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Do Intangibles Resources Matter? A Boundary Condition of Capital Structure on Innovation Capability

Evelini Lauri Morri Garcia[1], Valter Afonso Vieira[2], Karla Eloisi Gonçalves Martins[1]

[1] Universidade Estadual de Maringá, Departamento de Ciências Contábeis, Cianorte, PR, Brazil
[2] Universidade Estadual de Maringá, Programa de Pós-Graduação em Administração, Maringá, PR, Brazil

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ABSTRACT

Objective: the objective of this study was to analyze the effect of capital structure on the relationship between intangible resources and innovation capability. **Methods:** the hypotheses were tested using a panel dataset of 487 US companies listed on the S&P index from 2015 to 2022, employing fixed-effects regression models. **Results:** the results indicate that three intangible resources — accounting intangibility, marketing investments, and market-to-book — positively influence innovation capability. However, the effects of accounting intangibility and market-to-book on innovation capability diminish when firms rely primarily on debt financing, as opposed to equity issuance (i.e., the moderator). **Conclusions:** the findings highlight that different types of intangible resources contribute to innovation capability and underscore the role of capital structure in shaping management practices aimed at achieving competitive advantages and long-term corporate sustainability.

Keywords:
innovation; investment; intangibles; capital structure.

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Corresponding author:
Evelini Lauri Morri Garcia
Universidade Estadual de Maringá, Departamento de Ciências Contábeis
Rua Afonso Pena, n. 130 , Zona 1, CEP 87200-027,
Cianorte, PR, Brazil

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INTRODUCTION

Intangible resources, e.g., intellectual capital, brands, reputation, technology, and organizational knowledge, increasingly determine sustainable long-term value creation for firms (Barker et al., 2022). Because of their unique features, which are difficult to imitate, intangible resources generate competitive advantage and enable differentiation in highly competitive and dynamic markets (Crosby & Ghanbarpour, 2023). However, accumulating intangible resources does not guarantee superior performance (Hussinki et al., 2025).

Drawing on the assumptions of the resource-based view (RBV theory), intangible resources should enhance firms' innovation capability because they are valuable, rare, difficult to imitate, and irreplaceable if the organization is prepared to use them effectively (e.g., VRIN-O) (Barney, 1991, 1995). These same characteristics, however, complicate the identification, measurement, and classification of intangibles, as well as the estimation of their value for companies (Hussinki et al., 2025). Intangible resources are multifaceted and fall into categories with varying levels of risk and information asymmetry (Lu & Wang, 2018). Some intangible resources — such as accounting-recognized assets — offer greater certainty about future economic benefits, whereas others — such as marketing and other market-related resources — carry higher uncertainty and risk because they do not appear on balance sheets, forcing investors to make assumptions when valuing firms (Van Criekingen et al., 2022). To understand this tension, the authors posit three intangible resources — accounting intangibility, marketing investments, and market-to-book — as drivers of innovation capability.

Innovation capability constitutes a dynamic and essential competency present in companies to sustain the competitive advantage generated by innovations (Grimaldi et al., 2017). Maintaining innovation capability demands high and persistent investments and also involves broad risks inherent in innovative activities (Daronco et al., 2023). The literature has shown that innovation capability depends on the organizational structure and corporate strategy for managing these risks, which requires the interaction of different intangible resources to facilitate innovation and achieve superior performance (Mendoza-Silva, 2021). However, researchers have not yet provided robust empirical evidence, especially regarding the differentiated risks and opportunities embedded in a firm's portfolio of intangible resources (Hussinki et al., 2025).

There is also evidence that, after intangibles, the most critical resources for a company to innovate are financial resources (Kagere et al., 2025). Earlier investigations also show that innovative firms frequently rely on debt financing as a form of capital structure, which may prove inadequate for sustaining innovation (Faria et al., 2024). Yet, the role of capital structure as a moderating mechanism remains unclear. Against this backdrop, one research question emerges: *What is the effect of capital structure in moderating the relationship between intangible resources and innovation capability?*

To address this question, our study examines three intangible drivers of innovation capability — accounting intangibility, marketing investments, and market-to-book ratio — thereby clarifying how capital structure shapes innovation capability. From an innovation viewpoint, innovation capability requires persistence, high levels of investment, and faces the broad risks inherent in innovation activities (Daronco et al., 2023). Innovation capability depends on organizational structures and corporate strategies that manage these risks by combining different intangible resources (Mendoza-Silva, 2021). From a capital structure perspective, financing management and firm activities depend on managerial ability to secure funding (Faria et al., 2024).

Drawing on pecking order theory, firms prefer financing sources that minimize debt and transaction costs as well as information asymmetries, which strongly influence investor decisions (Myers & Majluf, 1984). Debt increases financial costs, while equity issuance heightens monitoring costs, particularly in the context of innovation (Kagere et al., 2025). Choosing a financing source therefore involves more than rational managerial calculation; it reflects biases and conflicts of interest concerning the risks involved (Lu & Wang, 2018). The authors hypothesize that the relationship between intangible resources and innovation capability is moderated by capital structure (i.e., source of debt). This research is relevant because it examines the complex interplay of structural, market, and financial strategies involving intangible resources (Crosby & Ghanbarpour, 2023).

This research differs from previous studies by integrating the interaction between accounting intangibility, marketing investments, and capital structure as joint determinants of innovation capability — an intersection largely overlooked in prior work. While earlier studies such as Fang et al. (2023) and Srivastava et al. (2001) grounded their analyses in the resource-based view (RBV) to explain how intangible or marketing resources enhance innovation capability and performance, they treated financial structure as exogenous. Similarly, Faria et al. (2024) and Rajaiya (2023) explored the role of innovation in shaping capital structure but did not test how financial leverage moderates the resource–innovation capability link. This paper advances this literature by theorizing and empirically showing that debt

financing can constrain or even reverse the benefits of intangible and market-based resources on innovation capability, thus combining RBV's internal capability perspective with the pecking order theory's financing constraints lens. This dual-theory integration offers a dynamic view of how marketing-related intangibles translate into innovation capability under varying financial conditions, filling a conceptual and empirical gap left by prior research.

To test the theoretical model, the authors use panel data from 487 North American firms between 2015 and 2022. The study advances the debate on innovation capability by showing how companies refine existing competencies (Farias et al., 2021) while building organizational structures that generate competitive advantage and foster long-term sustainable growth (Carmona & Gomes, 2021; Lopes & Carvalho, 2021).

This research provides theoretical and managerial contributions that advance the understanding of how intangibles foster innovation capability under financial constraints. Theoretically, first, it refines the resource-based view (RBV) by showing that the innovative potential of intangibles depends on their accounting recognition — intangibles formally recorded in financial statements (e.g., patents, software, licenses) provide more consistent and sustainable advantages, complementing prior studies that treated them as a homogeneous category alongside off-balance-sheet intangible assets (Lopes & Carvalho, 2021; Rahman et al., 2018). Second, it bridges the RBV and pecking order theory (Myers & Majluf, 1984) by revealing that the effectiveness of intangibles on innovation capability is contingent upon firms' financing decisions; specifically, high debt levels weaken the capacity of intangible resources to generate innovation capability, highlighting the interplay between strategic and financial factors. Managerially, the findings suggest that firms should balance stable, accounting-recognized intangibles with flexible, market-based resources such as marketing investments to sustain both short- and long-term innovation capability. Additionally, managers should ensure that capital structures are aligned with their intangible intensity — moderate debt can support innovation capability by disciplining resource use, while excessive leverage erodes the innovative benefits of intangible investments, particularly in knowledge-driven industries.

