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Market Orientation and Competitive Advantage in Vietnamese Food Processing Enterprises: Exploring the Moderating Effect of Digital Orientation

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Abstract

Purpose: Innovation is crucial in enabling organizations across various industries, particularly food processing, to gain a competitive advantage. This research examines how market orientation and digital transformation orientation influence innovation and competitive advantage in the Vietnamese food processing industries.

Design/methodology/approach: Data collected from 122 managers in food processing firms were subjected to partial least squares structural equation modeling (PLS-SEM) analysis to assess the validity of proposed relationships within the research model.

Findings: This study emphasizes the importance of innovation that incorporates market orientation, including customer, supply chain, and competitor orientation, as well as digital orientation, in enhancing the overall competitive advantage of food processing businesses. Customer orientation exerts the strongest influence on firms' innovation capabilities, followed by supply chain orientation and competitor orientation. This integrated market orientation improves firms' innovation capability, which in turn enhances their competitive performance. The research also highlights the direct contribution of digital orientation to a business's competitive advantage. Moreover, it confirms the role of digital orientation as a moderator in the relationship between innovation capability and competitive advantage.

Practical implications: Through empirical validation, this study provides actionable insights for practitioners, especially food processing company managers in developing economies, and offers a comprehensive roadmap for building innovation capability and implementing digital transformational strategies in the food processing industry.

Originality/value: This research is the first to integrate customer, supply chain, and competitor orientations while investigating both the direct impact of digital orientation on competitive advantage and its moderating role in the relationship between innovation capability and competitive advantage. On the one hand, the findings shed light on the combined effect of market orientations on firms' innovation capability and competitive advantage. On the other hand, they add to the understanding of the mechanisms through which digital orientation influences competitive advantage in the food processing industry, which has received scant scholarly interest. The study aligns with the field of decision sciences by developing a framework that explains how strategic orientations, particularly market and digital orientations, enhance innovation capability and competitive advantage in the food processing industry. It also offers empirically grounded insights to support managerial resource allocation and decision-making in an evolving economic landscape.

Keywords: Food Processing Enterprises; Customer; Competitive Advantage; Digital Orientation; Supply chain

JEL Classifications: M10, O31, L66

1. Introduction

The food processing sector plays a vital role in the global economy by directly impacting human sustenance and well-being, particularly in Vietnam, where the government prioritizes boosting domestic production and exports (USAID, 2023). However, Vietnamese enterprises face four challenges in this industry: (1) shifting consumer behavior toward online shopping and increased food safety awareness, (2) heightened competitive pressure requiring enhanced production efficiency (Azeem et al., 2021), (3) the need for technological integration in manufacturing processes, and (4) supply chain disruptions affecting production continuity (Meisya & Surjasa, 2022).

In response to these challenges, enterprises must focus on enhancing product quality, reducing costs, and improving customer responsiveness to maintain a competitive advantage (Porter, 2008). Innovation plays a crucial role here, enabling businesses to develop unique capabilities through agile methodologies (Tidd & Bessant, 2020) and create hard-to-replicate components (Saqib & Satar, 2021). This innovation is driven by a market-oriented approach that considers customer requirements, competitor actions, and stakeholder needs (Bamfo & Kraa, 2019).

In the context of Industry 4.0, digital technology serves as a key enabler for value creation and innovation (Verhoef et al., 2021), with digitally oriented organizations leveraging clear research and development roadmaps (Kindermann et al., 2021; Kollmann et al., 2021). Despite existing research highlighting the importance of stakeholder theory and digital orientation in elucidating the relationship between innovation and competitive advantage (Huhtala et al., 2014; Shehadeh et al., 2023), two crucial research gaps remain. First, previous studies on market orientation in emerging markets have overlooked the innovation stemming from supply chain orientation, thereby leading to an incomplete understanding of the factors driving innovation in organizations (Gruber-Muecke & Hofer, 2015). Strategic orientation encompasses various dimensions such as customer focus, supplier integration, competitive positioning, and innovation propensity. These dimensions collectively represent an organization's strategic approach to developing and maintaining competitive advantage (Huhtala et al., 2014). This multifaceted construct provides a framework for understanding how firms align their resources and capabilities with market opportunities and challenges. Second, stronger digitally-oriented organizations generally possess superior technological infrastructure, competencies, and networks (Chen & Kim, 2023). These assets facilitate the generation of innovative outcomes that drive value creation. However, no prior research has explored the boundary condition of digital orientation on the link between innovation and competitive advantage.

This study endeavors to fill these research voids by proposing and validating a model that investigates the integrative effects of market orientation key parties, including customers, suppliers, and competitors, on an enterprise's innovation and competitive advantage. Furthermore, this study investigates the mediating role of innovation capability to explain how market orientation factors indirectly affect competitive advantage. In addition, the study examines how digital orientation interacts with innovation to encourage an enterprise's competitive advantage. Essentially, three research questions are addressed:

RQ1. How do market orientation components (customer, supplier, and competitor orientations) influence a food processing enterprise's innovation capability, ultimately contributing to its competitive advantage?

RQ2: Does innovation capability mediate the relationships between the market orientation factors and competitive advantage?

RQ3. Does digital orientation interact with innovation to impact competitive advantage?

