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Business Model Innovation and Firm Performance: The Role of Turbulent Environments and Organizational Capabilities during two recent Brazilian economic downturns

Inovação do modelo de negócios, capacidades organizacionais e desempenho da empresa: Os efeitos moderadores da turbulência ambiental durante duas crises recentes no Brasil

Innovación en el modelo de negocio, capacidades organizativas y rendimiento empresarial: Los efectos moderadores de las turbulencias ambientales durante dos crisis recientes en Brasil

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ABSTRACT

Goal: This study uses the Resource-Based Theory framework to investigate how Business Model Innovation and organizational capabilities interact with environmental turbulence and competitive pressures to affect firm performance during two crises that impacted firms in Brazil: the 2015-16 recession and the 2020 COVID-19 pandemic. **Methodology/approach:** The research was conducted with a two-wave cross-sectional survey: the first wave took place during the 2015-16 recession, and the second during the 2020 pandemic. The survey focused on BMI, organizational capabilities, competitive intensity, and environmental turbulence. **Originality/relevance:** This research contributes to the understanding of how firms respond to crises of different nature and intensities by innovating their business models and the role of organizational capabilities in mediating this process. It offers insights into how the impact of BMI on firm performance varies across different levels of turbulence intensity. **Main findings:** In the 2015-16 crisis, firms in less turbulent industries that embraced BMI achieved higher performance. In contrast, during the 2020 pandemic, BMI in highly turbulent settings led to superior performance. The study highlights the importance of resource and capability alignment with the crisis context for organizational fit and performance in turbulent times. **Theoretical contributions:** This research aligns with Resource-Based Theory (RBT) and dynamic capabilities literature, shedding light on the interactions between BMI, organizational capabilities, and turbulence during crises. **Management contributions:** Understanding the interplay between BMI, capabilities, and turbulence can guide firms´ responses to economic crises, supporting strategic decision-making and adaptability. This research offers valuable insights for organizations facing turbulent environments.

Keywords: Business model innovation. Environmental turbulence. Firm's performance. Organizational capabilities.

RESUMO

Objetivo: Este estudo, baseado na Teoria Baseada em Recursos (TBR), investiga como a Inovação do Modelo de Negócios (IMN) e as capacidades organizacionais interagem com turbulências ambientais e pressões competitivas, influenciando o desempenho das empresas durante duas crises no Brasil: a recessão de 2015-16 e a pandemia de COVID-19 em 2020. **Metodologia/abordagem:** A pesquisa foi realizada com um levantamento transversal de duas ondas: a primeira onda ocorreu durante a recessão de 2015-16 e a segunda durante a pandemia de 2020. A pesquisa se concentrou na IMN, nas capacidades organizacionais, na intensidade competitiva e na turbulência ambiental. **Originalidade/relevância:** Esta pesquisa auxilia a compreensão de como as empresas respondem a crises de diferentes naturezas e intensidades inovando seus modelos de negócios e o papel das capacidades organizacionais na mediação desse processo oferecendo insights sobre como o impacto da IMN no desempenho das empresas varia em diferentes níveis de turbulência. **Principais resultados:** Em 2015-16, as empresas de setores menos turbulentos que adotaram a IMN obtiveram melhor desempenho. Em contraste, durante a pandemia de 2020, a IMN em ambientes altamente turbulentos levou a um desempenho superior. O estudo destaca a importância do alinhamento de recursos e capacidades com o contexto da crise para o ajuste organizacional e o desempenho em tempos turbulentos. **Contribuições teóricas:** Este estudo contribui para a literatura sobre TBR e capacidades dinâmicas ao esclarecer como a IMN, capacidades organizacionais e turbulências interagem durante crises. **Contribuições para a gestão:** Também oferece insights práticos, auxiliando empresas a tomarem decisões estratégicas e adaptativas em cenários de alta incerteza.

Palavras-chave: Inovação do modelo de negócios. Turbulência ambiental. Desempenho empresarial. Capacidades organizacionais.

RESUMEN

Objetivo: Este estudio, basado en la Teoría Basada en los Recursos (TBR), investiga cómo la Innovación del Modelo de Negocio (IMN) y las capacidades organizativas interactúan con turbulencias y presiones competitivas, afectando el rendimiento empresarial durante dos crisis en Brasil: la recesión de 2015-16 y la pandemia de COVID-19 en 2020. **Metodología/enfoque:** Se realizaron dos oleadas de encuestas en línea con ejecutivos vinculados a una escuela de negocios brasileña, una en la recesión de 2015-16 y otra en la pandemia de 2020. **Originalidad/relevancia:** El estudio contribuye al entendimiento de cómo las empresas responden a crisis de distinta naturaleza e intensidad mediante la IMN y el papel mediador de las capacidades organizativas. **Principales resultados:** En 2015-16, la IMN benefició a empresas en sectores menos turbulentos; en 2020, favoreció a empresas en entornos altamente turbulentos. El alineamiento entre capacidades y contexto de crisis fue crucial para el rendimiento. **Contribuciones teóricas:** Aporta a la TBR y a la literatura sobre capacidades dinámicas, esclareciendo la interacción entre IMN, capacidades organizativas y turbulencias en crisis. **Contribuciones a la gestión:** Proporciona insights para guiar a las empresas en decisiones estratégicas y adaptabilidad durante crisis económicas.

Palabras clave: Innovación en modelos de negocio. Turbulencia ambiental. Rendimiento empresarial. Capacidades organizativas.

INTRODUCTION

The business model (BM) outlines how a firm creates and delivers value to customers, and how it captures part of that value (Teece, 2018). BM innovation (BMI) complements "the traditional subjects of process, product, and organizational innovation" (Zott et al., 2011, p. 1032), and is increasingly seen as an alternative to derive new revenue and profit streams (Snihur et al., 2021). The management research literature addresses BMI as a reaction to exogenous shocks arising from technology shifts and governmental regulations (Spieth et al., 2023; Teece, 2018), as a response to competitive pressure (Wang & Habibulla, 2021; Zhao et al., 2020) or as an outcome of trial-and-error experimental responses to environmental changes (Donner & de Vries, 2021; McDonald et al., 2021; Spieth et al., 2023).

