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The moderating role of business environment in capability-competitiveness linkages: Evidence from e-commerce firms in Ho Chi Minh City

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Abstract
This study investigates the moderating effect of the business environment on the relationship between internal firm capabilities and competitive capability within the e-commerce sector. Drawing on the Technology-Organization-Environment (TOE) framework, the research examines how the external context qualifies the impact of Technological Capability and Organizational Capability on the Competitive Capability of e-commerce firms. The study is contextualized within the dynamic and rapidly evolving e-commerce market of Ho Chi Minh City, Vietnam. Utilizing quantitative data from a survey of 398 e-commerce firms, the hypotheses are tested using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal a significant asymmetric moderation effect: a favorable business environment positively amplifies the relationship between Technological Capability and Competitive Capability. However, the business environment does not exert a statistically significant moderating influence on the relationship between Organizational Capability and Competitive Capability. This research contributes to a more nuanced understanding of the TOE framework by demonstrating that the environment's role is not uniform across different types of internal capabilities. The findings offer targeted managerial implications for firms seeking to optimize capability development and strategic investments in the volatile context of emerging digital economies.

Keywords: E-Commerce, business environment, market orientation, business result, moderating role

1. Introduction

1.1 The E-Commerce Landscape of Ho Chi Minh City

The global digital transformation has positioned e-commerce as a central pillar of economic growth, particularly in emerging economies. Vietnam stands as a prominent example, with its e-commerce market experiencing exponential growth and projected to exceed a scale of $25 billion in 2024. At the forefront of this digital boom is Ho Chi Minh City (HCMC), the nation's economic powerhouse and the undisputed leader in e-commerce activity, consistently ranking highest in the country's e-business index. The city's market is characterized by a vibrant ecosystem, a large and digitally-savvy consumer base, and a high rate of internet penetration, creating a fertile ground for digital commerce.

However, this rapid growth is accompanied by significant challenges that create a complex and demanding operational context for local firms. The market is defined by intense competition, with domestic firms vying for market share against dominant regional platforms such as Shopee, Lazada, and the rapidly ascending TikTok Shop. The recent entry of formidable cross-border players like Temu and Shein has further intensified this competitive pressure, introducing new business models and heightening consumer expectations.

Beyond external competition, e-commerce firms in HCMC grapple with significant internal and environmental constraints. A critical challenge is the acute shortage of skilled IT labor, with projections indicating a deficit of 200,000 workers by 2025, which directly impedes firms' ability to innovate and scale their technological infrastructure. Simultaneously, the external business environment presents a dual-edged sword. While the government has enacted supportive policies, such as the National E-commerce Development Master Plan (Decision 645/QD-TTg), firms must navigate a landscape fraught with infrastructural bottlenecks.

Notably, logistics costs remain prohibitively high, accounting for 20-25% of an order's value, and the prevalence of cash-on-delivery (COD) transactions, especially in rural areas (over 60%), creates complexities in cash flow management and digital payment adoption. This confluence of rapid growth, fierce competition, internal capability gaps, and a turbulent external environment makes HCMC a compelling and critical setting for examining the factors that determine competitive success in e-commerce.

1.2 The capability-competitiveness nexus and the research gap

In strategic management literature, a firm's ability to achieve and sustain a competitive advantage is fundamentally linked to its internal capabilities. This study focuses on two core internal capabilities critical to the e-commerce sector: Technological Capability and Organizational Capability. Technological Capability (NLCN) is defined as a firm's proficiency in acquiring, assimilating, and leveraging technology to innovate processes, enhance product offerings, and improve overall performance. Organizational Capability (NLTC) refers to the firm's ability to effectively deploy its resources through coordinated structures, streamlined processes, and skilled human capital to realize its strategic objectives. These capabilities are considered primary drivers of a firm's Competitive Capability (NLCT), which is its capacity to create superior value and maintain an advantageous market position through mechanisms like cost leadership, service differentiation, and market responsiveness.

While the direct positive relationships between internal capabilities (NLCN, NLTC) and competitive outcomes (NLCT) are well-documented, a significant gap persists in understanding the conditional factors that shape these relationships. The Technology-Organization-Environment (TOE) framework, a dominant paradigm for studying technology adoption, posits that the external environment plays a crucial role. However, a substantial body of research has predominantly treated the business environment as a direct antecedent an independent factor influencing firm capabilities or performance. This approach overlooks its potentially more nuanced role as a moderating variable that can strengthen, weaken, or otherwise alter the effectiveness of a firm's internal strengths.