THEORETICAL BACKGROUND

Resource-based view applied to intangibles resources

RBV theory emerged to provide a strategic analysis of corporate resources and explain the foundations of competitive advantage, using the VRIN-VRIO model — valuable, rare, inimitable, non-substitutable, and organized to capture value (Barney, 1991, 1995). RBV theory also gave rise to complementary approaches, most notably dynamic capabilities theory, which emphasizes firms' ability to integrate, reconfigure, and renew resources in dynamic environments (Teece et al., 1997). Intangible resources comprise business practices, knowledge, and competencies that shape the use of tangible assets and contribute to firm value (Silva et al., 2017). Drawing on RBV theory, intangible resources occupy a central position in strategy, as they most closely meet the VRIN-VRIO conditions and represent privileged sources of competitive advantage (Barney, 1991, 1995). Examples include goodwill (the premium value derived from the synergy of tangible assets), brand equity (which fosters satisfaction, loyalty, and repurchase), intellectual property (patents, trademarks, copyrights, and trade secrets), software, technologies, employee knowledge and skills, and cultural capital developed through training (Penman, 2023). These intangible resources strengthen innovation capability, organizational culture, and ultimately corporate equity (Pereira & Pereira, 2023).

Nevertheless, only a fraction of intangible resources is formally recognized in financial statements. According to International Accounting Standard (IAS) 38 (IAS, 2020) — aligned with Pronouncement 4 of the Brazilian Accounting Pronouncements Committee (Comitê de Pronunciamentos Contábeis [CPC], 2019) — "intangible resources must be identifiable, non-monetary, without physical substance, and controlled by the entity because of past events that generate future economic benefits" (IFRS). Intangible resources that do not meet these criteria are excluded from a firm's assets (Barker et al., 2022). The recognition of intangible resources remains complex and debated in financial management (Van Criekingen et al., 2022). Three main challenges persist: (1) distinguishing between expenses and investments requires subjective judgment; (2) returns on intangible investments are uncertain; and (3) measurement is difficult, as most intangibles are internally generated with costs diluted over time (Crosby & Ghanbarpour, 2023). Consequently, intangible resources are more uncertain in valuation than tangible assets (Hussinki et al., 2025), despite their greater performance-generating potential (Lopes & Carvalho, 2021).

Off-balance-sheet indicators, such as advertising expenditures, provide signals of firms' commitment to building valuable intangibles (Luo & Jong, 2012). A firm's market value reflects both balance-sheet assets (e.g., tangible and intangible) and off-balance-sheet intangibles, such as brand, knowledge, human capital, and customer base (Hussinki et al., 2025;

Ocak & Fındık, 2019). Investors infer the value of unreported intangible resources from such signals when estimating fair value in capital markets (Penman, 2023). The delta between market value and book value is a proxy for the volume of off-balance-sheet intangibles (Machado, 2023).

Empirical evidence supports the RBV assumption that organizational capabilities derive from intangible resources (Grimaldi et al., 2017). Firms that prioritize intangible investments achieve superior growth in profitability, liquidity, and operational margins (Aguiar et al., 2021), outperforming those dependent on tangible resources alone (Kamasak, 2017). Intangible resources foster value creation (Magro et al., 2017), enable new product and service technologies (Pacheco & Rover, 2021), and strengthen competitive advantage (Barker et al., 2022). Scholars have suggested distinguishing between reported and unreported intangibles to better reflect their risk profiles, uncertainty, and potential outcomes (Machado, 2023).

Recent research emphasizes the role of intangible resources in innovation. They provide a key unit of analysis for explaining sustainable advantage and long-term innovation value (Pereira & Pereira, 2023). For instance, managerial culture has been shown to enhance innovation capability (Wang & Dass, 2017), and intangible resources generally exert a positive influence on corporate innovation (Fang et al., 2023). Despite this, gaps remain in understanding how firms' innovation capability depends on contextual boundaries. To address this, our study posits three drivers of innovation capability — accounting intangibility, marketing investments, and market-to-book ratio — and one moderator — capital structure.

Innovation capability

Innovation capability refers to a firm's condition to manage resources, knowledge, and processes that lead to the implementation of innovations that cyclically help the company and its stakeholders (Samson et al., 2017). Lawson and Samson (2001) conceptualized it as an organizational competency that integrates culture, structure, processes, and resources, allowing firms to adapt to environmental changes and sustain innovation as a recurring practice (Mendoza-Silva, 2021). Unlike specific instances of innovation, innovation capability represents a dynamic competency, consistent with the perspective of dynamic capabilities theory, and is essential for sustaining competitive advantage (Teece, 2007).

RBV theory (Barney, 1991, 1995) and dynamic capabilities theory (Teece, 2007) posit innovation as the outcome of mobilizing resources, particularly intangible ones (Mendoza-Silva, 2021). Authors have expanded the understanding of its drivers (Daronco et al., 2023), highlighting intangible resources — human, social, and relational capital — as strategic foundations for innovation (Mendoza-Silva, 2021). Innovation capability strengthens organizational resilience by enabling adaptation in turbulent contexts (Teece, 2016) and promotes sustainability by supporting green and social innovations (Singh et al., 2022).

In summary, innovation capability has become a central pillar of contemporary competitiveness, grounded in intangible resources, organizational processes, and dynamic competencies (Daronco et al., 2023). Evidence suggests innovation capability emerges from the articulation of internal and external resources (Mikhailov et al., 2025). Yet, its multidimensional complexity and the rapid evolution of business environments call for further research to clarify its (1) determinants and (2) boundary conditions. Despite progress, these two gaps remain, particularly concerning the interaction between capital structure and intangible resources that underpin innovation capability (Mendoza-Silva, 2021).

Pecking order theory

Modigliani and Miller (1958) comment that a firm's capital structure might not affect its value (in an ideal market). However, Donaldson (1961) observed that firms rarely follow this null effect in practice, proposing that firms have a preference or order of financing, from internal funds to external sources, and, within external financing, prioritize options with lower issuance costs and risks. In this paper, the authors test this paradox.

Pecking order theory examines how information asymmetry between managers and investors shapes financing and investment decisions (Myers & Majluf, 1984) and explains situations in which firms may reject positive-net-present-value projects because of financing constraints. Managers possess superior information regarding the firm's assets and opportunities, while external investors interpret financing decisions as signals of intrinsic value. For instance, issuing new shares may indicate overvaluation, potentially depressing share prices and generating costs for existing shareholders. Consequently, firms prefer internal financing through retained earnings; when insufficient, they resort to debt, and equity issuance occurs only as a last resort.

Pecking order theory highlights the role of transaction costs and market imperfections. Issuing new securities involves direct and indirect costs that affect share prices, which internal financing or debt can mitigate. This dynamic can result in the rejection of valuable projects if firms cannot finance them without issuing equity (Myers & Majluf, 1984). Pecking order theory

suggests that financing choices reflect firm-specific circumstances, particularly in innovative firms. Empirical evidence indicates that highly innovative firms often exhibit lower leverage and prefer equity over debt (Rajaiya, 2023), while other studies show that some innovative firms adopt higher leverage and avoid equity issuance to preserve control, reduce agency costs, signal credibility, and allocate resources to high-return projects (Faria et al., 2024; Kagere et al., 2025; Lu & Wang, 2018).

Debt financing imposes financial obligations that compel managers to prioritize promising projects (Martínez-Romero et al., 2025). Innovation capability, in turn, drives sustainable growth and is a strategic priority for firms seeking competitive advantage (Farias et al., 2021). Nevertheless, in contexts with elevated organizational or external risk, innovation may be constrained in favor of initiatives with immediate profitability or lower uncertainty (Lee et al., 2023). Despite these insights, the literature has yet to fully explore how varying levels of risk associated with intangible resources interact with capital structure to influence innovation capability.

HYPOTHESES

Accounting intangibility

In this study, the authors hypothesize a positive relationship between accounting intangibility and innovation capability. RBV theory emphasizes that intangible resources provide a differentiating advantage for innovation, as these resources are difficult for competitors to replicate, enabling firms to sustain their advantage over time (Barney, 1991; Pereira & Pereira, 2023; Teece, 2016).

