, and Ebsco databases identified a total of 4, 3, and 2 scientific articles, respectively, that simultaneously relate Organizational Ambidexterity, Digital Transformation & SMEs, none of them from Latin America. Thus, this study aims to complement the literature by observing Brazilian ambidextrous SMEs, identifying mechanisms that facilitate the implementation of TD, which is of great value to re-searchers, entrepreneurs, and public and private managers. The paper is composed of the following chapters: theoretical framework, research method, results presentation, discussion, and conclusion.

2 RESEARCH BACKGROUND

This chapter presents the main approaches in the scientific literature regarding

the phenomena of Digital Transformation (DT), Ambidexterity, their relationships, and impacts on the reality of small businesses. This background is based on research published in journals recognized as reliable sources, as such identification is essential for the development of scientific knowledge (Nazareno & Reisdorfer, 2023). The main concepts are presented in Table 02, in the conceptual framework at the end of the chapter.

2.1 DIGITAL TRANSFORMATION

The widespread use of digital tools has imposed on businesses the challenge of constant adaptation to changes, often radical, of a social, industrial, and organizational nature (Scuotto *et al*, 2021). This phenomenon exposes the need for redefining value propositions, reveals the demand for new organizational identities, and has been recurrently referred to by the term Digital Transformation (Li *et al*, 2017; Liere-Netheler *et al.*, 2018, Wessel *et al.*, 2021). Despite the growing interest in the topic, the theme still lacks shared understanding regarding what it entails and what its impacts are on business models in various sectors (Carvalho *et al.*, 2021).

In order to summarize the main approaches taken by the literature on Digital Transformation in the last three decades, Vial (2019) developed a framework composed of 8 blocks and 24 criteria, demonstrating the central role of digital tool use in the value creation process and the reinforcement of disruptions. In summary, the scheme presents that, in search of competitive advantage and new paths to value creation, organizations should consider aspects such as strategy, structure, processes, and culture.

In this scenario, the use of mobile, social, analytics, cloud, internet of things, platforms, and ecosystems digital technologies foster market disruptions, whose implications alter consumer behavior, user expectations, and affect the competitive environment, which, in turn, demand strategic responses from organizations aimed at leveraging digital resources and adopting initiatives for Digital Transformation (Vial, 2019).

Business opportunities generated by the use of digital technologies are abundant; however, the Digital Transformation strategy must be developed to keep the company competitive in its context (Carvalho *et al.*, 2021). Thus, organizations must implement structural changes, overcoming barriers that hinder efforts towards Digital Transformation, generating positive impacts, and mitigating negative effects

(Vial, 2019).

2.2 DIGITAL TRANSFORMATION IN SMES

The use of digital technologies has been fundamental in creating value, obtaining innovation capacity, and gaining competitive advantage across various segments, but intelligent leveraging of digital resources is a particularly important success factor for SMEs (Scuotto et al, 2021). Digital technologies enable SMEs to improve efficiency, engage with stakeholders, and expand into new markets, but their use tends to be more complex as there are often difficulties in designing, implementing, and achieving full digitalization of strategic and organizational models (Garzoni et al., 2020). Although studies have pointed to a direct relationship between investment in Information Technology and increased profitability in small businesses (Meirelles, 2021), these businesses generally have limited resources and lack the cognitive and organizational sets to lead the introduction to TD (Li et al., 2017).

On the other hand, essential TD characteristics are observed in SMEs, such as organizational agility, flexibility, decentralization, customer proximity, and lean decision-making (Garzoni et al., 2020), highlighting individual digital capabilities that act as important drivers for the adoption of new technologies, accelerating the adaptation to new contexts (Tams et al., 2014).

2.3 ORGAZATIONAL AMBIDEXTERITY LANDSCAPE

2.3.1 Antecedents of Organizational Ambidexterity

Organizational ambidexterity (OA) has antecedents in applied investigations of business strategy, addressing adaptation associated with the use of strategies and environmental factors. Duncan (1976) coined the term, referring to the use of dual organizational structures for managing conflicting demands inherent in dynamic environments (O'Reilly & Tushman, 2013). March (1991) proposed two distinct activities in the process of organizational learning: exploitation, associated with refinement, efficiency, selection, production, and implementation; and exploration, referring to research, variation, experimentation, flexibility, innovation, discovery, and risk-taking.