This study addresses this specific lacuna, which is explicitly identified as a key research gap in the foundational thesis. The assumption that internal capabilities translate into competitive advantage in a uniform manner, irrespective of external conditions, is a theoretical oversimplification. In a volatile market like HCMC's e-commerce sector, the same technological investment or organizational structure may yield vastly different outcomes depending on the prevailing regulatory, infrastructural, and competitive context. Therefore, investigating the business environment's moderating role is not merely an academic exercise but a response to a pressing real-world managerial dilemma.

2. Theoretical Framework and Hypothesis Development

This study's conceptual model is grounded in a synthesis of established theories in strategic management and information systems, primarily the Technology-Organization-Environment (TOE) framework, complemented by insights from the Resource-Based View (RBV), the Capability-Based View (CBV), and Institutional Theory. Together, these perspectives provide a robust theoretical foundation for conceptualizing the business environment not as a simple antecedent, but as a critical contingency factor that moderates the relationship between a firm's internal capabilities and its competitive standing.

Synthesizing these theoretical perspectives, this study proposes that the business environment moderates the efficacy of both technological and organizational capabilities in generating competitive capability.

2.1 Moderating effect on technological capability

The competitive returns from investments in technological capabilities are particularly sensitive to the external context. Technological assets in e-commerce such as data analytics platforms, automated logistics systems, and integrated payment gateways do not operate in a vacuum. Their effectiveness is intrinsically linked to the broader digital and physical ecosystem. A supportive business environment, characterized by robust digital infrastructure, clear and favorable e-commerce regulations, and a digitally literate consumer base, can act as an amplifier. In such a context, a firm's technological superiority can be more easily translated into tangible competitive advantages like faster delivery times, superior customer personalization, and greater operational efficiency. Conversely, a hostile or underdeveloped environment marked by unreliable internet, logistical bottlenecks, or unstable legal frameworks can severely curtail the benefits of even the most advanced technologies, leading to a diminished return on investment. This leads to the following hypothesis:

Hypothesis H_1: The business environment moderates the relationship between Technological Capability and Competitive Capability of e-commerce enterprises in HCMC.

2.2 Moderating effect on organizational capability

The impact of organizational capabilities such as strategic leadership, quality of human capital, and financial management on competitive capability can also be contingent on the external environment. A stable, predictable environment might reward organizational structures that are optimized for efficiency and cost control. In contrast, a turbulent and uncertain environment, typical of emerging e-commerce markets, may place a premium on organizational capabilities related to agility, learning, and rapid decision-making. A favorable business environment, offering clear market signals and policy stability, may allow a firm's well-defined strategies and processes to be executed more effectively, thereby strengthening their contribution to competitive capability. Conversely, an unpredictable environment could render rigid organizational structures obsolete, suggesting that the link between organizational capability and competitiveness is not static but is shaped by external conditions. This logic underpins the second moderation hypothesis:

Hypothesis H_2: The business environment moderates the relationship between Organizational Capability and Competitive Capability of e-commerce enterprises in HCMC.

3. Research Methodology and Findings
3.1 Sample and Data Collection
The study's population consists of e-commerce enterprises operating within Ho Chi Minh City, a key hub for digital commerce in Vietnam. The final sample comprises data from firms. Respondents were high-level managers, including directors, vice-directors, or other authorized leaders with in-depth knowledge of their firm's strategic operations, competitive positioning, and performance.
A stratified random sampling technique was employed to enhance the representativeness of the sample. The population of e-commerce firms was stratified based on company size (small, medium, and large), and participants were then randomly selected from within each stratum. Data were collected through a structured questionnaire administered via both online channels (Google Forms distributed through email and professional networks) and direct, in-person surveys. This dual-mode approach was chosen to maximize the response rate and ensure data quality. All collected responses were screened for completeness and consistency, resulting in 398 valid questionnaires for the final analysis.

3.2 Measures
All constructs in the research model were measured using multi-item scales adapted from established literature and contextualized for the Vietnamese e-commerce sector through a rigorous Delphi method involving academic experts and industry practitioners. A 5-point Likert scale (ranging from = "Strongly Disagree" to 5 = "Strongly Agree") was used for all items. The final measurement items for the key constructs central to this paper are as follows.