According to IAS 38 (IAS, 2020) and CPC 04 (CPC, 2019), only resources without physical substance that satisfy three criteria — (1) identifiability, (2) control by the company, and (3) reliably measurable future economic benefits — can be recognized as intangible resources on the balance sheet. These requirements reflect prudent accounting practices, avoiding the recognition of resources with uncertain returns (Penman, 2023). Consequently, accounting practices provide conservative and reliable information, typically based on historical cost, even if they undervalue the resource's true economic potential (Machado, 2023).

Accounting practices contribute to enhanced firm performance and competitive advantage because they represent tested investments with greater guarantees, often yielding higher cash flows and financial stability compared with other asset types (Barker et al., 2022; Lopes & Carvalho, 2021; Machado, 2023). Moreover, documented accounting reports increase a firm's ability to fund innovative projects internally, reducing reliance on external financing (Kagere et al., 2025). Accounting intangibility enhances credibility and visibility with investors and creditors, potentially lowering capital costs and supporting sustained investment in innovation capability (Lu & Wang, 2018). Evidence also indicates that accounting intangibility bolsters corporate resilience, further facilitating continued innovation investment during adverse conditions (Uddin et al., 2022). Based on this rationale,

H1a: Accounting intangibility positively affects innovation capability.

Marketing investments

We hypothesize a positive relationship between marketing investments and innovation capability. Marketing investments facilitate direct interactions with customers through advertising, promotions, sales, publicity, and social media (Crosby & Ghanbarpour, 2023). RBV theory underscores the strategic importance of marketing investments, including brand equity, customer loyalty, and customer base expansion, which are cultivated through marketing investments (Srivastava et al., 2001). Marketing investments do not appear in financial statements because they do not meet the recognition criteria of IAS 38. For instance, brand equity — whether rare, difficult to imitate, or high-status — requires substantial and ongoing internal investment but is not capitalized on the balance sheet (Rahman et al., 2018). Investors often interpret marketing investments as proxies for expenditures (Palomino-Tamayo et al., 2020).

Drawing on RBV theory, marketing-generated intangibles constitute valuable resources that can facilitate innovation (Kyriakopoulos et al., 2016). Marketing investments enhance innovation capability by enabling market feedback, brand differentiation, and collaboration opportunities (Sarkees & Luchs, 2015). Marketing investments might drive firms' positions as industry leaders, attract customers willing to pay a premium, and support the development of strategies that respond to emerging trends (Luo & Jong, 2012). Marketing investments in advertising, sales promotion, and product display (Farias et al., 2021; Garcia et al., 2023) serve as differentiators from competitors and facilitate the identification of changing consumer preferences, which is crucial for driving innovation (Crosby & Ghanbarpour, 2023; Rahman et al., 2018). In summary, marketing investments (Garcia et al., 2022) contribute to innovation by creating and maintaining off-balance-sheet organizational resources, providing firms with the capacity to experiment with new products, R&D initiatives, and innovative processes (Aguiar et al., 2021). These invest-

ments enable adaptation to ongoing market transformations and the improvement of processes and services, forming a critical component of firms' innovation capability (Srivastava et al., 2001). Thus,

H1b: Marketing investments positively influence innovation capability.

Market-to-book

We propose a positive relationship between market-to-book and innovation capability. While recorded intangible resources represent only a fraction of a firm's total intangible resources, off-balance-sheet intangibles are widely recognized in the literature as critical drivers of competitiveness and innovation, despite remaining unreported in financial statements (Van Criekingen et al., 2022). This gap between accounting recognition and economic reality poses a significant challenge for measuring and managing intangibles (Machado, 2023). Market-to-book occurs when a firm's market value exceeds the value recorded in accounting books, creating a premium edge (Machado, 2023). This premium largely reflects goodwill, a subjective yet essential contributor to corporate value creation (Pacheco & Rover, 2021). Leading firms such as Microsoft, Apple, Nvidia, Alphabet, and Amazon exhibit particularly high levels of goodwill, illustrating this phenomenon.

According to RBV theory, unrecorded intangible resources — including goodwill — constitute strategic resources because they satisfy the VRIN-VRIO criteria (valuable, rare, inimitable, non-substitutable, and organized to capture value) (Barney, 2001; Teece et al., 1997) and provide a strong foundation for innovation and competitive advantage (Barney, 2001). These resources are difficult for competitors to replicate, thereby protecting profitability and enabling the expansion of innovation capability (Pacheco & Rover, 2021). Empirical evidence indicates that goodwill positively influences innovation investments by providing firms with the capacity to pursue successive innovation initiatives (Zhang & Zhang, 2025). Similarly, intellectual capital, another off-balance-sheet resource captured in market-to-book measures, might enhance innovation capability (Karadag et al., 2025). Based on these arguments,

H1c: Market-to-book positively affects innovation capability.

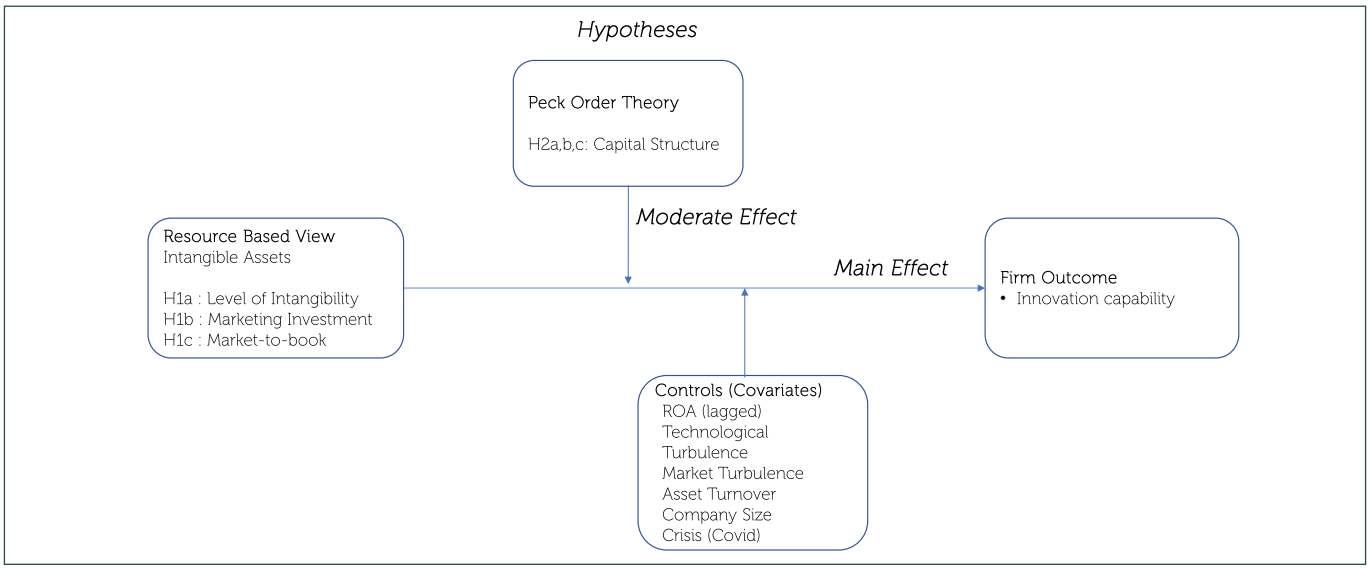
Moderating role of capital structure

In this study, the authors propose that a firm's capital structure moderates the relationship between intangible resources and innovation capability. Pecking order theory posits capital structure as a critical organizational resource (Myers & Majluf, 1984). While greater intangible resources generally support higher innovation capability, this relationship may weaken or even become negative in firms that rely predominantly on debt financing. The moderating effect arises because firms whose value creation depends largely on intangibles provide fewer guarantees to external creditors, raising the cost of debt (Rajaiya, 2023). Pecking order theory argues that high-interest debt obligations reduce profits and create financial pressure (Myers & Majluf, 1984). To offset these costs, companies may reallocate budgets away from innovation projects, thereby constraining innovation investments (Martínez-Romero et al., 2025).