Tushman and O'Reilly (1996) proposed reconciling the exploration and exploitation activities as two dimensions of OA. Since then, the literature has been deepened in perspectives that explore organizational models (Fourné et al., 2019),

organizational learning (Raisch & Birkinshaw, 2008), organizational adaptation (Meyer & Stensaker 2006), strategic management (Patel et al., 2013), and technological innovation (Smith & Tushman, 2005)..

Table 01 presents 21 definitions of Organizational Ambidexterity, cited and reiterated by researchers in studies published between 1976 and 2019. Most definitions relate to managing opposing tensions and conflicting demands, seeking business benefits. Our study mainly appropriates the definition by Patel et al. (2013), in which it is perceived as a phenomenon that enables the realization of existing advantages while creating challenges for future markets.

Table 1. Definitions of Organizational Ambidexterity.

| Definition | Author(s) |
|---|------------------------------|
| The use of dual organizational structures to manage conflicting demands in dynamic environments. | Duncan, 1976 |
| Two distinct activities in the process of organizational learning: exploitation (associated with refinement, efficiency, selection, production, and implementation) and exploration (referring to search, variation, experimentation, flexibility, innovation, discovery, and risk-taking). | March, 1991 |
| The reconciliation of exploration and exploitation as two separate dimensions of organizational ambidexterity. | Tushman & O'Reilly, 1996 |
| The ability of a firm to simultaneously manage activities related to low-cost and differentiation strategic positions. | Porter, 1996 |
| The ability of a firm to simultaneously manage activities related to global integration and local responsiveness. | Bartlett & Ghoshal, 1998 |
| The ability of a firm to simultaneously manage activities related to production efficiency and flexibility. | Adler et al., 1999 |
| The capability that organizations have to address simultaneously conflicting demands, according to developed managerial skills. | Benner & Tushman, 2003 |
| The ability to manage organizational tensions between the need for flexibility and the need for stability. | Gibson & Birkinshaw, 2004 |
| The ability to pursue both exploratory innovation (seeking new knowledge and technologies) and exploitative innovation (developing existing competencies). | Smith & Tushman, 2005 |
| The ability to manage the trade-off between conflicting activities, processes, and structures for exploration and exploitation. | O'reilly Tushman, 2004 |
| The ability of organizations to align and leverage resources to simultaneously pursue exploratory and exploitative innovation. | Raisch & Birkinshaw, 2008 |
| The ability to manage and balance paradoxical demands of stability and change within organizations. | Andriopoulos & Lewis, 2009 |
| Company's ability to balance different activities simultaneously in a trade-off situation. | Rothaermel & Alexandre, 2009 |
| The ability to manage the paradox of alignment and adaptability in organizations, to exploit current capabilities while exploring new opportunities. | Jansen et al. , 2009 |
| Ability of the organization to be aligned and efficient in its management for today's business demands while also being adaptable to environmental changes. | Raisch & Birkinshaw, 2008 |
| A phenomenon that allows organizations to exploit current advantages while creating challenges for future markets. | Patel et al., 2013 |
| The company's ability to identify innovation opportunities and leverage competitive market opportunities by assembling the necessary assets, knowledge, and relationships with speed and surprise. | Junni et al., 2013 |
| The ability to equate the organization's exploration and exploitation actions generates an organizational capacity, conceptualized as ambidexterity. | Martins, et al, 2014 |

| | |
|---|--------------------------|
| The company's ability to maintain both an operational backbone and a digital services platform. | Sebastian et al., 2017 |
| A dynamic capability that enables organizations to simultaneously explore new opportunities and exploit existing resources to compete in changing environments. | Fourné et al., 2019 |
| The capability of an organization to pursue exploratory (discontinuous) and exploitative (incremental) innovation simultaneously. | Montealegre et al., 2019 |

Source: own authorship.

2.3.2 Literature Approaches

In the literature, three approaches are observed for investigating the elements that favor ambidexterity and are related to structural, contextual, and leadership-based solutions. In the first approach, called Structural Ambidexterity, researchers suggest the structural development of ambidextrous units to deal with distinct processes, systems, incentives, and cultures inherent to the ambidextrous process. Thus, through structural separation or the maintenance of parallel structures, the company can individually deal with activities related to exploration and exploitation (Raish & Birkinshaw, 2008).