Firms in dynamic business environments need to orchestrate their resources to sense and seize opportunities of creating and delivering value for customers, counting on their operational capabilities (Teece, 2018), which consist of firms' routines and higher-level activities that enable them to solve problems systematically, build new competencies, and address rapidly changing environments (Teece, 2018; Wilhelm et al., 2022). Socio-economic crises amplify competitive pressures due to heightened levels of uncertainty, compelling firms to prioritize adaptability, agility, and innovative adaptations to their business models. Recent economic downturns in Brazil, notably the 2015-16 recession and the global disruption caused by the 2020 COVID-19 crisis, represent instances where Brazilian companies faced significant demands for change. Even though their causes were of different nature (local economy's performance versus global pandemic), they both present common characteristics of turbulent fields, where relevant uncertainty arise not only from the interaction among organizations, but from the field itself, and individual firms cannot rely simply on their own direct actions to successfully adapt to the market. In such contexts, apart from the direct competition dynamics, organizations become increasingly entangled in public regulation, technology and social changes linked to an environment where its own ground is in motion (Emery & Trist, 1965).

The 2015-16 Brazilian economic crisis[1] was marked by an extended recession lasting 11 quarters and resulting in an 8.2% decrease in GDP (IBGE, 2018). Furthermore, the slow recovery in the following years left economic activity in 2019 approximately 5% below pre-recession levels (Balassiano, 2020). This crisis was characterized by both supply and demand shocks, which were exacerbated by policies that reduced productivity and fiscal challenges (Borça Junior et al., 2019).

In contrast, the 2020 global recession, triggered by the COVID-19 pandemic, had a different nature. It led to a demand and regulatory crisis,

[1] According to Jaworski & Kohli (1993), environmental turbulence is composed by market turbulence, technological turbulence, and competitive intensity. This study assesses competitive intensity apart from market and technological turbulences due to the heterogeneity among industry sectors included in it. It also draws on the work of Emery & Trist (1965) and their concept of "turbulent field".

pushing companies to adapt by adding new services and attributes to their offerings due to lockdowns and social distancing measures. This crisis resulted in a 4.1% GDP decrease, a 4.8% drop in GDP per capita, and a 5.5% decline in family consumption expenses (UNCTAD, 2020a, 2020b). These challenges brought significant changes to the labor market and transformed business practices, particularly fostering the growth of e-commerce (BBC, 2020) and exposing companies to new competitors. This, in turn, impacted the profitability structure of many industries.

Crises like these are recurrent events in modern history, arising both from local and global origins, and can lead companies to actively pursue Business Model Innovation (BMI) as a performance-enhancing strategy (Latifi et al., 2021; Salamzadeh et al., 2023). These crises present practical challenges that push businesses to adapt quickly and efficiently to changing environments. As businesses aim not only to survive but also to thrive in these challenging periods, the significance of unraveling the relationship between BMI and organizational capabilities becomes increasingly clear. Additionally, examining how recent crises have affected firms in Brazil, particularly in how organizations have adapted their business models to navigate crises of varying nature—whether economic downturns or global disruptions like the COVID-19 pandemic—can provide valuable insights. Similar trends have been observed in firms worldwide, highlighting how organizations, regardless of their location, have had to innovate their business models to respond to global challenges.

The Resource-Based Theory (RBT) framework is a fundamental strategic approach for comprehending how companies navigate environmental changes and economic crises (J. B. Barney et al., 2021; Bigelow & Barney, 2021). RBT, therefore, offers a foundational perspective highlighting the essential role of a firm's resources, encompassing both tangible and intangible assets, as the fundamental building blocks supporting Business Model Innovation (BMI) during economic crises. As well, dynamic capabilities are central to the RBT, playing a critical role in enhancing adaptability and agility links to performance, especially when crises peak (Bughin et al., 2021).

Given the recent body of research on Business Model Innovation (BMI), there is a notable lack of empirical evidence addressing its relations and impacts in contexts where companies endeavor to innovate to leverage capabilities in response to heightened environmental turbulence, particularly during crises. While previous research has primarily examined BMI in single turbulence contexts (Spieth et al., 2023), this study aims to shed light on the intricate interplay between environmental turbulence, competitive intensity, organizational capabilities, and BMI, employing a methodology designed to comprehend the impact of these recent Brazilian crises on firm performance. Consequently, our central question can be summarized as follows: within the context of the Resource-Based Theory (RBT) framework, how do Business Model Innovation and organizational capabilities interact with environmental turbulence and competitive pressures in the pursuit of performance during economic downturns?

From a managerial and comparative perspective, this research is designed to assess the performance implications of organizational capabilities harnessed through BMI in environments characterized by high competition and extreme external turbulence characterized by these two recent economic crises. The study employs a mixed-method approach, with a primary

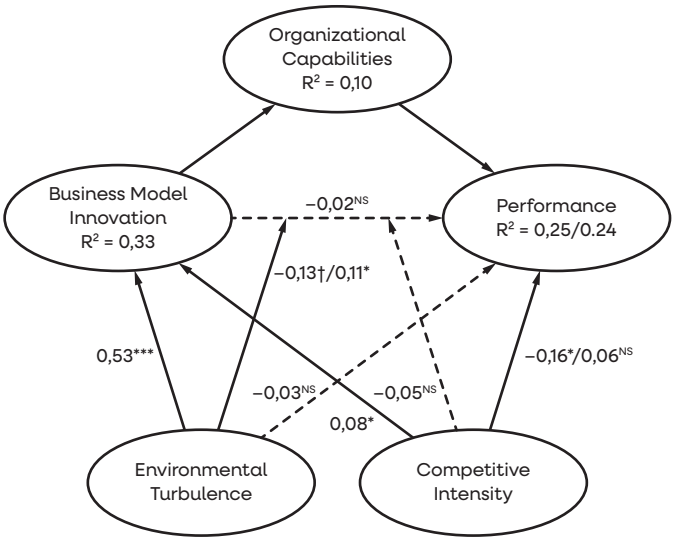
focus on quantitative analysis. The qualitative stage, carried out through in-depth interviews, aimed to develop items to measure organizational and dynamic capabilities in the context of the companies studied. The quantitative phase involved online cross-sectional surveys conducted with executives from a Brazilian business school, collected during the 2015-16 recession and the COVID-19 pandemic. The quantitative data was analyzed for measurement quality and then hypotheses were tested using a multi-group structural equation modeling approach.