Pecking order theory suggests that debt financing also functions as a signaling mechanism to manage investors' perceptions of the firm's value-creation potential (Myers & Majluf, 1984). Short-term profitability gains particular attention in contexts of information asymmetry, as they serve as primary indicators of managerial performance (Bai et al., 2025). Maintaining a broad base of intangible assets requires ongoing investment, which competes for limited cash flows with innovation projects (Aguiar et al., 2021). In environments with costly debt, firms tend to prioritize sustaining existing intangible resources rather than pursuing projects with uncertain long-term returns, thereby reducing financial capacity for innovation expansion (Rajaiya, 2023). Empirical evidence shows that debt-oriented firms sometimes engage in innovation, but this tendency reflects a risk-averse management approach, particularly under shareholder pressure (Kagere et al., 2025; Lu & Wang, 2018). Because intangible resources carry higher uncertainty than physical assets (Kamasak, 2017), firms with substantial intangible bases may further constrain innovation to manage the combined risks of debt costs and maintenance of existing resources (Lee et al., 2023; Martínez-Romero et al., 2025; Santos et al., 2024). Therefore,

H2: The positive relationship between intangibility (H2a), marketing investments (H2b), and market-to-book (H2c) with innovation capability weakens or becomes negative when a firm relies primarily on debt financing rather than equity issuance.

Based on these considerations, Figure 1 shows our theoretical model and hypotheses, and Appendix I presents the paper positioning.



Source: Developed by the authors.

Figure 1. Conceptual model.

METHODOLOGICAL PROCEDURES

Sample and data

The authors use a longitudinal quantitative study with panel data. The authors obtained data from 487 publicly traded North American companies. To compose the sample, the authors considered all North American companies listed on the NYSE and Nasdaq. From this initial sample, the authors removed companies in the financial, insurance, and holding sectors (SIC codes: 4400 to 5000 and 6000 to 6500) because they follow specific financial and accounting rules that may bias the analysis. To ensure comparability of annual return data, the authors considered firms whose fiscal year ends in December. For sample determination purposes, the authors excluded firm-years with missing data regarding the main variables (Bendig et al., 2018).

The longitudinal data in this study are financial in nature, extracted from the financial statements of the sample companies for the period 2015–2022 via the Compustat Financials Dataset of the Standard & Poor's Global Marketplace. The authors selected listed companies due to the availability of public data, a common and widely adopted approach in studies at the marketing–finance interface (Luo & Jong, 2012; Rahman et al., 2018). The 2015–2022 timeframe is justified for three reasons. First, this period reflects greater consistency in the reporting of intangible assets following the consolidation of International Financial Reporting Standards (IFRS), particularly the last major revision of IAS 38 in 2014, which ensures better comparability across firms and over time. Second, from 2015 onward, intangibles have gained increased strategic relevance in the innovation process, driven by digitalization and the knowledge-based economy, making this period especially pertinent to the study's objectives (Mendoza-Silva, 2021). Finally, this period provides a sufficiently long and methodologically sound historical series, minimizing the effects of prior shocks and enabling robust analyses of the moderating role of capital structure. The 487 companies over the eight-year period resulted in a total of 2,247 observations in an unbalanced panel.

Variables

The dependent variable in this study is the firm's innovation capability. Innovation capability has been operationalized in various ways, and there is no consensus in the literature regarding a single ideal measure. Prior research suggests that innovation capability can be proxied indirectly, with the research context guiding methodological choices. One common approach is to use R&D expenditures — absolute value, intensity, or growth — as an input-based measure of innovation capability (Mendoza-Silva, 2021). The authors operationalized innovation capability as the percentage change in R&D expenditures in year t relative to year $t - 1$. This annual variation captures the dynamics of a firm's innovation effort: an increase indicates greater allocation of resources to innovative activities (e.g., hiring R&D personnel, developing projects, acquiring equipment or software), whereas a decrease signals retraction. In some theoretical and empirical models, R&D effort serves as a necessary precursor for generating innovative outputs, such as patents or new products; thus, changes in R&D expenditures function as a dynamic proxy for potential innovation capability. To account for sectoral influences and other biases, the authors focus on the variability of innovation capability, indicating genuine changes in budgetary allocation to innovation investments (Trunschk et al., 2024).

The independent variables capture three distinct measures of intangible resources. First, accounting intangibility is measured as total intangible assets minus goodwill divided by total assets in year *t*. This measure captures the proportion of intangible resources recognized in financial statements, excluding goodwill to avoid distortions from acquisitions or business combinations (Lev, 2019; Machado, 2023). Second, marketing investment is measured as the percentage change in advertising expenditure in year *t* relative to year *t* – 1. This proxy reflects the firm's effort to develop intangible marketing resources (e.g., brand equity, customer relationships, and sales capabilities) that are off-balance-sheet, with percentage growth capturing the dynamics of strategic investment rather than absolute scale (Graham & Frankenberger, 2000; Joshi & Hanssens, 2010). Third, market-to-book is measured as the firm's market value divided by its book equity in year *t*, serving as a proxy for off-balance-sheet intangibles, including goodwill, human capital, reputation, innovation, and organizational knowledge. This measure reflects investors' perceptions of a firm's intangible resources and their potential to generate future value (Machado, 2023; Van Criekingen et al., 2022).

The moderating variable is capital structure and reflects the proportion of total assets financed by debt, calculated as long-term debt plus current liabilities divided by total assets. This moderating variable captures the extent to which a firm relies on debt financing relative to equity issuance, reflecting strategic decisions about funding sources (Rajaiya, 2023). Finally, the study incorporates control variables at multiple levels: firm-level financial controls (lagged return on assets, asset turnover), sector-level controls (technological turbulence), market-level controls (market turbulence), firm size, and years affected by the COVID-19 crisis. Detailed definitions and operationalizations of all variables are provided in Table 1.

Table 1. Operationalization of variables and conceptual definition.

Variable	Variable type	Measurement	Source
Innovation capability	Dependent	Percentage change in R&D expenditure in year t relative to *t* – 1	Mendoza-Silva (2021); Trunschke et al. (2024)
Level of accounting intangibility	Independent	Value of total intangibles minus goodwill divided by total assets in year *t*	Lopes and Carvalho (2021); Machado (2023)
Marketing investments	Independent	Percentage change in advertising expenditure in year t compared to *t* – 1	Graham and Frankenberger (2000); Joshi and Hanssens (2010)
Market-to-book	Independent	The market value of the company is divided by the value of equity in year *t*	Lopes and Carvalho (2021); Machado (2023)
Capital structure	Moderator	The book value of long-term debt plus debt in current liabilities divided by the book value of total assets in year *t*	Rajaiya (2023)
ROA (lagged)	Control	Operating income before depreciation, amortization, and depletion divided by total assets in year *t* – 1	Lopes and Carvalho (2021)
Asset turnover	Control	Net revenue divided by total assets in year *t*	Lopes and Carvalho (2021)
Market turbulence	Control	Sum of sales, general and administrative expenses by SIC and year divided by the sum of net revenues by SIC in each year *t*	Bendig et al. (2018)
Technological turbulence	Control	Sum of R&D expenditures per SIC divided by the sum of net revenues per SIC in each year *t*	Bendig et al. (2018)
Company size	Control	Natural logarithm of total assets in year *t*	Bendig et al. (2018); Lopes and Carvalho (2021)
Crisis (COVID)	Control	1 for *t* = 2020 and 2021 and 0 for other years	Trunschke et al. (2024)

Note. Developed by the authors.