In the second approach, called Contextual Ambidexterity, it is suggested that tensions arising from the ambidextrous process can be resolved at a single level of the company if it can develop the capacity for alignment and adaptability throughout the business unit. Unlike the previous proposal, this approach has its main core in the role of the individual, who takes responsibility for their own balance between conflicting demands (Gibson & Birkinshaw, 2004). The company's management has the role of fostering a favorable context, which can be understood as systems, processes, and beliefs (O'Reilly & Tushman, 2013).

The third approach, called Leadership-based Ambidexterity, highlights the role of behavioral integration in establishing mechanisms that enable the balance of tensions (Venugopal et al., 2020). In this approach, there are studies that relate exploration to operational levels, with the intention of developing innovations for emerging problems, and exploitation to top management, related to the utilization of solutions (Floyd & Lane, 2000; Venugopal et al., 2019). The role of top management is also observed in fostering collaborative team behavior, emphasizing joint decision-making, and the quantity and quality of transacted information (Lubatkin et al., 2006).

2.3.3 Organizational Ambidexterity Measures

To identify the use of OA by an organization, previous studies define criteria that enable the observation of the balance and combination of exploratory orientations

(Junni et al, 2013).. The study by Lubatkin et al. (2006), conducted with 139 SMEs, enables the identification of a company's ambidextrous behavior based on 12 measurement items, six of which are directed at each dimension of OA. This article has obtained a significant volume of citations, being the most referenced of the entire Web of Science database when searching for the terms Ambidexterity and SMEs.

The items consistent with exploration correspond to the organization's characteristics that make it: (i) seek new technological ideas through "out-of-the-box" thinking; (ii) base success on its ability to explore new technologies; (iii) create products or services that are innovative for the company; (iv) seek creative ways to meet customer needs; (v) aggressively invest in new market segments; and (vi) actively target new consumer groups.

The items related to exploitation describe managerial practices of: (i) committing to improving quality and reducing costs; (ii) continuously improving the reliability of its products and services; (iii) increasing levels of automation in its operations; (iv) constantly investigating customer satisfaction; (v) adjusting what it offers to keep current customers satisfied; and (vi) deepening its existing customer base.

2.3.4 Orgazational Ambidexterity in SMEs

The implementation of OA by an institution varies according to environmental circumstances, internal factors, size, and segment (Wenke et al., 2021). With regard to size, large companies tend to have greater availability of resources to dynamically adapt structurally to parallel units or structural separation, favoring the adoption of Structural Ambidexterity (Lubatkin et al. 2006). In this model, the prolonged maintenance of distinct structures involves risks that may not necessarily be assumed by small businesses (Burgers & Covin, 2016).

Despite the limitation of resources, small businesses generally have greater flexibility and versatility than large companies, favoring the adoption of exploration in an environment of incremental improvement and refinement (Fourné et al, 2019). In these companies, top management plays a vital role and can use a combination of integration and differentiated approaches in management to assist ambidextrous behavior (Andriopoulos & Lewis, 2010), compensating for the scarcity of resources, to make dual physical structures viable, as described in the Contextual and Leadership-Based OA models.

2.3.5 Orgazational Ambidexterity in Digital Transformation Landscape

O OA generally refers to a complex group of decisions and routines that enable the organization to identify and seize new opportunities by reallocating organizational assets, such as the constant construction and reconfiguration of competencies. Such issues favor rapid adaptation to environmental changes (Birkinshaw et al., 2016; He & Wong 2004), avoring, in the context of DT, the adoption of new technologies and digital innovation while managing existing resources and consolidated technologies (Lee et al., 2015).

The business use of technology generates inevitable contradictions typical of the ambidextrous process. These relate to the objectives, priorities, and types of technological tools to be adopted, such as the need to reconcile the maintenance of stable structures and the application of innovative trends (Montealegre et al., 2019). Therefore, OA is acknowledged as the ability to simultaneously exploit stable and emerging technologies (He & Wong, 2004), agile and traditional systems in technology management Vinekar et al., 2006; Yoshikuni et al., 2017), and also as the capacity to promote balance be-tween the use of digital innovation and pre-existing resources (Li et al., 2017).