THEORETICAL MODEL AND HYPOTHESES

A BM "describes an architecture for how a firm creates and delivers value to customers and the mechanisms employed to capture a share of that value" (Teece, 2018, p. 40). This study focusses the contribution of the business model concept in contexts of environmental turbulence, where the level of relevant uncertainty confronting the firm arises from the external environment itself more than from the interaction among competitors or specific industry effects. In such situations, the firm "cannot expect to adapt successfully simply through its own direct actions" (Emery & Trist, 1965), and its continuous adjustment to external changes becomes uncertain. Therefore, this research analyses the contribution of BMI in various types of firms and industries as an expedient to achieve internal and/or external fit[2] and improve performance quickly in two distinct turbulent environments. Figure 1 presents the theoretical model proposed to explain the relationships through which environmental turbulence, competitive intensity, and BMI lead to strengthening the organizational capabilities and improved performance.

Figure 1.

Theoretical model



[2] see Siggelkow, p. (2011, p. 1129) for a definition of internal fit and external fit.

According to the RBT (VRIO framework)[3], firms achieve sustained competitive advantage through mastering organizational usage of valuable, rare, and inimitable resources and capabilities (J. Barney & Clark, 2007; Bigelow & Barney, 2021) while implementing an unparalleled value-creating strategy, and when the other firms are unable to duplicate the benefits of this strategy (Bigelow & Barney, 2021). From the business model perspective, the less imitable, transferable, or substitutable the resources and capabilities become, and the more productive they are, the higher will be its value (Teece, 2018). From the dynamic capabilities' perspective, the firm will increase the value of its business model by fostering its ability to alter its resource base and learning pattern, and by systematically creating and modifying its operational routines to respond to the changing environment. According to the work of Zahra et al. (2006) about how ordinary and dynamic capabilities are related to one another, and how this relationship is moderated by organizational knowledge and skill within an interactive relationship, what "the firm can do (its skills) is shaped in part by what it knows, and what the firm knows is affected in part by what it does" (Zahra et al., 2006, p. 926). Drawing on those propositions, the assumption adopted by this study is that, initially, organizational capabilities precede BMI in providing managerial feedback (knowledge) regarding BMI opportunities, but its focus is on subsequent BMI's deployment of organizational capabilities to reconfigure resources to transform the organizational structure to seize and capture (Teece, 2018) such opportunities. However, this study does not investigate this feedback loop, given the longitudinal approach required to identify recursive relationships correctly. Therefore, we hypothesize:

> *H1: The business model innovation is positively related to the organizational capabilities.*

BMs are instrumental in analyzing a firm's strategy, way of operation, and resulting performance. The extant literature indicates that BMI is core to firm performance (Cucculelli & Bettinelli, 2015), and that it may be a key conduit to exploit performance improvement opportunities (Guo et al., 2017). Balboni et al. (2019) suggest that novelty-centered and efficiency-centered BMIs may negatively or positively impact growth performance depending on the stage of a startup life cycle it is adopted. In this regard, Leppänen et al. (2023) argue that BMI can produce high performance only when novelty is combined with other value drivers, particularly with efficiency. Clauss et al. (2022) emphasize that BMI serves as an important intermediary through which firms' strategic agility contributes to superior firm performance.

Hence, we posit the following hypothesis:

> *H2: The business model innovation is positively related to organizational performance.*

[3] Resources and capabilities are valuable if they allow the firm to exploit opportunities or neutralize external threats and allow the firm to design or implement strategies that improve its efficiency and effectiveness. Resources and capabilities are rare if few competitors have them. The imitability of resources and capabilities is imperfect if competitors face a cost disadvantage in obtaining them. To carry out the full potential of the competitive advantage derived from valuable, rare, and costly to imitate resources, the firm must also properly organize itself to fully exploit them (J. Barney & Clark, 2007).

BMI provides managers and entrepreneurs a way of accomplishing more with the firm's resources and capabilities by designing or modifying an activity system to create and capture the value and cope with environmental change (Zott et al., 2011). An organizational capability is a routine or group of procedures that are "substantial in scale and significance" through which the firm produces the outputs that are significant to its survival and prosperity (Winter, 2000, p. 983). Ordinary capabilities are those that permit the firm to run its affairs in the short term, and dynamic capabilities are those "that operate to extend, modify or create ordinary capabilities" (Winter, 2003, p. 991, 2018). According to RBT, firm-level efficiency advantages allow the capture of entrepreneurial rents and competitive advantage building, and firm-specific capabilities and assets, as well as existing isolating mechanisms, are "the fundamental determinants of firm performance" (Teece et al., 1997, p. 510). Cucculelli & Bettinelli (2015) have found that BMI plays a crucial role in shaping the firm's competences. Heredia et al. (2022) argue that technological capabilities positively influence firm performance. Leppänen et al. (2023) highlight how efficiency-centered BMI contributes to firm's high performance. Consequently, we postulate:

> *H3: The improvement of organizational capabilities is positively related to performance.*

Market turbulence[4] is characterized by rapid changes in customer needs, demanding that firms continuously modify their products and services portfolio to satisfy customers' preferences (Jaworski & Kohli, 1993; Turulja & Bajgoric, 2019). *Technological turbulence*[5v] refers to the rate of technological change and may put the firm's survival at risk (Jaworski & Kohli, 1993; Turulja & Bajgoric, 2019). According to Amit & Zott (2012), product innovation without BMI may fail to sustain competitive advantage in fast-moving technology markets. Turulja & Bajgoric (2019) have found that environmental turbulence boosts firm's innovation and performance. Therefore, we posit the following hypothesis:

> *H4: Environmental turbulence is positively related to business model innovation.*

Globalization, technology, and economic liberalization have reshaped the global economy, leading to a world of extreme competition where mature companies in leadership positions seem more vulnerable than others (Lindskov, 2022). According to Hagel et al. (2011), the market concentration measured by the economy-wide Herfindahl-Hirschman Index (HHI) in 2010 decreased to less than half compared to 1965. This drop occurred as it became increasingly more accessible for businesses to enter and exit markets and industries due to the adoption of worldwide liberalization policies and the increased flow of information due to digital technology. This trend of HHI suggests that the

[4] Market turbulence relates to the rate of change in customers' profile and preferences, and to the degree of instability and uncertainty that are present in the firms' market (Jaworski & Kohli, 1993).