Model

To test the hypotheses, the authors used econometric regression with panel data and fixed effects (similar to Garcia, Vieira, & Agnihotri, 2025; Garcia, Vieira, & Nath, 2025), according to the model proposed in Equation 1. The proposed model aims to infer the relationship between intangible assets and innovation capability moderated by capital structure.

$$IC_{it} = \psi_0 + \psi_1 LI_{it} + \psi_2 MI_{it} + \psi_3 MTB_{it} + \psi_4 CS_{it} + \psi_5 LI_{it} * CS_{it} + \psi_6 MI_{it} * CS_{it} + \psi_7 MTB_{it} * CS_{it} + Controls + \eta_{it} \quad (1)$$

Where: IC_{it} is the increase in the innovation capability of company *i* in year *t*. LI_{it} is the level of accounting intangibility of company *i* in year *t*. MI_{it} is the increase in marketing investments of company *i* in year *t*. MTB_{it} is the market value measured by the market-to-book ratio of company *i* in year *t*. CS_{it} is the metric of the

capital structure, such that the higher the measure, the greater the adhesion of company *i* in year *t* to debt versus equity originating from shares. $Controls_{it}$ are the control variables of the model. To test the persistence of the effects in the medium term, a regression was operationalized whose dependent variable is innovation capability at *t* + 1.

We ran statistical models using robust standard errors (robust vce), through White's robust correction, which controls biases caused by heteroscedasticity. All continuous variables were winsorized at 1% to avoid biases that may be generated by outliers. This winsorization is relevant for mitigating the effects caused by outliers and influential observations in the original sample (Wooldridge, 2006).

ANALYSES OF RESULTS

Results

Table 2 presents the correlation matrix and descriptive statistics of the study variables.

Table 2. Descriptive statistics and correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Innovation capability	1,000										
(2) Accounting intangibility	.064***	1,000									
(3) Marketing investments	.163***	.050***	1,000								
(4) Market-to-book	.079***	.116***	.027*	1,000							
(5) Capital structure	-.014	.184***	-.028*	.174***	1,000						
(6) ROA (lagged)	.035***	.082***	-.076***	.082***	.122***	1,000					
(7) Technological turbulence	.109***	.080***	.102***	.121***	-.252***	-.404***	1,000				
(8) Market turbulence	.097***	.225***	.084***	.099***	-.257***	-.285***	.722***	1,000			
(9) Asset turnover	-.081***	-.096***	-.088***	-.105***	-.160***	.257***	-.231***	-.142***	1,000		
(10) Firm size	.036***	.158***	-.018	.572***	.411***	.380***	-.234***	-.265***	-.149***	1,000	
(11) Crisis	.031**	-.010	.040**	.043***	.057***	-.091***	.067***	.031***	-.103***	.024***	1,000
N (observations)	5,403	12,857	3,892	13,026	12,961	13,026	13,026	13,026	13,026	13,026	13,026
Average	.090	.077	.136	4.997	.267	.063	.054	.2114	.821	7.087	.233
Standard deviation	.354	.102	.666	1.758	.200	.182	.083	.1364	.650	2.048	.423
Minimum	-1.000	.000	-1.000	.775	.000	-.939	.000	.0027	.003	2.195	.000
Maximum	1.795	.492	4.000	9.476	.777	.429	.386	.5166	3.607	11.415	1.000

Note. Developed by the authors. *** p < .01, ** p < .05, * p < .10.

We used Equation 1 as the basis for the econometric model to test the study hypotheses. Table 3 presents the results for the relationships tested in year *t* and, to broaden the analysis, also presents results for the effects generated on innovation capability in year *t* + 1, which allows us to verify the persistence of the relationships between the constructs over time.

Table 3. Effect of intangible resources on the innovation capability moderated by capital structure.

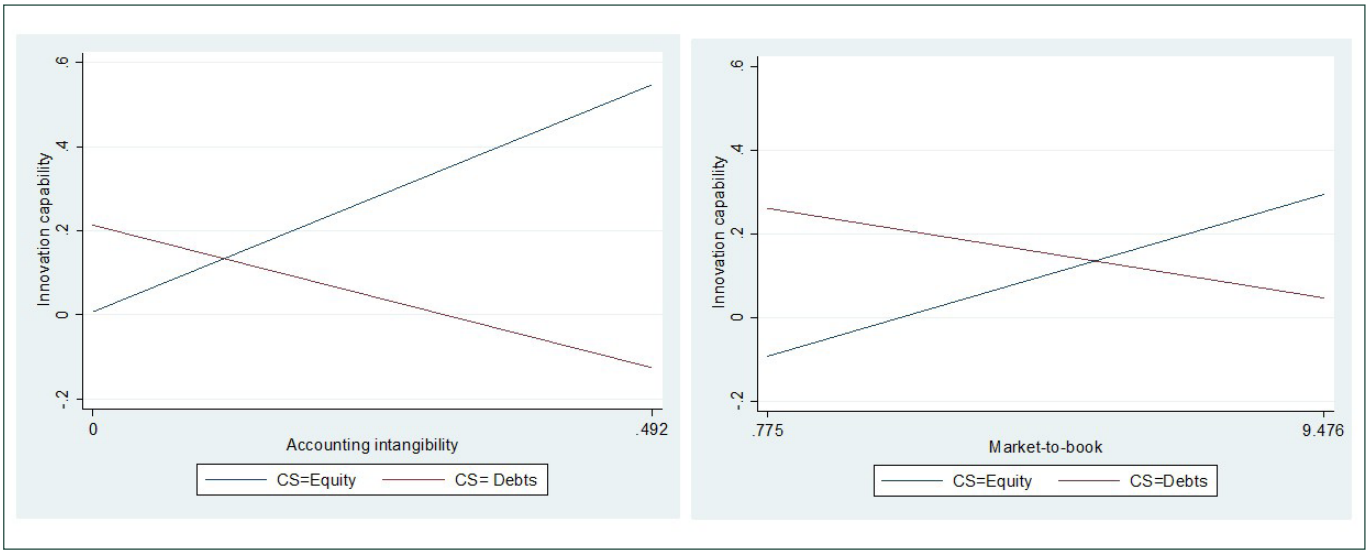
Dependent: Innovation capability	t (short time)		t + 1 (medium time)	
	Coefficient	t-value	Coefficient	t-value
H1a: Level of accounting intangibility	1.0968***	3.39	1.6086***	2.76
H1b: Marketing investments	.0477**	1.99	.0044	.20
H1c: Market-to-book	.0446**	2.30	.0528*	1.89
Moderator				
Capital structure (CS)	.7365**	2.35	-.2472	-.60
Interactions				
H2a: Level of accounting intangibility * CS	-2.2965**	-2.37	-3.3161**	-2.13
H2b: Marketing investments * CS	.0262	.31	-.0112	-.13
H2c: Market-to-book * CS	-.0890**	-1.98	.0150	.23
Controls (covariates)				
ROA (lagged)	.3182*	1.78	.1880	1.14
Technological turbulence	.5814	1.05	-.3208	-.51
Market turbulence	-.3482	-.68	.2011	.42
Asset turnover	.0736	1.12	-.2351***	-3.35
Company size	.0636*	2.11	-.1227***	-2.72
Crisis (COVID)	-.0258	-1.37	.0619***	2.87
Constant	-.7022***	-2.88	.7600**	2.26
F-test	5.28***		2.86***	
R^2 (overall)	.02		.01	
N (observations)	2,247		1,806	

Note. Developed by the authors. t-value above ±1.96 is significant; * sig. < .10, ** sig. < .05, *** sig. < .01. Model See Equation 1.

Hypothesis H1a suggests that there is a positive relationship between the level of accounting intangibility and innovation capability. The results in Table 3 show that the level of accounting intangibility of companies is positively and significantly related to innovation capability in the same year ($\psi 1 = 1.10$, $p < .01$) and in the following year ($\psi 1 = 1.60$, $p < .01$), which confirms our assumption. Therefore, hypothesis H1a is supported, indicating that accounting intangibility and innovation capability in the short term have a positive association. Hypothesis H1b indicates that there is a positive relationship between increased marketing investment and innovation capability. The results illustrate that marketing investment increases innovation capability ($\psi_2 = .05$, $p < .05$), supporting our assumption. The results in Table 3 show that market-to-book is related to innovation capability ($\psi 3 = .04$, $p < .05$), supporting H1c.