Table 2. Literature Review Conceptual Framework.

| Concept | Description | Author(s) |
|--------------------------------|--|---|
| Digital Transformation | Phenomenon related to transformations precipitated by the use of digital technology, which promote changes in business processes, operational routines, and organizational capabilities, demanding strategic business responses. | Scuotto et al., 2021; Vial, 2019; Li et al., 2017; Liere-Netheler et al., 2018; Lee et al., 2015 |
| Organizational Ambidexterity | Refers to the ability of the organization to efficiently take advantage of existing market opportunities while creating and innovating in future market challenges. | Patel et al., 2013; Duncan, 1976; Tushman & O'Reilly, 1996; Benner & Tushman 2003; Gibson & Birkinshaw, 2004; Andriopoulos & Lewis, 2009. |
| Structural Ambidexterity | Ambidexterity model whose development is given through the development of distinct structural mechanisms, to deal with demands related to exploration and exploitation. | Meyer & Stensaker, 2006, Duncan, 1976 |
| Contextual Ambidexterity | Ambidexterity model in which behavioral capacity to engage, across the entire business unit, in alignment and adaptability is developed. | Gibson & Birkinshaw (2004) |
| Leadership-Based Ambidexterity | Ambidexterity model developed from behavioral integration, in the establishment of integrative mechanisms, developed by leadership, and which enable the contradictory management of OA tensions. | Floyd & Lane, 2000; Venugopal et al., 2019 |

Source: own authorship

3 RESEARCH METHOD

We conducted a multiple case study using a qualitative approach, collecting data through semi-structured interviews with ambidextrous Brazilian SME managers in the service sector. This method enabled us to provide empirical descriptions of specific instances of the phenomena investigated, drawing on various data sources, as outlined by Yin (2018). This method is indicated for consideration from an interpretive or critical perspective (Mello et al., 2023). Following an inductive research process (Creswell, 2007), we conducted an extensive literature review to gather information, before collecting data from multiple sources and analyzing it.

Table 3. Summary of Surveyed Companies

| Company | Geographic scope of operations | Length of existence | Team Size | Description of services offered |
|--------------------|--------------------------------|---------------------|-----------|--|
| DevX Systems | Regional | 04 years | 12 | Custom software and hardware development for improving industrial processes, involving circuits, boards, and IoT. Also sells own products. |
| Otim Games | National | 05 years | 18 | Development of mobile applications, gamification tools and games for advertising, education, and entertainment. Awarded in the largest Brazilian startup acceleration program in 2017 in the Education and Accessibility category. |
| Resolution Company | National | 10 years | 36 | Hardware and software development and maintenance, including metrology, industrial automation, instrumentation, and calibration services for the industrial and scientific sectors. |
| Vitoria Systems | International | 10 years | 20 | Custom software development for web, desktop, and mobile systems, and participates in initiatives to develop assistive technologies to increase autonomy and freedom of movement for people with disabilities. |
| Siw Digital | National | 10 years | 14 | Offers corporate learning services for companies, providing training, consulting, and services related to capacity building, culture, and performance. |

Source: Own authorship.

To access the sample and select the case studies, we conducted individual interviews with eight experts in small businesses who work at Sebrae, the main Brazilian institution for promoting entrepreneurship and management in SME's. These experts work in the states of Minas Gerais and Espírito Santo, have been with

the company for between 13 and 28 years, and were selected through the researcher's networking efforts. In total, the experts recommended 46 companies, with 37 of them perceived as potentially ambidextrous. The majority operate in the service sector (62% of the total), which is home to 45% of the country's businesses, including around 7.9 million companies (Data Sebrae, 2021). The services provided by the companies are associated with various microsegments, not limited to technology services. Given the sector's representativeness in our sample and for the economy, we chose to focus exclusively on this area, investigating similar cases.

The research sample is based on typical or special cases and analyzed five cases, collecting data through interviews with their directors. In the case study, the choice of sample is particular and always intentional, based on pragmatic and theoretical criteria, rather than probabilistic criteria (Bravo, 1998). To select the sample, contact was made with the companies in a random order, through the experts, until five executives expressed an interest in participating in the research. In total, seven companies were approached.