[5] The high-order dynamic capabilities are those that the top managers use to sense pathways to build the company's future, conceive business models to create and capture value from opportunities, and settle the best firm's configuration of resources and capabilities to achieve improved performance and competitive advantage (Teece, 2018).

competitive intensity is more than twice what it was in 1965 (Hagel et al., 2011). Olabode et al. (2022) posit that increasing competitive intensity strengthens the indirect effects of disruptive business models on firms' market performance. We then hypothesize:

> *H5: Competitive intensity is positively related to business model innovation.*

Despite recognizing the influence of organizational capabilities on firm performance, strategy scholars' dissent about their effects under different conditions of environmental dynamism, keeping the subject open for further investigation and debate. Environmental dynamism gives rise to market opportunities and pressures firms toward innovation (Teece et al., 1997). The resource-based framework outlined by Teece et al. (1997) posits that the firm's superior performance and competitive advantage in dynamic environments are rooted in DCs, enabling the company to improve its operational routines to fit into changing environments. However, Winter (2003) acknowledges that high environmental dynamism can render the firm's capabilities obsolete, eroding competitive advantage, but contends some misconceptions linking DCs to generic formulas for superior performance. Drnevich & Kriauciunas (2011) do not find evidence that the degree of environmental dynamism affects the contribution of ordinary and dynamic capabilities to relative firm performance at the process level. Protogerou et al. (2012), by their turn, suggest that environmental dynamism does not moderate the impact of dynamic capabilities on operational capabilities and firm performance. However, recent studies suggest that environmental turbulence boosts firm´s innovation capabilities rather than moderating the relationship between innovation and performance (Mokhtarzadeh et al., 2022; Turulja & Bajgoric, 2019).

Additionally, an initial value created by a capability may become irrelevant in a relatively stable context from the environmental perspective. In contrast, in turbulent environments, a previously valuable capability may lose importance, and in high turbulence, a dynamic capability may no longer fulfill its purpose, without further contributing to firm performance (Drnevich & Kriauciunas, 2011; Helfat et al., 2007).

The effects of environmental turbulence and competitive intensity in the contribution of organizational capabilities to firm performance are still controversial. Al Dhaheri et al. (2024) posit that environmental turbulence influcence SMEs' implementation of both DCs and artificial intelligence, mediating disruptive elements and improving firm performance. On the other hand, there are works concluding that turbulence has a negative effect on performance (Boyne & Meier, 2009; Hina et al., 2021; Turulja & Bajgoric, 2019). Therefore, we hypothesize that:

> *H6: Environmental turbulence is negatively related to performance.*

Houessou et al. (2024) find that competitive intensity impacts positively the performance of fish farming firms of south-Benin. However, Anning-Dorson (2017) concludes that competitive intensity negatively affects performance of firms in sub-sectors of the emerging African economy. Mathur et al. (2021), on

their turn, find that market competition negatively impacts the performance of Indian pharma firms. Thus, we propose that:

> *H7: Competitive intensity is negatively related to performance.*

Clauss et al. (2019), in their study about strategic agility, BMI, and firm performance in the German firms of the electronic industry, contrary to their prediction, find that while environmental turbulence fosters the adoption of different types of BMI, value capture BMIs are negatively related to firm performance. Our hypothesis regarding this point is that:

> *H8: Environmental turbulence reduces the effect of business model innovation on performance.*

The work of Najafi-Tavani et al. (2023) about UK-based export firms has found that the intensity of competition has an inhibiting role on the cost-advantage centered BMI – firm performance relationship. Therefore, our assumption in this matter is that:

> *H9: Competitive intensity reduces the effect of business model innovation on performance.*

METHODOLOGICAL PROCEDURES

Research approach

The research consisted of two phases, the first qualitative and the second quantitative. In the qualitative stage, the focus was to understand the phenomena (Creswell & Creswell, 2018) by unveiling the B2B customer journey. In-depth interviews were conducted with 48 mid and top-level managers, using a semi-structured script required to develop the organizational capability measurement scales, applying the framework suggested by several authors (Christensen et al., 2007; Silverstein et al., 2009). The qualitative data collected from these interviews played a pivotal role in the construction and refinement of the items that would comprise the measurement scales for organizational and dynamic capabilities. To ensure the robustness and comprehensiveness of these scales, the interview transcriptions were subjected to content analysis, conducted by a panel of academic and professional specialists.

The quantitative phase of the research was conducted through a survey and had a descriptive character. It sought to describe the behavior of the variables of a population, seeking to establish relationships between constructs that characterize the reality of the sample studied (Creswell & Creswell, 2018). This phase sought to test the relationship between BMI, organizational capabilities, and performance, moderated by environmental turbulence and competitive intensity.

Research instruments

The organizational capabilities scales consisted of 15 items grounded in established theoretical frameworks (Christensen et al., 2007; Silverstein et al., 2009; Teece, 2018; Ulwick, 2016; Wunker et al., 2016), representing both ordinary and dynamic capabilities. These items were developed through 48 qualitative telephone interviews conducted with managers and entrepreneurs (CEOs, directors, managers) from small to very large companies (annual revenues exceeding BRL 10 billion/USD 2 billion) across various industries. The interviews applied the Jobs to Be Done (JTBD) theory (Christensen et al., 2007), which focuses on identifying the 'jobs' that companies or individuals must accomplish to achieve specific goals or address challenges. Participants were asked to identify the key jobs their companies needed to prioritize to succeed in turbulent times and the organizational capabilities required to address those jobs.

The JTBD framework was relevant for this research as it provided a structured method to identify latent needs and challenges not explicitly addressed in existing literature. By centering on the 'jobs' companies must execute to navigate turbulent environments, the framework facilitated the development of context-specific scales that reflect the relationship between organizational capabilities and success factors in dynamic settings. This methodological approach ensured that the scales were grounded in empirical data and aligned with organizational practices.

The responses from the interviews were recorded, analyzed, and categorized into jobs to be done and their corresponding organizational capabilities, as summarized in Table 1. This analysis produced a list of dynamic and ordinary capabilities. For instance, "Efficient business management" was identified as an ordinary capability, emphasizing operational efficiency (Teece, 2014, 2016). In contrast, capabilities such as "Understanding changes in the business context and translating them into strategies," "Innovation and organizational digitalization," and "Cultural alignment" correspond to high-order dynamic capabilities associated with sensing, seizing, and transforming (Teece, 2018).