To perform a robust post-hoc analysis, the authors test hypotheses H1a, H1b, and H1c considering the effects of intangible resources in year t on innovation capability in the following year ($t + 1$). The results indicate that there is a persistent effect with a positive and significant relationship for accounting intangible ($\psi 1 = 1.61$, $p < .01$). This result reinforces the support for hypothesis H1a. There are no statistically significant effects for the relationship between marketing investments and the market value of the company in year t and innovation capability in the following year ($\psi 2 = .00$, p = ns and $\psi_3 = .05$, p = ns). Therefore, hypotheses H1b and H1c are supported only within one fiscal year.

The model presents the main effect of capital structure on companies' innovation capability. The results indicate that there is a positive and significant relationship with innovation capability in year t ($\psi_4 = .74$, $p < .01$) and a relationship without statistical significance in year $t + 1$ ($\psi_4 = -.25$, p = ns). Regarding the moderating effects of intangible resources, the results indicate that the association between the level of accounting intangibility of companies is negative and significant in the same year ($\psi_5 = -2.30$, $p < .05$) and in the following year ($\psi_5 = 1.60$, $p < .05$) when companies rely more heavily on debt, which supports H2a. There are no significant effects on the marketing investments–innovation capability association moderated by capital structure (in t: $\psi_6 = .03$, p = ns and $t + 1$: $\psi 6 = -.01$, p = ns). The results therefore reject H2b. Finally, the results indicate that the market value of companies is negatively and significantly related to innovation capability in the same year when companies rely more heavily on debt ($\psi_7 = -.09$, $p < .05$), supporting H2c. The effects of this relationship are not significant when considering the following year ($\psi_7 = .02$, p = ns). Figure 2 shows the moderating plots.



Source: Developed by the authors.

Figure 2. Moderating plots.

Discussion of results

The main finding of this study is that intangible resources, while essential for building innovation capability, do not produce uniform or context-invariant effects, as their effectiveness depends both on their nature and on the capital structure under which the firm operates. The results show that accounting-recognized intangibles, marketing investments, and market-to-book positively influence innovation capability, but with different temporalities and intensities. Furthermore, the findings show that indebtedness acts as a limiting factor, restricting the conversion of certain intangibles into innovation capability. These patterns reveal that the innovation generation process is not only a function

of resource endowment, as proposed by the original proposition of the resource-based view (Barney, 1991), but also of how such resources are articulated with financial, informational, and institutional mechanisms that shape their interpretation, perceived risk, and capacity to generate returns over time (Barney, 1995; Teece, 2007, 2016).

The first layer of interpretation concerns the mechanisms that explain why different types of intangibles produce distinct effects on innovation. The authors focus on the type and recognition of intangibles (accounting-recognized vs. non-recognized), linking to RBV and empirical support for H1a. This study advances the resource-based view (RBV) by providing robust empirical evidence that accounting-recognized intangibles — excluding goodwill — constitute a persistent and measurable driver of innovation capability. The positive and significant effects observed both in the same year (ψ_1 = 1.10, p < .01) and in the following year (ψ_1 = 1.60, p < .01) confirm that these assets create enduring innovative potential.

Intangibles recognized for accounting purposes — such as patents, software, intellectual property rights, and licenses — have been shown to have more persistent impacts on innovation capability, both in the current and following years. This pattern can be understood through the mechanism of cognitive sustainability: because such assets are identifiable, controllable, and measurable, as required by IAS 38 and CPC 04, they enjoy greater institutional verifiability and less interpretative ambiguity (Machado, 2023; Penman, 2023). Contemporary literature has emphasized that resources whose nature is more 'materially anchored' reduce stakeholders' interpretative uncertainty and facilitate the construction of stable organizational routines (Aguiar et al., 2021; Barker et al., 2022). Thus, these recognized intangibles become cognitive and structural bases that allow for long-term planning, continuous resource allocation, and the deepening of innovative competencies (Bai et al., 2025; Carmona & Gomes, 2021), aligning with Teece's (2007, 2016) perspective on dynamic capabilities. Empirical results confirm this logic, reinforcing that their contribution does not depend exclusively on their VRIN-O character, but also on their accounting institutionalization, which confers durability and reliability (Barker et al., 2022; Lopes & Carvalho, 2021).

In the case of marketing investments, a different mechanism is observed. Marketing investments, while positively associated with innovation capability in the short term (ψ_2 = .05, p < .05), lose significance over longer horizons, indicating that such relational resources generate temporary competitive advantages rather than sustained ones. This pattern indicates that marketing functions as a catalyst for innovation, facilitating differentiation, market feedback, and competitive positioning (Kyriakopoulos et al., 2016; Sarkees & Luchs, 2015). However, the non-capitalizable nature of these expenditures limits the durability of their impact. These results extend prior research (Joshi & Hanssens, 2010; Rahman et al., 2018) by demonstrating that marketing investments have immediate but less enduring effects compared with other intangible resources.

The positive impact of marketing investments on innovation capability can be attributed to the rapid activation mechanism based on market learning. Marketing expenditure allows companies to capture up-to-date information on consumer behavior, demand trends, and differentiation opportunities (Crosby & Ghanbarpour, 2023; Luo & Jong, 2012). These information flows intensify exploration processes, stimulate rapid adjustments in products, design, communication, and positioning, and contribute immediately to innovative activity (Kyriakopoulos et al., 2016). However, because they do not meet the accounting recognition criteria, such resources are not capitalized, which reduces their durability as organizational assets (Rahman et al., 2018). The absence of accounting institutionalization is justified precisely because they are more volatile, dependent on continuous investment flows, and sensitive to budget cycles (Barker et al., 2022; Hussinki et al., 2025; Penman, 2023). Thus, although they function as catalysts for innovation in the short term (Kyriakopoulos et al., 2016), they do not create persistent learning structures and long-term routines, explaining why their effect does not remain in the $t + 1$ period. This finding complements research showing that marketing can generate value and innovation but depends on the competitive context and the economic cycle (Garcia et al., 2023).

Market-to-book ratios, which capture investors' perceptions of hidden or off-balance-sheet intangibles, exhibit short-term significance (ψ_3 = .04, p < .05) but no lasting effect on innovation capability in subsequent periods. Because it is a metric that captures market perceptions of unrecognized intangibles — such as reputation, human capital, know-how, customer relationships, and goodwill — this indicator functions as an expectations mechanism (Pacheco & Rover, 2021; Van Criekingen et al., 2022). Market-to-book reflects investors' assessments of the innovative potential and quality of unmeasured intangible resources, aligning with the signaling logic present in studies such as Karadag et al. (2025) and Zhang and Zhang (2025). However, expectations are volatile and sensitive to changes in market sentiment, macroeconomic cycles, and domi-

nant narratives (Machado, 2023). Thus, its impact tends to be immediate, but not sustained, since market expectations, while influencing managerial decisions in the short term, do not automatically translate into organizational structures, routines, or internal capabilities capable of supporting innovative processes in the long term (Lozada et al., 2023).

In other words, market-to-book influences innovation while functioning as an external stimulus, since it is a market interpretation that the firm possesses promising intangible assets (Lu & Wang, 2018). This stimulus can lead managers to prioritize exploratory initiatives or mobilize resources to take advantage of a favorable moment (Mendoza-Silva, 2021). However, because such perceptions do not represent institutionalized resources within the organization, they do not generate persistent internal mechanisms for learning, coordination, or technological development (Lozada et al., 2023). Sustainable innovation requires structured foundations, such as routines, technical capabilities, R&D infrastructure, and formal intellectual property protection mechanisms (Teece, 2007, 2016), rather than merely market signals. Thus, the positive effect of market-to-book is transitory because it depends more on external expectations than on effectively appropriable resources.