The interviews took place between August and December 2021, via videoconference, lasting between 60 and 120 minutes, and were conducted in compliance with Brazil's General Data Protection Law, with the documentation previously approved by the Ethics Committee of Fundação Getulio Vargas. The interviews were recorded and transcribed, the respondents' identities were kept confidential, and they agreed to the Consent Form presented in advance by the researcher.

Table 3 summarizes the investigated companies, although for confidentiality reasons, the names used in the work are fictitious. All of them are categorized by the Brazilian Federal Revenue Service as SME, in a category that includes companies whose annual gross revenue ranges from 360,000 to 4.8 million Brazilian Reais, monetary value corresponding to approximately 72,015 to 960,200 US dollars. To increase the study's validity and provide new perspectives, we adopted sequential data triangulation and simultaneous method triangulation. Thus, the interviews were complemented with information published by the press or shared by the investigated companies, and we used a survey consisting of Likert scale batteries of agreement and disagreement.

4 PRESENTATION OF RESULTS

This chapter presents the organizational contexts of the companies. All companies demonstrated a good balance between exploration and exploitation practices, validating ambidextrous business behavior. Likewise, it was observed that the companies made good use of both established and emerging digital technologies to create value.

The interviewees were exposed to Likert scales of agreement and disagreement to certify the existence of ambidextrous behavior and to identify TD initiatives. The first scale considers the 12 criteria of OA by Lubatkin et al. (2006), and the second is based on a study by Vial (2019). The criteria used to observe OA and TD, along with the results of semi-structured interviews and Likert scales.

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

4.1 COMPANY 01 - DEV X SYSTEMS

The company develops platforms, software, virtual assistants, and IoT, in which consolidated and emerging technologies are embedded. Knowledge management, which enables the simultaneous development of both types of technology (consolidated and emerging), reveals the typical ambidextrous dilemma within the company.

In constant pursuit of innovative solutions, the company faces challenges related to team competence management. At this point, the management assumes the role of fostering innovation and individual ambidextrous behavior through the adoption of systematic initiatives and learning processes, as can be seen in the following quote. Such characteristics are typical in Contextual and Leadership-Based OA models.

"We set aside hours of the day for internal training. We only work with six productive hours per day, and people work eight. So they have two unproductive hours, in terms of product development. During these 02 hours, we work on other fronts, such as studies, interpersonal relationships..." (Dev X Commercial Director)

In addition to on-demand services, the company develops products through self-financing, in which spin-offs are generally developed, indicating the use of structural separation, a characteristic of Structural OA. According to the director, the

model allows the exploitation of opportunities without compromising the main operation.

The company demonstrates a good position regarding TD, through the mastery and application of consolidated and emerging technologies, and for the creation of value for customers, partners, and society. Innovative solutions, of a technological and social im-pact nature, have been developed by the company for the purpose of improving public transportation, emergency public services, and elderly care.

4.2 COMPANY 02 - OTIM GAMES

The company develops gamification tools for learning, entertainment, and advertising, incorporating consolidated and emerging immersive technologies such as augmented reality, virtual reality, and artificial intelligence. The company also develops and markets mobile applications for various purposes, with the goal of maintaining cost structure, as stated by the Director:

*"We make apps to pay bills. If we could, we would live solely from games."
(Managing Director, Otím Jogos).*

The quote reveals an ambidextrous dilemma, in which services developed with consolidated technologies are directed at mature markets and serve an exploitation role, while innovative solutions with emerging technologies, aimed at less explored markets, play an exploration role. This dilemma is recurrent in companies that develop technological products (Montealegre *et al.*, 2019).

To reconcile the dimensions of OA, the company adopts different practices, often with strong influence on the individualized role of the collaborator, as observed in the Contextual OA model. The role of the board is directed towards fostering the study of new knowledge related to innovation, combined with rigorous control methods. In a favorable cultural context, employees often take on assignments associated with both exploration and exploitation. For example, employees have 15 to 20% of their daily workload to develop prototypes or innovative products.