Table 1

Jobs to be done and Organizational Capabilities of organizations

Jobs To Be Done	Capacidades Organizacionais
Effectively manage the organization by implementing proper processes and ensuring people are aligned and committed to achieving results.	**1. Efficient business management:** Implement effective management practices to ensure well-structured processes and consistent results. **2. Development of skills aligned with business strategy:** Identify and enhance organizational capabilities to support the execution of strategic priorities. **3. Cultural alignment:** Foster the integration of organizational values and behaviors to strengthen cohesion and team performance.
Achieve sustainable business growth by securing adequate funding and ensuring long-term financial stability.	**4. Definition and consolidation of growth strategies:** Formulate and implement plans to sustain and accelerate sustainable business growth. **5. Innovation and organizational digitalization:** Develop initiatives that incorporate digital technologies and drive innovation in processes and business models. **6. Funding and financing strategies to sustain current operations:** Ensure financial support to maintain operational continuity and efficiency. **7. Funding and financing strategies to build the future:** Plan and secure resources to invest in growth and transformation projects.
Position the organization as a relevant and attractive entity that creates a meaningful impact on society.	**8. Being a relevant organization that makes a difference in society:** Demonstrate a positive social impact through actions and projects that benefit communities and stakeholders. **9. Attract, challenge, and engage talent:** Create an environment that values human potential, fostering the development and retention of high-performing professionals.
Create an environment that fosters executive career development while ensuring emotional balance and nurturing healthy relationships	**10. Succession planning and support for executive career development:** Ensure leadership continuity through structured succession and development programs. **11. Build an environment of trust, with emotional balance and healthy relationships:** Establish an organizational climate that promotes well-being and nurtures a culture of respect and cooperation.
Adapt and thrive in a constantly changing world by responding effectively to evolving challenges and opportunities.	**12. Understanding changes in the business context and translating them into strategies:** Identify emerging trends and adapt organizational plans to capture opportunities and mitigate risks. **13. Mobilize people for future movements:** Engage teams in implementing initiatives that align the organization with future demands.
Establish and maintain a global presence to operate as a recognized and influential organization worldwide	**14. Executives with vision and knowledge for global action:** Develop leaders capable of strategically operating in international markets with a global perspective. **15. Know how to operate in a global context:** Integrate cultural, technical, and strategic competencies to successfully execute operations in a globalized environment.

The instrument developed from this process included scales to measure the extent to which each organizational capability had been satisfactorily addressed within the company and its importance. Three Ph.D. researchers specializing in business management and strategy designed the scales, which were reviewed and validated by the executive board of the research organization (a business school) and other key informants to ensure face and content validity (DeVellis & Thorpe, 2022). Additionally, the instrument incorporated validated scales to measure BMI (Spieth & Schneider, 2016), organizational performance (Filho et al., 2012), and environmental turbulence (Kmieciak et al., 2012b). All items were assessed using 11-point Likert scales (from 0 to 10), and classification questions were included to segment

respondents and companies. Table 2 presents the scales used, along with their related constructs and sources.

Table 2.

Constructs and scales used in the model

Construto	Questão	Fonte
Organizational capabilities	The scale represents both Ordinary and Dynamic Capabilities, measured in terms of how satisfactorily they have been addressed and their importance. The items in the model were calculated as the product of importance and satisfaction assessments.	Prepared by the authors based on the first phase of the research.
Market Turbulence	In our business, customer preferences for products, services, or solutions change over time. We see demands from customers who have never purchased our products and services before New customers tend to have product or service needs that are different from those of our current customers.	Soares (2013) (market); Kmieciak et al. (2012b) (Technological)
Technological turbulence	The technology in our industry is changing fast. Technological changes offer great opportunities in our industry. Many new product ideas have been made possible through technological advances in our industry.	Kmieciak et al. (2012)
Competitive Intensity	The level of competitiveness in the market in which we operate is high The competitors of the market in which we operate are very competitive. The number of direct competitors in the market in which we operate is high.	Gonçalves Filho et al. (2012)
Business Model Innovation	The promised benefits offered to the market The way we deliver our offers to the market The sources and ways to monetize our business	Spieth e Schneider (2016)
Performance	Return on capital or resources invested Overall profitability Market Share Growth Revenue Growth Productivity Quality of products and services	Adapted from Gonçalves Filho et al. (2012), Perin & Sampaio (2004) and research data

Before model testing, the authors conducted preliminary screening to identify and treat missing data, outliers, and assumption violations. These steps showed departures from normality, but kurtosis and skewness levels were not strong enough to prevent applying robust estimation algorithms (Muthen & Kaplan, 1992).

Data collection and Sample profile

The study comprises a cross-sectional online survey in two different periods, the first during the last semester of the 2015-16 economic crisis and the second during the COVID-19 pandemic in 2020. The study's first wave was applied to 3,977 executives from 1,892 institutions of a Brazilian business school during August and September 2016, achieving 144 complete questionnaires. Between August and September 2020, in the second wave, 19,970 invites were sent to executives from 3,960 institutions from the CRM of the same business school, achieving 429 complete answers.

The main difference between the sample framework in the first and the second waves was the addition of potential key respondents in the 2020 data collection, allowing more than one respondent from the same firm. To ensure comparability between samples, the authors compared the sample profile in the two waves, finding significant job position differences (see **Table 3**). Controls for job position were added to the structural model to verify the impacts of these disparities in the results.

Table 3.

Sample profile

Variable/category	2016 % (n)	2020% (n)	Chi-square	Df	P value
Job position			**55,84**	**5**	**0,00**
CEO*	24% (34)	11% (47)			
VP	4% (6)	3% (13)			
Function Director *	15% (22)	10% (44)			
SBU director	31% (45)	17% (74)			
Managers*	12% (17)	44% (187)			
Others	14% (20)	15% (64)			
Annual Revenue (BRL million)**			**10,28**	**5**	**0,07**
0,0 – 2,4 (USD 0 – 0,5 million)	4% (6)	4% (19)			
2,4 – 16,0 (USD 0,5 – 3,1 million)	8% (11)	9% (40)			
16,0 – 90,0 (USD 3,1 – 17,5 million)	23% (33)	17% (75)			
90,0 – 300,0 (USD 17,5 – 60,0 million)	17% (24)	14% (61)			
300,0 – 1.000,0 (USD 60,0 – 200,0 million)	24% (35)	17% (75)			
Greater than 1.000,0 (> USD 200,0 million)	24% (35)	37% (159)			
Sector			**5,26**	**3**	**0,15**
Agriculture	7% (10)	6% (25)			
Industry	25% (36)	32% (136)			
Retailing	3% (5)	7% (29)			
Services	65% (93)	56% (239)			
Family business			**0,97**	**1**	**0,33**
Yes	42% (60)	37% (159)			
No	58% (84)	63% (270)			

Source: research data. **Notes:** * implies significant pos hoc percentage differences according to Z tests with 5% significance level.
** BRL/USD conversion based on December/2020 BRL currency of BRL 5.142 = 1 USD.