Furthermore, this result suggests that unrecognized intangible assets, due to their diffuse nature and difficulty of measurement, lack the necessary attributes to support an innovative trajectory, especially the verifiability, controllability, and institutional anchoring that characterize accounting-recognized intangibles (Pacheco & Rover, 2021; Santos et al., 2024). Unlike patents, software, or licenses, which present materiality, legal protection, and defined measurement criteria (Lopes & Carvalho, 2021; Penman, 2023), the implicit intangibles captured by market-to-book cannot be easily mobilized by the firm as cognitive or structural bases. Consequently, although they may drive tactical movements in the short term, they do not establish the basis for continuous innovation.

This pattern also aligns with the literature that distinguishes between perceived resources and possessed resources (Machado, 2023; Ocak & Fındık, 2019). While investor perception may signal confidence and potential, only resources effectively incorporated into internal processes — and organized to capture value — can generate sustained competitive advantage (Barney, 1991, 2001). Thus, the fact that the market-to-book ratio does not show significance in the subsequent period reinforces that market expectations do not replace organizational capabilities (Santos et al., 2024).

The second layer of interpretation of the results emerges when capital structure is incorporated as a boundary condition. The moderating role of capital structure reveals additional insights. While capital structure exhibits a direct positive effect on short-term innovation capability — suggesting that debt can discipline management and focus attention on higher-return projects (Martínez-Romero et al., 2025) — the negative interactions identified in H2a and H2c indicate that reliance on debt reduces the positive effects of accounting intangibility and market-to-book on innovation capability.

Pecking order theory suggests that financial leverage increases agency costs, liquidity pressures, and tighter monitoring, encouraging managers to prioritize projects with lower risk and faster returns (Farias et al., 2021; Myers & Majluf, 1984). The results of this study confirm this asymmetric financial mechanism: debt significantly weakens the positive relationship between accounting intangibility and innovation capability and reduces the market-to-book effect. This occurs because recognized and perceived intangibles have a limited capacity to serve as collateral, raising the cost of debt and reducing the financial slack available for long-term innovative projects (Martínez-Romero et al., 2025; Rajaiya, 2023). In contexts of high leverage, managers tend to redirect resources to preserve liquidity and maintain existing assets, limiting innovation capability, which involves risks and long maturation cycles (Faria et al., 2024; Martínez-Romero et al., 2025). In addition, external investors and creditors may demand greater financial discipline, reducing tolerance for the uncertain investments typical of innovation processes (Palomino-Tamayo et al., 2020).

A relevant theoretical aspect emerges from the absence of significant moderation of debt on marketing investments: these resources, due to their rapid effects and high discretion, can be maintained even under liquidity constraints (Luo & Jong, 2012). This suggests that marketing investments function as tactical tools that can survive debt pressure, while resources of a cognitive or perceptual nature, whose effectiveness requires a longer horizon, suffer greater erosion (Rahman et al., 2018). This pattern challenges the traditional view that all categories of intangibles respond in the same way to financial pressures and points to a neglected temporal dimension in the literature on dynamic capabilities (Ocak & Fındık, 2019).

The findings of this study allow us to define the conditions under which the theory discussed here is most applicable to systematic innovation capability (Samson et al., 2017). The identified effects may be stronger in knowledge-intensive sectors, such as technology and digital services, where the value of companies derives substantially from intangibles and where accounting

institutionalization plays a central role in reducing uncertainty (Hussinki et al., 2025; Magro et al., 2017). In institutional environments with strong enforcement of accounting standards (Lee et al., 2023; Lopes & Carvalho, 2021), such as those adopted in the US context after the consolidation of IFRS, the persistent effects of recognized intangibles tend to be even more pronounced (Lev, 2019). On the other hand, in highly volatile sectors, such as fashion, retail, and media, where differentiation is rapid and trend-based, marketing effects are expected to be more intense and lasting (Garcia et al., 2023). In startups and young companies, whose funding often depends on venture capital and whose market indicators exhibit strong volatility, market-to-book ratios may have more speculative effects and be less related to structured innovation (Singh et al., 2022; Zhang et al., 2024).

CONCLUSIONS

The objective of this study was to analyze the effect of capital structure on the relationship between intangible resources and innovation capability. The findings reveal that the effectiveness of intangibles in fostering innovation capability is neither uniform nor unconditional; rather, it depends on how these resources are recognized, managed, and financed. This study demonstrates that the relationship between intangibles and innovation capability is mediated by distinct mechanisms and conditioned by capital structure. Innovation capability thus ceases to be understood as a simple function of resource endowment and begins to be interpreted as a process dependent on the nature of the asset, the temporality of its return, and the financial pressures faced by the firm. The evidence underscores the foundational role of intangible assets in developing dynamic capabilities, enabling firms to continuously adapt in competitive environments (Teece et al., 1997).

Theoretical implications

From a theoretical standpoint, this study offers contributions on three levels. First, it clarifies that different types of intangibles operate through distinct mechanisms — cognitive, relational, and perceptual — and that these mechanisms have divergent temporalities. Second, it partially reorients the literature by proposing that innovation capability depends not only on the availability of valuable resources but also on the interaction between accounting recognition, market perception, and financial constraints. Third, it extends the RBV (resource-based value) model by integrating capital structure as a boundary condition, showing that the effect of resources on innovation capability is conditioned by financial constraints that shape managerial behavior.

RBV contribution (resource nature and persistence): This result emphasizes the importance of intangibles in firm competitiveness and distinguishes between recognized and unrecognized forms. By demonstrating that formally recorded intangibles maintain influence over time, the study refines RBV theory, suggesting that the institutional mechanisms of resource validation — such as the conservative accounting criteria of IAS 38 — play a crucial role in the transformation of innovation capability. This empirical consistency supports Bai et al. (2025), who associate accounting conservatism with reliable innovation investment, and contributes a nuanced view that the value of resources depends on their verifiability and durability, not solely on their strategic uniqueness.

Dynamic capabilities (temporal and relational dimension): The paper discusses how intangibles act differently across time horizons (short-term marketing vs. long-term accounting assets). Beyond RBV, the results deepen the understanding of dynamic capabilities by uncovering temporal asymmetries in the contribution of intangible types. These findings partially align with Machado (2023), who recognizes market-to-book as a proxy for hidden intangibles, but the current evidence demonstrates that their contribution is volatile and highly sensitive to market sentiment. Consequently, innovation capability emerges not from any single resource category but from the interplay between stable accounting intangibles and flexible, perceptual intangibles (Crosby & Ghanbarpour, 2023). Theoretically, this reinforces the need for a temporal perspective within the dynamic capabilities framework, in which short-term adaptability and long-term stability coexist as complementary innovation mechanisms.

Capital structure as a boundary condition (integration of RBV and finance): It introduces moderation, integrating RBV and pecking order theory with empirical evidence on leverage. By integrating capital structure as a moderating boundary condition, the study bridges resource-based and corporate finance perspectives. The results reveal that higher leverage weakens the positive influence of intangibles on innovation capability, demonstrating that debt financing can erode the innovative potential of intangible-intensive firms. This evidence provides a novel interface between RBV and pecking order theory (Myers & Majluf, 1984), suggesting that financial architecture shapes the translation of resources into innovation capability. While pecking order theory argues that debt is preferred under information asymmetry, these findings indicate that when intangible assets dominate the firm's value, excessive

debt undermines innovation structures, as repayment obligations restrict long-term investment flexibility. This duality enriches theoretical understanding by illustrating that the resource–performance link is contingent on financing design — a point often overlooked in prior research. Collectively, these insights advance theory by positioning financial constraints as strategic contingencies that condition how firms transform intangible resources into sustained innovation advantage.