At the top management level, there is constant analysis of opportunities for new business and commercial models. For example, the director describes a feasibility study for the company's entry into the NFTs (Non-Fungible Token) gaming segment, involving blockchain technologies. According to him, investment in new business opportunities is possible due to the optimization of production processes, such as the use of software frameworks and libraries, which increase productivity,

response speed, and resource utilization. The adoption of ambidextrous practices in the company allows for simultaneous activities related to business sustainability and the identification of future opportunities. Given that most of the services offered by the company are based on emerging digital technologies, OA has a direct relationship with resource utilization for business reconfiguration, consequently fostering TD.

4.3 COMPANY 03 - RESOLUTION COMPANY

The company offers instrumentation services, automation engineering, automation system integration, and technical support, designing, building, and operating prototypes and sensors. It develops sensing and automation technologies incorporating emerging technologies such as IoT, Big Data, Artificial Intelligence, Robotics, and Industry 4.0. The use of innovative technologies is an important driver for the development of new products. However, most of the solutions offered are based on consolidated technologies that aim to simplify processes and operations for small and medium-sized enterprises, as stated by the CEO.

"[...] our technologies were developed primarily to meet small demands. To serve small and medium-sized businesses that do not have or will not have the means or need to have automation professionals [...] we have developed easy-to-install sensors and easy-to-configure tools to enable automation in the small and medium-sized industry." (Respondent 03. CEO Resolution)

As an Exploration initiative, the development of new versions and combinations of products and business rules is exemplified, as stated by Lubatkin et al. (2006). As exploitation, control initiatives were identified, related to the search for operational improvements, such as the accreditation of the National Institute of Metrology, Quality, and Technology (Inmetro) seal. According to the CEO, defining control mechanisms for managerial improvement aims, among other points, to favor the administration of semi-independent units, as in the Structural OA model.

4.4 COMPANY 04 - VITÓRIA SYSTEM

The company develops on-demand software and markets its own product, a guide robot, developed with various technologies to assist the mobility of visually impaired individuals. The diversity of the portfolio aims to guarantee the company's profitability while seeking future business opportunities, similarly to the Structural OA model:

"[...] product development is paramount. Today we develop custom software to maintain a minimum revenue to maintain a team and the infrastructure to develop the robot." (Respondent 04, CEO Vitória System)

Given the limitation of resources for product development, the company has recon-figured key partnerships for robot production on a larger scale. Such reconfigurations are essential elements for value creation, according to Vial (2019). The development of proto-types and products heavily relies on embedded emerging technologies, such as sensors and components for IoT, artificial intelligence, and robotics.

"We are constantly developing new technologies, proposing new technologies to clients... we live outside of normalcy all the time because we receive challenges all the time." (Respondent 04, CEO Vitória System)

The company's value proposition is closely related to the implementation of cutting-edge digital technologies, which generates the need for constant team updating. However, there is low employee involvement in activities outside their traditional functions. Flexibility in the functions performed by employees is a striking characteristic of the Contextual and Leadership-Based OA models.

In addition to a strong search for innovation, the company adopts exploitation practices, such as the adoption of the Brazilian Association of Technical Standards (ABNT) NBR ISO/IEC 29110 normative standard. The standard attests that certified software developers have adequate processes for development, allowing the delivery of software that adheres to the requirements defined in the project (ABNT, 2021).

4.5 COMPAY 05 - SIW DIGITAL

Siw emerged as a school for open courses, mainly focusing on products that addressed the impact of digital tools on the business reality. In 2021, the company adopted a position as Learntech, offering courses, lectures, training, and consulting for the B2B segment, proposing differentiated corporate learning processes with a focus on culture and performance.

Education and consulting products use their own methods and consolidated tools and largely address issues related to innovation and technology. Knowledge of these topics favors the incorporation of good practices, sharing culture among employees, and the use of digital tools and agile methodologies. In the performance of their functions, employees take on versatile and flexible roles, circulating between

exploration and exploitation activities.

Among the typical OA dilemmas observed in the company, balancing the use of agile and traditional management systems stands out (Vinekar et al., 2006). In this aspect, the company reconciles traditional project management with agile methods, such as the OKR and H3 framework from McKinsey consultancy, used to promote innovation and growth (Mckinsey, 2009).

"We have a look we call H3, Horizon 03. We use the 03 horizons to organize our initiatives, right? The horizon of immediate cash generation, the horizon of new businesses, and the horizon of future cash." (CEO Siw).