All respondents occupy strategic positions in their companies in both waves. While in 2020 there was a greater percentage of managers (44%) than in the 2016 sample (14%), directors of strategic business units (SBUs) and CEOs were more frequent in the 2016 sample ($p < 0,05$). The sample represents a cross-section of the companies with the greatest prevalence in Brazil's economic matrix, in terms of productivity, managerial maturity, and contribution to GDP. It is primarily focused on medium and large-sized companies from the

services, industry, and agribusiness sectors. This choice was strategic, as these companies, compared to small-sized firms, tend to have more structured management and a more robust capacity for adaptation. Additionally, the sample distribution by sector closely follows the distribution of companies across sectors in the Brazilian economy, with a predominance of companies in the services and industry sectors, which reinforces the representativeness of the sample in the national context.

Measurement quality

Exploratory Factor Analysis was the starting point to check the measurement quality assessment by checking the dimensionality of the scales. Measures of Sample Adequacy (MSA), KMO, and variance explained highlighted favorable conditions to apply EFA to both samples. Communalities and cross-loadings estimate pointed out poorly fitted items with deletion potential to arrive at the final solution with unidimensional solutions for all constructs.

Based on the framework proposed by Bagozzi et al. (1991) to ensure convergent validity, the authors checked item loadings at the 1% level of significance. Confirmatory Factor Analysis (maximum likelihood estimation) has shown significant loadings in all cases. Comparing the Average Variance Extracted (AVE) with the squared correlations between paired constructs, the authors have confirmed discriminant validity in both groups (Fornell & Larcker, 1981). The overall measurement quality was consistent since both Composite Reliability (CR) and Cronbach's Alpha (CA) were higher than 0.70, while AVE above 0.50 (Fornell & Larcker, 1981). Table 4 shows the summary of these steps.

Table 4.

Overall measurement quality and validity summary

Constructs	1	2	3	4	5	6	7
(1) Capabilities	0,87/0,89	0,46	–0,08	–0,02	0,31	0,28	0,39
(2) Performance	0,44	0,90/0,90	0,09	0,09	0,10	0,14	0,13
(3) Inov* turb.	–0,03	–0,12	0,86/0,85	0,35	–0,16	–0,16	–0,39
(4) Inov. * comp. Intensity	–0,04	–0,08	0,27	0,88/0,85	–0,11	–0,33	–0,17
(5) Business model innovation	0,36	0,20	–0,32	–0,27	0,93/0,94	0,32	0,60
(6) Competitive intensity	0,26	–0,04	–0,03	–0,04	0,28	0,94/0,94	0,43
(7) Environmental turbulence	0,37	0,11	–0,34	–0,02	0,48	0,43	0,90/0,89
Average variance extracted (AVE)	0,57/0,63	0,64/0,66	0,54/0,53	0,60/0,52	0,76/0,78	0,78/0,77	0,65/0,62
Composite reliability (CR)	0,95/0,96	0,91/0,92	0,93/0,93	0,93/0,90	0,90/0,92	0,91/0,91	0,88/0,87
Cronbach's alpha (CA)	0,94/0,95	0,89/0,90	0,93/0,92	0,93/0,92	0,84/0,86	0,86/0,85	0,82/0,80

Nota: 2016 Data / 2020 data. The main diagonal represents the square root of the AVE. Values below the diagonal are correlations for 2016 data. Data above the diagonal represent the correlations for 2020 data.

Model testing

The authors have applied the nomological validity test to evaluate the fit between hypotheses and structural relationships (Netemeyer et al., 2003). First, the researchers used imputed mean scores of each construct and group to test a multi-group analysis by adding equality of constraints for structural weights, covariances, and errors. Chi-square difference tests reveal significant differences in samples in the structural weight matrix (c^2 = 18.172; df = 9; p = 0.033), while no differences were detected for covariances (c^2 = 10.868; df = 10; p = 0.368) and structural errors (c^2 = 12.983; df = 13; p = 0.449), implying in differences in the structural weights in the 2015-16 and 2020 data waves. A separate probe for each weight revealed significant differences between the two waves. Table 5 summarize the weights and significance levels, along with chi-square difference tests.

Table 5.

Weights overall measurement quality and validity summary

Independent constructs	Dependent Constructs	With Controls		Without Controls		
		2016	2020	2016	2020	Diferença χ^2
Competitive intensity	Inovação do modelo de negócios R^2=0,24 / 0,36	0,08*	0,08*	0,09	0,08†	0,00
Environmental turbulence		0,54***	0,54***	0,47***	0,55***	1,73
Job1 (manager)		−0,03	−0,09*			
Job2 (SBU director)		0,01	−0,05			
Job3 (CEO)		0,13†	−0,06			
Business model innovation	Capacidades R^2 = 0,13 / 0,09	0,32***	0,32***	0,34***	0,31***	0,31
Competitive intensity	Desempenho R^2=0,27 / 0,23	−0,14*	0,05	−0,16*	0,07	5,93*
Environmental turbulence		−0,03	−0,03	−0,06	−0,01	0,23
Capabilities		0,47***	0,48***	0,48***	0,47***	0,02
Inov. * Comp. Intensity		0,04	0,04	−0,03	0,08†	1,44
Inov * Env. turb.		−0,12†	0,10*	−0,10†	0,10*	4,37*
Business model innovation		0,08	0,00	0,06	−0,04	0,88
Job1 (manager)		0,12	0,05			
Job2 (SBU director)		0,08	0,00			
Job3 (CEO)		0,17*	−0,01			

Note: 2016. Data / 2020 data. Significance Symbols: † p < 0.100. * p < 0.050. ** p < 0.010. *** p < 0.001.

It should be noted that adding controls for job positions does not change the effects and significance of the model. The absence of significance implies that even though there are differences in job positions from both waves of data, respondents' role does not change the conclusions pertained in this paper. Chi-square tests revealed distinct structural weights for the 2016 and 2020 waves in two relations.