Managerial implications

From a managerial perspective, the results suggest that firms might benefit from adopting a more differentiated approach to managing intangible resources, recognizing that these assets operate across distinct time horizons. Accounting-recognized intangibles such as patents, software, and licenses appear to have more persistent effects on innovation capability, indicating that they can serve as reliable foundations for long-term competitiveness. Managers may therefore consider prioritizing the accumulation, protection, and strategic deployment of these assets as part of broader innovation programs. In contrast, marketing investments and market-based perceptions of intangibles — reflected in market-to-book ratios — seem to stimulate innovation capability in the short term but require continuous reinforcement to maintain their impact. Hence, effective intangible management might involve balancing stability and adaptability: combining the enduring benefits of formalized intangibles with the renewal of relational and market-oriented assets through ongoing investment and communication initiatives.

The findings also indicate that financing choices can condition intangible-driven innovation capability. While moderate debt levels may help discipline managerial decisions and support short-term innovation projects, excessive leverage tends to constrain the capacity of intangible resources to generate sustained innovative outcomes. Managers in intangible-intensive industries, particularly those operating in technology or knowledge-based sectors, might therefore adopt less conservative financing strategies (issuing shares) to preserve the flexibility required for long-term innovation capability. For investors, the evidence suggests caution when relying exclusively on market-based indicators, since they capture short-term expectations rather than persistent innovative capacity. A more balanced assessment might integrate both accounting-based measures and disclosures about intangible investments. Finally, policymakers could design programs that encourage the simultaneous development of formal and market-based intangibles, recognizing that innovation capability may emerge from the complementarity between intellectual property protection, marketing capability, and access to affordable capital.

Limitations and future research

The analysis relied on data from North American firms due to the specific disclosure requirements of variables such as R&D and advertising expenditures, which are less consistently reported in other contexts, including Brazil. Although most prior studies on innovation capability use U.S. data, restricting the analysis to a single country introduces potential biases, particularly regarding cultural and economic differences relative to developing economies. Future research could address this limitation by examining firms across different institutional contexts, especially as financial databases for publicly traded companies become increasingly refined.

The conclusions open new research opportunities regarding the financial governance of innovation, the temporal cycles of intangibles, and institutional contingencies that modulate firms' ability to transform strategic resources into sustained competitive advantage. Further research could extend the model by incorporating additional internal and external firm conditions as moderators. Possible avenues include managerial characteristics (e.g., CEO or CFO attributes), firm life-cycle stages, or external influences, such as macroeconomic conditions, accounting regulations, and public innovation policies. These moderators could provide a more comprehensive understanding of the contingencies shaping the link between intangibles, capital structure, and innovation capability.

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Authors

Evelini Lauri Morri Garcia

Universidade Estadual de Maringá, Departamento de Ciências Contábeis

Rua Afonso Pena, n. 130 , Zona 1, CEP 87200-027, Cianorte, PR, Brazil

elmgarcia@uem.br

Valter Afonso Vieira

Universidade Estadual de Maringá, Programa de Pós-Graduação em Administração

Av. Colombo, n. 5790, Jd. Universitário, CEP 87020-900, Maringá, PR, Brazil

vavieira@uem.br

Karla Eloisi Gonçalves Martins

Universidade Estadual de Maringá, Departamento de Ciências Contábeis

Rua Afonso Pena, n. 130 , Zona 1, CEP 87200-027, Cianorte, PR, Brazil

ra111354@uem.br

Authors' contributions

1st author: conceptualization (equal), data curation (lead), formal analysis (lead), methodology (lead), project administration (equal), validation (lead), visualization (lead), writing – original draft (equal), writing – review & editing (lead).

2nd author: data curation (supporting), funding acquisition (lead), validation (equal), visualization (equal), writing – review & editing (lead).

3rd author: conceptualization (equal), investigation (supporting), methodology (supporting), writing – original draft (lead).

APPENDIX I

Table 1. Paper positioning across literature.

Authors (year)	Independent variable(s)	Dependent variable	Moderating variable(s)	Main findings	Theory
Bai et al. (2025)	Accounting conservatism	Corporate innovation	Not identified	Conservatism generally reduces innovation risk-taking.	Not identified
Fang et al. (2023)	Intangible resources	Innovation performance	Not identified	Intangible resources positively affect innovation.	Resource-based view (RBV)
Faria et al. (2024)	Innovation, strategic resources	Capital structure (debt vs. equity)	Not identified	Strong innovation capacity reduces debt usage.	Trade-off theory, pecking order theory
Garcia et al. (2023)	Marketing investments	Firm outcomes	Macroeconomic conditions	Effectiveness of marketing investments depends on macroeconomic conditions.	Myopic marketing theory
Graham and Frankenberger (2000)	Advertising expenditures	Earnings, market value	Not identified	Advertising improves earnings and firm value.	Not identified
Joshi and Hanssens (2010)	Advertising spending	Firm value	Analyst coverage (indirect effect)	Advertising affects firm value directly and via analyst attention.	Signaling theory
Kagere et al. (2025)	Competition, access to finance	Firm innovation behavior	Not identified	Access to finance boosts manufacturing innovation.	Not identified
Karadag et al. (2025)	Intellectual capital	Innovation capability	Environmental dynamism, network ties	IC enhances innovation more under dynamic and networked conditions.	Knowledge-based view
Kyriakopoulos et al. (2016)	Marketing resources	Radical innovation activity	Not identified	Marketing resources foster radical innovation and payoffs.	Resource-based view (RBV)
Lu and Wang (2018)	Managerial conservatism, board independence	Corporate innovation	Not identified	Conservatism lowers innovation; independent boards mitigate.	Agency theory
Martínez-Romero et al. (2025)	R&D outsourcing competitiveness	Debt financing (capital Structure)	Not identified	Family firms are more likely to use debt when outsourcing R&D.	Resource dependence theory
Rajaiya (2023)	Innovation success	Capital structure (debt levels)	Not identified	Innovation increases debt capacity.	Pecking order theory
Sarkees and Luchs (2015)	Marketing and innovation investments	Alliance type choice	Not identified	Higher investments raise alliances to exploit complementarities.	Transaction cost economics
Srivastava et al. (2001)	Market-based assets (marketing capabilities)	Competitive advantage, firm performance	Not identified	Marketing assets influence value creation and market-to-book.	Resource-based view (RBV)
Zhang and Zhang (2025)	Goodwill impairment	Corporate innovation investment	Not identified	Goodwill impairments reduce innovation investment.	Not identified
This paper	Accounting intangibility, marketing investments, and market-to-book	Innovation capability	Debt financing (capital structure)	The positive relationship between accounting intangibility and innovation capability weakens or becomes negative under high debt financing. The positive relationship between market-to-book and innovation capability weakens or becomes negative under high debt financing.	Resource-based view (RBV) and pecking order theory

APPENDIX II

Table 2. Hypotheses and theoretical rationality.

Hypotheses	Main elements / Justification	Theory
H1a: Accounting intangibility positively affects innovation capability.	Accounting intangibility improves credibility with investors and creditors, lowers capital costs, and supports sustained innovation.	Resource-based view (RBV)
H1b: Marketing investments positively influence innovation capability.	Marketing investments (advertising, promotions, sales, publicity, social media) generate off-balance sheet resources (brand equity, customer loyalty, customer base) that facilitate new products, R&D, and innovative processes.	Resource-based view (RBV)
H1c: Market-to-book positively affects innovation capability.	Market-to-book captures off-balance sheet intangibles (goodwill, intellectual capital, human capital, reputation, know-how). These resources satisfy VRIN-O criteria and lead to innovation.	Resource-based view (RBV)
H2a: The positive relationship between accounting intangibility and innovation capability weakens or becomes negative under high debt financing.	Limited collateral value of accounting intangibles raises debt costs, reducing funds available for innovation.	Pecking order theory
H2b: The positive relationship between marketing investments and innovation capability weakens or becomes negative under high debt financing.	Marketing-driven intangibles require ongoing investment that competes with cash flows constrained by debt service.	Pecking order theory
H2c: The positive relationship between market-to-book and innovation capability weakens or becomes negative under high debt financing.	Off-balance sheet intangibles (goodwill, intellectual capital) create higher uncertainty, and under debt pressure, firms may deprioritize innovation to mitigate risks.	Pecking order theory