3.2.1 Technological Capability (NLCN):
This 4-item scale assesses a firm's ability to leverage technology:
- **NLCN1:** The enterprise quickly and flexibly updates new technology trends in the market.
- **NLCN2:** The enterprise always evaluates the suitability of new technology and prioritizes appropriate technologies before implementation.
- **NLCN3:** The enterprise dedicates a significant portion of its IT investment budget to infrastructure, security, and data analytics to ensure stable operations.
- **NLCN4:** The enterprise has sufficient information technology capabilities to effectively deploy applications into its business operations.

3.2.2 Organizational Capability (NLTC):
This 3-item scale measures the effectiveness of a firm's internal structures and resources:
- **NLTC1:** The leadership builds a clear e-commerce strategy, oriented towards customers and suitable for the e-commerce market.
- **NLTC2:** Human resources possess high expertise in e-commerce/digital fields (e.g., digital marketing, platform operations, and data analytics) and are prioritized for training and development.
- **NLTC3:** The enterprise has strong financial resources, sufficient to meet its e-commerce business objectives.

3.2.3 Business Environment (MTKD)
This 3-item scale captures perceptions of the external operating context:
- **MTKD1:** The enterprise fully complies with local laws and policies on e-commerce.
- **MTKD2:** The enterprise has a dedicated team to advise on business laws and policies.
- **MTKD3:** The enterprise, if operating in multiple branches/markets, always adapts to the specific characteristics of each market region.

3.2.4 Competitive Capability (NLCT)
This 3-item scale assesses a firm's ability to compete effectively:
- **NLCT1:** The enterprise integrates the most advanced and modern technologies, such as AI chatbots and logistics automation.
- **NLCT2:** The enterprise is always ready (has sufficient technological conditions) to support innovative ideas and cooperate strongly with technology partners.
- **NLCT3:** The enterprise continuously optimizes products, campaigns, and technology to maintain a leading position on e-commerce platforms.

3.2.5 Analytical Procedure and Results
The hypotheses were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the SmartPLS 4 software. PLS-SEM is well-suited for this study due to its effectiveness in handling complex models and its focus on prediction.The reliability and validity of the measurement model were first established, with all constructs demonstrating strong internal consistency (Cronbach's), convergent validity (Average Variance Extracted-AVE > 0.5), and discriminant validity (HTMT< 0.85).
To test the moderation hypotheses (H1 and H2), an interaction term approach was employed. This involved creating product terms by multiplying the standardized values of the independent variables (NLCN and NLTC) with the standardized values of the moderator (MTKD). The statistical significance of the path coefficients from these interaction terms to the dependent variable (NLCT) was then assessed using a bootstrapping procedure with 5,000 resamples. The results are presented in Table 1 and Figure 1.

Table 1: Results of the moderation analysis on competitive capability (NLCT)

	Original Sample (O)	Sample Mean (M)	Standard Deviation	T-Statistics (|O/STDEV|)	P-Values
MTKD -> NLCT	0,178	0,182	0,047	3,812	0,000
NLCN -> NLCT	0,321	0,322	0,046	6,919	0,000
NLCN*MTKD -> NLCT	0,117	0,116	0,045	2,579	0,010
NLTC -> NLCT	0,244	0,242	0,051	4,788	0,000
NLTC*MTKD -> NLCT	-0,077	-0,076	0,043	1,766	0,077