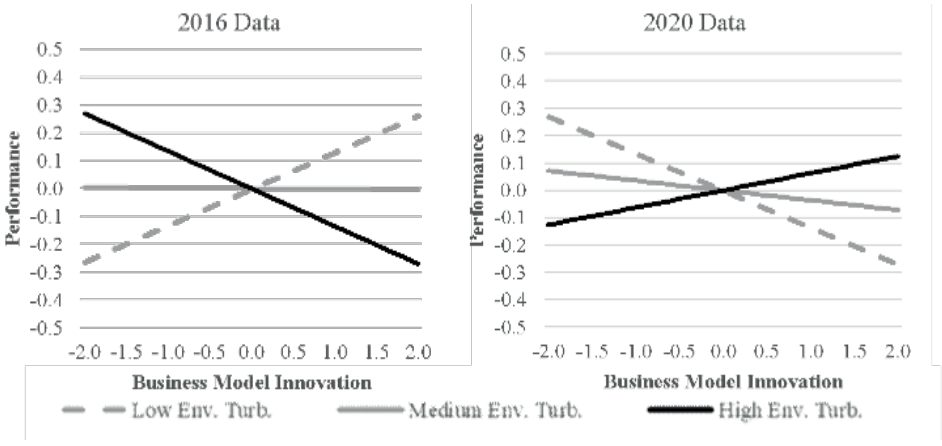
DISCUSSION

First, the negative effect of *intensity of competition* is significant only in the 2015-16 data (β = -0.16 ; p< 0.05), with a non-significant weight for the 2020 data (β = 0.07 ; p = 0.15). This result suggests that while higher competitive pressures implied lower performance in the 2015-16 crisis, the role of competition was effectively null for performance during the Covid-19 pandemic. The 2015-16 data results are aligned with the findings of Anning-Dorson (2017) and Mathur et al. (2021). The 2020 data results are in accordance with the findings of Mahdi et al. (2024), who related the non-significant influence of competitive intensity on firm performance to COVID-19 practices of co-dependence rather than co-destruction among rivals. In our study, such inference might corroborate the assumption of Emery & Trist (1965) that turbulent fields require dissimilar organization whose fates are correlated (and at stake) to maximize cooperation among them.

Second, the interaction between *environmental turbulence* and *BMI* is positive and significant for the 2020 data (β = 0.10; p <0.05) and negative for the 2015-16 crisis (β = -0.10; p <0.10). As shown in Figure 2, this result indicates that for 2020 data, companies experiencing relevant *technological* and *market* challenges (bold continuous line) who adapted their business model for the COVID-19 crisis achieved greater performance than non-innovative firms in similar contexts. Also, companies in industries affected less by environmental turbulence achieved higher performance by *not* adopting innovations in their business model. In contrast, those *affected to a lesser extent by turbulence* who implemented BMI faced a substantial reduction in their business performance.

Figure 2.

Interaction of environmental turbulence with business model innovation as a predictor of business performance: 2016 and 2020 COVID-19 pandemic data



Notes: the values represent standardized (Z values). The interaction terms used ±1 standard deviations of the moderator (environmental turbulence).

For 2015-16 data results are the opposite. Data shows that innovative firms that faced low environmental challenges due to demand downturn achieved higher performance. Nonetheless, companies that experienced the demand

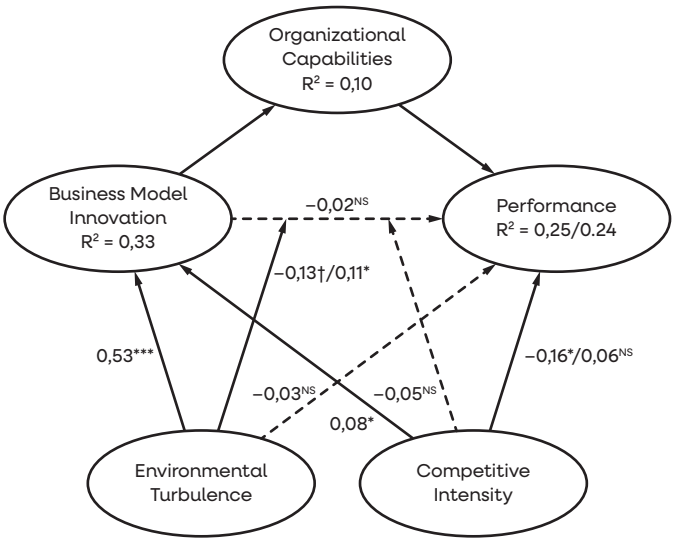
downturn and trying to innovate to deal with the crisis accomplished below the average performance.

Drawing on the works of Turulja & Bajgoric (2019), stating that environmental turbulence has a clear role in boosting innovation, and on the study of Clauss et al. (2019), concluding that different types of BMIs may positively or negatively impact firm performance, the study's results suggest that while the COVID-19 turbulence might have led firms to prioritize value proposition and value creation BMIs, the 2015-16 economic downturn's turbulence might have promoted value capture BMIs. From the perspective proposed by Najafi-Tavani et al. (2023), these differences suggest that the high turbulence of 2015-16 economic recession has fostered efficiency-centered BMIs while the high turbulence during COVID-19 crisis has promoted novelty-centered BMIs.

To wrap up the analyses, we present a model where the non-significant differences between each group were settled to equality to provide a final model for the 2015-16 and 2020 COVID-19 waves of data. These results also provide evidence for the complete mediation of the *organizational capabilities* as a source to predict *firm performance*, reflecting that BMI can only improve performance when it allows companies to achieve superior capabilities to achieve competitive advantages. The model fit presents acceptable standards for analyzing SEM models.

Figure 3.

Final Structural Equation Model (path analysis) for pre covid and covid data



Note The values next to the arrows represent the standardized loads. *** = p < 0.001. ** = p < 0.01. * = p < 0.05. Model FIT: c^2 = 94.485; df = 32; p<0.001; c^2/df = 2.953; GFI = 0.92; NFI = 0.89; IFI = 0.92; TLI = 0.90; CFI = 0.92; RMSEA = 0.06.

CONCLUSION

Findings

This study explores the relationship between Business Model Innovation (BMI), organizational capabilities, and firm performance during two significant Brazilian economic downturns: the 2015-16 recession and the 2020 COVID-19 pandemic. By adopting a Resource-Based Theory (RBT) perspective, the research examines how firms leverage BMI and capabilities to navigate environmental turbulence and competitive pressures during these crises. The findings suggest that BMI has different effects on firm performance, depending on the level of turbulence experienced by the firm and the nature of the crisis.

Internal factors, mostly derived from public policies called "New economic matrix", have a crucial effect on the economic recession that lasted from the second quarter of 2014 until the fourth quarter of 2016 in Brazil (Balassiano, 2018), resulting in the 6.9% drop in 2015-16 GDP. Differently, the COVID-19 health policy response "essentially resulted in two shocks for Brazil: an external shock, including foreign demand and prices; and a domestic shock, as domestic demand and supply [were] affected by consumers' decision to avoid physical interactions, and by the restrictions on economic activity imposed to prevent contagion" (World Bank, 2020, p. 5). These shocks, in addition to an international oil price shock (Brazil is a net oil exporter), caused the 4.1% GDP decrease in 2020. Even though these crises had distinctive causes, their outcomes exemplify what Emery & Trist (1965) described as *turbulent fields*: dynamic environments where relevant uncertainty arises from the field itself, making the conditions for achieving organizational fit precarious.