Throughout its trajectory, the company has demonstrated that it has diversified its activities, developing new business fronts from identified opportunities. Ideas developed became independent business units with their own or partially shared team, as the following quote states:

"I consider Brand 01 and Brand 02 as spin-offs, but we have an internal evolutionary ruler. First, they become projects, then they become products, then they become businesses, and then they become companies." (CEO Siw).

5 RESULTS AND DISCUSSIONS

5.1 ORGANIZATIONAL AMBIDEXTERITY FOSTERING DIGITAL TRANSFORMATION IN SME'S

5.5.1 Exploitation Practices

The investigated companies have mastery of consolidated technologies and use development frameworks to streamline operations, increase productivity, and reduce costs. Usually open source, libraries of functions and components are developed, facilitating the reuse of structures and reducing development time, enabling a focus on activities with higher potential for value generation. In businesses directly related to system development (Resolution, Dev X, Vitoria System, and Otim Jogos), frameworks are directly applied to product and service development. Siw uses them to develop communication and promotion platforms.

The use of automation software to seek operational improvements, especially to systematize administrative, productive, commercial, and advertising processes, stands out. Two of the companies (Dev X and Resolution) demonstrate particular mastery, as they develop industrial automation solutions as a service offering to third parties.

The top management of the companies has demonstrated constant commitment to improving the offering of services and products, which is evident, especially in Resolution and Vitoria System. The former has Inmetro accreditation, and the latter obtains certification of the ABNT normative standard.

5.1.2 Práticas de Exploration

All companies demonstrated value propositions closely related to the exploration of digital resources, which is an important driver for the development of new products in search of future market opportunities. Companies base the success of the company on the ability to explore new technologies, making the use of digital resources a key part of exploration.

Four companies implement emerging technologies in the provision of services to foster innovative solutions in their current or future products. Siw's products do not have embedded emerging technologies, but the company demonstrates a good level of assimilation of them. The constant search for mastery of technologies, especially those of a disruptive nature, tends to favor future market positioning. To do this, established mechanisms were observed that involve cultural and structural aspects, motivated by leadership, and that enable the apprehension and use of technology.

Such mechanisms derive from the company's global strategic planning since the companies do not specifically formulate Digital Business or Digital Transformation Plans. According to Vial (2019), specific strategies have the role of formulating and executing digital resources, especially to create differential values for the company.

The restriction of resources, typically observed in SMEs as a hindrance to accessing TD (Li et al., 2018), is also observed in the investigated companies. The creation of value is closely related to the ability to exploit emerging technologies, demonstrating an exploratory orientation for Exploration. To deal with the limitation of resources, companies invest in internal mechanisms, team training, and retention.

5.1.3 Conciliação de práticas exploratórias

In order to reconcile the dimensions of OA, two companies establish the recurrence of employees' daily workload for the development of prototypes, study of new technologies, or expansion of knowledge. At Dev X and Otim, between 15 and 25% of the workday is officially dedicated to exploration practices. According to the director of Otim, the mastery of competencies acquired during this period favors a

quick response to market demands, enables the development of new businesses, and contributes to the creation of knowledge repositories, streamlining the company's operation.

In addition to mechanistic structures to foster OA, the role of top management is fundamental in the strategic orientation of the company. The strength of this relationship is proportional to the interface ability of interaction between the team, CEO, and top management, including communication richness, functional complementarity, and decentralization power (Cao et al., 2010). The interviewed executives demonstrated commitment to fostering OA and TD.

Companies have demonstrated their search for innovation through portfolio diversification, however, resource constraints restrict the creation of new offers. To optimize this process, four investigated companies use the knowledge generated in providing on-demand services to create products that can be used later for commercialization.

5.2 OBSERVED MODELS

From the literature descriptions, we identified characteristics in the companies that approach them to the Structural, Contextual or Leadership-Based OA models. However, all SMEs adopt initiatives present in more than one model, indicating that their ambidextrous behavior is composed of the combination of one or more models. All investigated companies develop spin-offs to exploit future opportunities, applying the Structural OA model. Resolution and Vitória companies have greater alignment with this model, defining more rigid processes and functions and less flexibility in the individuals' function transition.