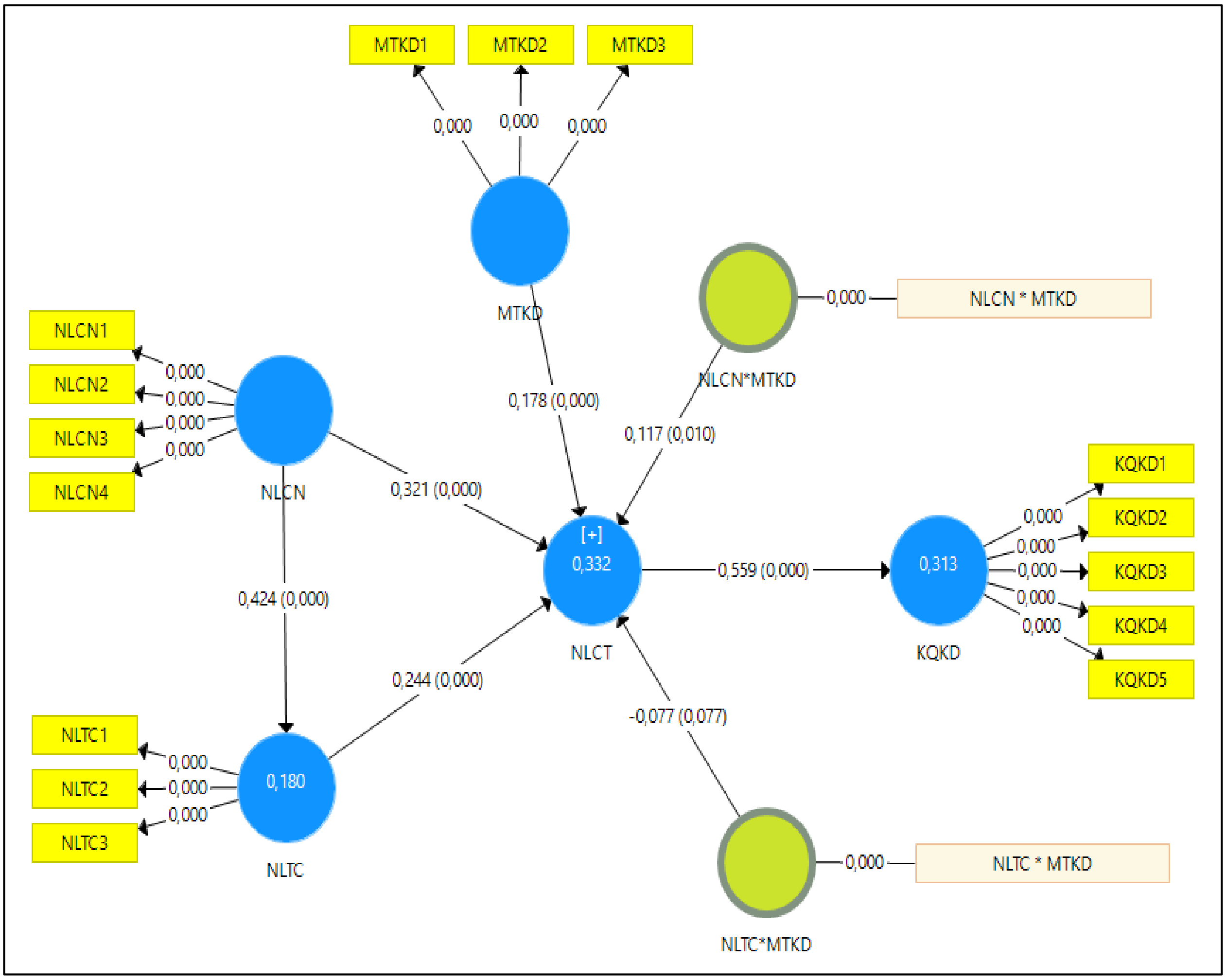

Fig 1: Model with business environment as a moderating variable

4. Summary of Findings

The results from the structural model provide clear and distinct outcomes for the two moderation hypotheses. The analysis shows that the interaction term for Technological Capability and Business Environment (NLCN*MTKD) has a positive and statistically significant effect on Competitive Capability. This finding provides strong empirical support for Hypothesis H1, indicating that the business environment indeed moderates the relationship between a firm's technological prowess and its competitive capability.

In contrast, the path coefficient for the interaction term representing Organizational Capability and the Business Environment (NLTC*MTKD) was not statistically significant at the conventional level. Consequently, Hypothesis H2 is not supported. This result suggests that the influence of organizational capability on competitive capability is not significantly altered by variations in the business environment. The combination of these two findings reveals a compelling asymmetric moderation effect, where the external environment plays a crucial role in shaping the outcomes of technological capabilities but not organizational capabilities.

5. Discussion

The empirical results present a nuanced picture of the interplay between internal capabilities and the external environment. The discovery of an asymmetric moderation effect where the business environment significantly amplifies the impact of technological capability but not organizational capability invites a deeper interpretation of how different types of firm strengths function within a volatile market context.

5.1 The amplifying role of the business environment on technological capability

The strong support for Hypothesis H1 confirms that a favorable business environment acts as a powerful amplifier for a firm's technological capability. This finding aligns with the core tenets of the TOE framework and RBV, which posit that the value of internal assets is contingent upon external conditions. The underlying logic is that technological capabilities in e-commerce are inherently externally-facing and ecosystem-dependent. The competitive advantage derived from an advanced data analytics engine, a highly automated warehouse, or a seamless online payment system is directly tied to the quality and maturity of the surrounding digital and physical infrastructure.

In the context of Ho Chi Minh City, this dynamic is particularly salient. When the business environment is supportive characterized by reliable high-speed internet, widespread adoption of digital payments, a clear legal framework for data privacy, and efficient last-mile delivery networks a firm's investments in technology can be fully leveraged. This synergy allows the firm to translate its technological superiority into tangible market advantages, such as superior customer experience, faster order fulfillment, and more effective marketing campaigns, thereby strengthening its competitive capability.