In 2015-16, firms operating in less turbulent industry contexts that have chosen to innovate their business models were the ones achieving higher performance, compared to those that opted for BMI within high turbulence industry contexts, which have presented below-average outcomes. In 2020, these trends were reversed, with BMI under high turbulence leading to higher performance than the below-average results from firms innovating their business models in less turbulence industry contexts. These outcomes suggest that in 2015-16, while BMI was an elaborated choice to recover productivity, improve performance, and achieve a competitive advantage, BMI became an endeavor in 2020 to confront uncertainty arising in multiple fronts due to the COVID-19 implications.

Another finding is that the mediation of ordinary and, more specifically, dynamic capabilities is paramount in determining BMI's impact on the firm's adaptative responses and performance within turbulent environments. In other words, regardless of the severity of the crisis, the level of turbulence experienced by the firm stems from the existing resources and capabilities it can deploy to match the changing environmental conditions. The 2015-16 results suggest that firms operating in low turbulence industry contexts could count on the characteristics and outcomes of existing DCs to improve their performance (Eisenhardt & Martin, 2000). In contrast, in 2020, the stability of firms' routines under low turbulence was confronted with unprecedented changes, making previously valuable DCs decline their significance, failing to deliver improved performance (Helfat et al., 2007). On the other hand, firms operating in high turbulence contexts in 2015-16 seem to have relied on DCs

no longer fulfilling their purposes under the extended economic recession, while the emergence of multiple challenges in various fronts in 2020 triggered DCs capable of delivering appropriate adaptative responses and improved performance (Teece et al., 1997).

Theoretical contributions

This study makes relevant contributions to the management and strategy literature. First, addressing BMI through a framework congruent with the resource-based and dynamic capabilities approaches facilitates the acquisition of detailed knowledge of customer needs and opportunity recognition, which are key requirements for business model design and innovation. Second, the study examines the role of environmental turbulence, providing evidence it fosters BMI as an antecedent. Third, the analysis suggests that the contribution of DCs to ordinary capabilities and performance improvement is conditioned by the environmental turbulence. Fourth, by highlighting that the mediation of DCs and ordinary capabilities within turbulent environments may lead to higher or decreasing performance, this research emphasizes the importance of strengthening the firm's capabilities and business model competencies to achieve improved outcomes and competitive advantage. Finally, the answers from firms of different sizes and sectors in this research suggest that the business model concept does provide a new way, complementary to RBT and Market Positioning, to expedite internal and external fit to improve performance in turbulent contexts, where the level of relevant uncertainty confronting the firm arises from the external environment itself more than from the interaction among competitors or specific industry effects.

Managerial implications

This study provides valuable insights for practitioners on how Business Model Innovation (BMI) and organizational capabilities impact firms during different crises. Results shown that in economic downturns, like Brazil's 2015-16 recession, firms can improve performance by refining internal processes and increasing efficiency without changing their business model. However, during more disruptive crises, such as the COVID-19 pandemic, firms must innovate their business models to maintain a competitive edge. Dynamic capabilities are essential in such turbulent times, allowing firms to adapt and seize new opportunities. The study also emphasizes the importance of continuously evaluating resources, fostering a culture of innovation, and tailoring strategies to the specific characteristics of each crisis. Finally, this research highlights the importance of tailoring strategic responses to the specific characteristics of each crisis. Managers should recognize that strategies that work well in one type of crisis may not yield the same results in another.

Limitations

This research is also susceptible to limitations. First, the 2016 and 2020 samples differ in terms of port and size of firms, which proved to be statistically not significant, as well as in the position occupied by respondents – 2016 with 74% of CEOs, vice-presidents, and directors, 12% managers, 14% other, versus

2020 with 41% of CEOs, vice-presidents, and directors, 44% managers, 15% other – which was submitted to statistical control with unchanged results. Second, even though the conceptual model provides the environmental turbulence and competitive intensity effects on the relationship between BMI and performance, future research may prefer to develop measures of their impact over the contribution of the organizational capabilities to the firm's performance. Third, our model analyses the combined effects of ordinary and DCs on firm performance. In addition to existing propositions about how ordinary capabilities and DCs relate to one another (Teece, 2018), and extant clarifications of the conditions of their specific contributions to relative firm performance (Drnevich & Kriauciunas, 2011; Wilhelm et al., 2022), further model improvement may be achieved by exploring in more detail the interrelationship between BMI, DCs, and ordinary capabilities, and their respective contributions to firm performance within turbulent environments. Fourth, as the 2020 poll was conducted within six months after the start of the COVID-19 crisis, its timing may have affected the respondents' assessment of the outcomes surveyed. Therefore, a follow-up poll might be advisable to consolidate the study's findings. Also, the mere usage of a data collection considering the pandemic period is very specific, being interesting for highlighting the strategic impact of current affairs but limiting the generalizability of results for other crises.

Future research

This research presents some avenues for future research. First, future studies could develop more precise and nuanced measures to assess the impact of environmental turbulence and competitive intensity on the relationship between BMI and firm performance. Secondly, future studies could undertake longitudinal analyses to evaluate the long-term impact of BMI and capabilities on performance, shedding light on potential reciprocal effects between these variables, especially using time-series data and methodologies like vector autoregressive (VAR) models. Furthermore, the specificity of this study to the 2015-16 recession and the COVID-19 pandemic limits its generalizability. Future research could expand the scope by examining the strategic impacts of BMI and organizational capabilities not only across a broader range of crises over time but also in crises specific to industries or sectors. Additionally, studies could compare how these dynamics unfold in different regions and countries, considering variations in institutional, economic, and cultural contexts, which may influence the effectiveness and outcomes of adaptive strategies. By broadening the temporal, sectoral, and geographical lenses, future research can provide more comprehensive insights into the adaptability and resilience of firms during turbulent times.

Final remarks

In conclusion, our findings suggest that the two recent Brazilian downturns were the type of turbulent environment where individual organizations face a level of relevant uncertainty capable of rendering their direct actions ineffective in providing adaptative responses to the external changes. In such circumstances, the firm's business model innovation turns out to be a suitable alternative to expedite value creation, value delivery, and value capture.

Consequently, further research should focus more intensely on environmental turbulence's effects over the singular contributions of BMI, dynamic and ordinary capabilities to firm performance.

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