Contextual OA has as its main characteristic the responsibility assumed by individuals in the ambidextrous process. Thus, there is greater development of the collaborator's adaptability capabilities and transition throughout the business unit. In the model, management should encourage individuals to make their own judgment on how to best balance alignment and adaptability demands (O'Reilly & Tushman, 2013). Among the analyzed companies, Otim Jogos and Dev X demonstrated greater adherence to such practices.

The Leadership-Based OA highlights the integrative role of the company's leadership in fostering culture with ambidextrous aspects. In this regard, management has the role of articulating goals, developing skills, and defining routines to perceive

opportunities and then take advantage of them to reconfigure the organization (Montealegre et al., 2019). Siw is the company that best demonstrated the development of organizational culture in the ambidextrous process.

5.3 AMBIDEXTROUS SME INITIATIVES THAT FAVOR DT

TD in a company implies the business strategic response, through the transformations brought about by the use of digital technology (Li et al., 2017). In the investigated SMEs, the strategic responses have an intimate relationship with OA. Among them, it is recurrent the development of mechanisms to apprehend knowledge related to emerging technologies with high disruptive potential. OA allows such companies to acquire such knowledge while managing services based on consolidated technologies.

The companies' value propositions have aspects related to technological innovation, which places the offer of digital services at the heart of the business objective. As pointed out by Lubatkin et al. (2006) and Vial (2019), the use of digital resources is an important element of future positioning and exploration characteristic.

In the investigated cases, employees occupy a central space in business performance, demanding from senior management the construction of mechanisms to foster a culture focused on digital mindset. In some cases, it was observed that employees take responsibility for their own balance between exploitation and exploration demands, a striking characteristic of the Contextual OA, as presented by Gibson and Birkinshaw (2004). However, the two companies with the largest number of employees demonstrated greater rigor with individual assignments and less flexibility in assuming roles traditionally out-side their functions. These demonstrated greater mastery of exploitation activities and apparent greater maturity to manage dual units, as in the Structural OA model, presented by Raish and Birkinshaw (2008).

Still related to this model, all investigated managers demonstrated using Spin-off initiatives, in which two units act in a dual manner, most of the time sharing a team. The presented objectives, however, always involved the ability to deal with present and future technology demands.

It is also relevant to highlight that all companies demonstrated a shortage of re-sources for the development of new products, as presented by Garzoni et al. (2020). How-ever, in order to build new innovative solutions, these companies are willing to develop projects with reduced profitability margins. This measure contributes

to the enrichment of the company's knowledge repository, a method used by all companies. In this case, the knowledge generated in this modality optimizes the traditional operation of the company (exploitation), while employees can partially focus on the development of new solutions (exploration). This characteristic highlights the practices of Leadership-Based Ambidexterity, as stated by Venugopal et al. (2020).

6 CONCLUSION

This article aimed to investigate ambidextrous initiatives of Brazilian SMEs in the service sector and their relation to initiatives for Digital Transformation. For this purpose, theory-based studies were conducted based on the reality of 05 companies (multiple case studies), chosen from the indication of experts. Data and method triangulation aimed to enrich the analysis and included scales and criteria previously defined by Lubatkin et al. (2006) and Vial (2019).

As pointed out by Li et al. (2017), the resource limitation that characterizes SMEs also imposes on this group of companies the lack of organizational and cognitive assets necessary to introduce TD. For this group of companies, the transition to the use of disruptive technologies is more complex, since they need to achieve complete business digitalization first, especially in Brazil, where only 3% of small businesses are digital leaders (ABDI, 2019).

In order to create value for the business and improve the quality-of-service offerings, companies have adopted initiatives related to the use of emerging and established technologies. Ambidextrous behavior has proven to be essential for simultaneously maintaining profitability and capturing future opportunities.

The ambidextrous behavior adopted by companies has characteristics observed in different models presented in the literature. Two of the companies have a predominant Structural OA characteristic, two companies have a Contextual OA, and one of the companies has a Leadership-Based OA. However, it is observed that the implementation of OA comprises a combination of characteristics from different models. The research is limited to case studies in SMEs in the service sector, strongly associated with innovation through digital resources. Future studies may improve the investigation if conducted in the Commerce, Industry, Agribusiness, and Civil Construction segments.

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