Conversely, in an environment plagued by logistical bottlenecks, regulatory ambiguity, or low consumer trust in online transactions, the very same technological investments may fail to deliver their promised returns. An advanced logistics software is of little use if the physical road network is congested and unreliable. This explains the significant amplifying effect: a favorable environment unlocks the full competitive potential of a firm's technological assets.

5.2 The insignificant moderation on organizational capability: A Resilience Perspective

Perhaps the more intriguing finding is the lack of support for Hypothesis H_2. The statistical insignificance of the interaction between organizational capability and the business environment suggests that the strength of the relationship between organizational capability and competitive capability remains stable, regardless of whether the external environment is favorable or hostile. This result should not be interpreted as a failure, but rather as a meaningful discovery that reveals a fundamental difference in the nature of organizational capability compared to its technological counterpart.

Instead of being amplified by a positive environment, strong organizational capability may function as a source of internal resilience a buffer that insulates the firm from external turbulence. Organizational capabilities, which encompass strategic leadership, an agile culture, high-quality human capital, and prudent financial management, are primarily internal-facing. A firm with a visionary leadership team, a highly skilled and motivated workforce, and efficient internal processes can navigate regulatory hurdles, devise creative solutions to infrastructural gaps, and build a strong brand reputation through superior service, even in a challenging market. In this view, organizational capability is not an opportunistic asset that thrives only in fair weather; it is a foundational, "all-weather" strength that allows the firm to generate competitive advantage from within. Its impact on competitiveness is therefore more consistent and less conditional on the external context. This positions organizational capability as a source of stability and endurance, while technological capability is a more context-dependent source of opportunity.

6. Conclusion

This study set out to investigate the moderating role of the business environment on the link between internal capabilities and competitive capability in Vietnam's burgeoning e-commerce sector. The empirical evidence, drawn from 398 firms in Ho Chi Minh City, reveals a distinct and theoretically significant asymmetry. A favorable business environment was found to be a crucial catalyst, significantly amplifying the positive effect of a firm's technological capability on its competitive standing. This underscores the idea that the return on technology investment is highly contingent on the quality of the external ecosystem. Conversely, the impact of organizational capability on competitiveness was found to be stable and not significantly moderated by the business environment, suggesting that strong organizational foundations provide a form of internal resilience that is effective across varying external conditions. This research thus refines the TOE framework by demonstrating that the environment's moderating influence is not monolithic but varies according to the nature of the internal capability in question.

7. Managerial Implications

The findings of this study offer several actionable implications for managers and strategic leaders of e-commerce firms, particularly those operating in dynamic and emerging markets like Ho Chi Minh City.

First, technology strategy must be environmentally-attuned. The results strongly caution against a one-size-fits-all approach to technology investment. Managers should treat their technology roadmap as context-sensitive. Before committing to large-scale deployments of advanced systems, a thorough analysis of the prevailing business environment is essential. In a supportive environment with robust infrastructure and clear regulations, aggressive investment in cutting-edge technology to seize a first-mover advantage is a viable and recommended strategy. However, in an uncertain or underdeveloped environment, a more prudent, modular, and scalable approach to technology adoption may be wiser to mitigate the risk of resource wastage. This means actively aligning the firm's technological ambitions with the practical realities and trajectory of the local policy and infrastructure landscape.

Second, building organizational capability is a non-negotiable, perennial priority. The finding that organizational capability's impact is stable across environmental conditions highlights its role as the firm's core source of resilience. This "all-weather" strength encompassing visionary leadership, a skilled and agile workforce, and sound financial management provides the stable foundation upon which all other competitive actions are built. For managers, this means that investments in talent development, fostering an innovative and adaptive culture, and streamlining internal processes should never be relegated to secondary importance, even when facing external pressures or chasing technological trends. In turbulent times, doubling down on strengthening the organizational core can be the most effective and sustainable competitive strategy.

Finally, the most effective approach is an integrated, dynamic strategy. The ultimate implication is the need for a dual-pronged approach to capability development. Firms must continuously invest in strengthening their foundational organizational core to build resilience. Simultaneously, they should remain agile and opportunistic in their technological thrusts, timing significant investments to coincide with windows of opportunity opened by a favorable and maturing business environment. This balanced strategy allows a firm to not only withstand external shocks but also to effectively capitalize on emerging opportunities, thereby charting a path toward sustained competitive advantage.

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