This study offers important theoretical and practical insights, advancing existing literature on market dynamics and organizational strategies. First, the study reinforces the significance of innovation rooted in market orientation, particularly within the domain of supply chain orientation, a domain that prior research on market orientation in emerging markets has largely overlooked when examining innovation capability and competitive advantage. Second, the study provides a conceptual explanation for the impact of digital orientation on competitive advantage and the moderating effect of this factor on the link between innovation and competitive advantage, whereas earlier studies have typically modeled digital orientation only as a direct driver of performance without theorizing or testing its moderating role in the innovation-competitive advantage relationship. Third, through combined mediation and moderation analyses, this study offers a comprehensive understanding of the underlying mechanism and boundary conditions of the impact of market orientation and stakeholder factors on innovation capability and competitive advantage. Taken together, the study speaks directly to the core concerns of the decision sciences by clarifying how firms can design and implement more effective strategic and operational decisions that leverage digital orientation and market-oriented innovation to build and sustain competitive advantage in turbulent, technology-intensive environments. In addition, the findings offer practical guidance for managers making strategic and operational decisions to strengthen innovation capability and competitive advantage in the food processing industry.

In the following section, the article introduces the theoretical framework, discusses the development of the hypotheses, and presents the empirical results. Finally, this study examines the findings in the context of existing literature and provides suggestions for future research.

2. Literature Review and Hypothesis Development

2.1. Stakeholder Theory

Stakeholders represent groups and individuals with legitimate interests in a firm's activities and outcomes, whose support is essential for achieving organizational objectives (Freeman et al., 2018). Key stakeholders typically include customers, employees, suppliers, capital providers, and local communities. Stakeholder theory suggests businesses should consider stakeholders' interests when making strategic decisions (Freeman et al., 2018). This theory proposes a relationship between companies and communities, groups, or individuals with shared objectives and reciprocal influence (Baah et al., 2022), encompassing collaboration (Miles, 2015), to create and enhance value (Kahupi et al., 2021) and foster sustainable innovation (Oruc & Sarikaya, 2011). A firm's survival and success hinge on diverse stakeholders

(Harrison et al., 2019). As a result, organizations must develop strategies, management practices, and operational behaviors that address these varied expectations of these stakeholders (Freeman et al., 2018). This stakeholder-centric approach fundamentally shapes a firm's strategic direction and decision-making processes.

Innovation, encompassing new offerings and processes (Vicente et al., 2015), inherently involves multiple stakeholders and complex interactions (Hueske & Guenther, 2015). Adopting a multi-stakeholder approach to innovation enables organizations to effectively identify key stakeholders, incorporate diverse perspectives, leverage collective expertise, and secure broader support for new initiatives (Hueske & Guenther, 2015).

Research has identified three critical stakeholder groups in innovation: suppliers, customers, and competitors (Afuah & Bahram, 1995). Customer input has proven particularly crucial for successful product development (Walter, 2003), while supplier collaboration can significantly enhance innovation outcomes (Hueske & Guenther, 2015). In the food processing industry, customers and suppliers also play important roles. Food processing refers to the transformation of agricultural products into consumable goods through various manufacturing processes (Minot, 1998). These processes range from basic operations like cleaning and sorting to more complex transformations, including milling, canning, and freezing (Minot, 1998). With the broader food supply chain, the processing sector serves as a crucial intermediary between primary producers (farmers and fishermen) and end consumers. Raw material suppliers are particularly vital to this industry, as their inputs significantly shape operational structures and processing methodologies. Moreover, consumer preferences primarily drive the evolution of the food processing sector (Minot, 1998). Furthermore, competitive monitoring becomes essential in a market saturated with similar products, such as the food industry (Traill & Meulenberg, 2002). Early and consistent engagement with these stakeholders throughout development helps organizations anticipate challenges, establish effective communication channels, and develop shared understanding before product launch (Hueske & Guenther, 2015).

2.2. Market Orientation

Market orientation represents a customer-centric organizational culture that prioritizes creating superior value for customers through continuous opportunity identification (Narver & Slater, 1990). This approach has garnered significant academic and managerial interest due to its demonstrated impact on firm performance (Morgan et al., 2009). The framework encompasses three key elements: customer understanding, competitor analysis, and inter-functional coordination, which together inform strategic decision-making. The concept aligns with stakeholder theory, as both emphasize the importance of engaging multiple stakeholders. While market orientation primarily focuses on customers and competitors, stakeholder theory expands this perspective by incorporating all relevant stakeholders, including supply chain partners, into strategic considerations. Ferrell et al. (2010) reinforce this connection by demonstrating how market-oriented companies should prioritize stakeholder claims based on their potential impact on organizational performance.

Recent research challenges the traditional aggregate-level approach to market orientation. Studies by De Luca et al. (2010) suggest that different components of market orientation may yield varying performance outcomes. This finding is significant because aggregate measures might obscure the true impact of individual components. For example, a company might excel in customer orientation and benefit substantially from this aspect despite showing lower overall market orientation scores (Han et al., 1998). Given these insights, Huhtala et al. (2014) advocate for disaggregated analysis approaches. Drawing on this recommendation, this study examines competitive advantage by analyzing the market orientation components independently.

2.3. Innovation Capability

Innovation capability, fundamentally grounded in the dynamic capability theory (Teece et al., 1997), represents an evolution of resource-based theory (Barney et al., 2001). This theoretical framework conceptualizes innovation capability as an organization's systematic capacity to adapt, integrate, and reconfigure resources in response to dynamic business environments, thereby maintaining competitive advantage (Helfat & Peteraf, 2009). Within this theoretical context, innovation capability manifests as an organization's proficiency in designing and executing innovation strategies by creating, expanding, and adapting resources to develop novel products, services, processes, and markets (Mendoza-Silva, 2020). The integration of innovation capability within the broader framework of dynamic capabilities, which encompasses both product development and entrepreneurial activities (Eisenhardt & Martin, 2000), positions it as a fundamental component of organizational capabilities (Froehlich & Bitencourt, 2019; Wang & Ahmed, 2004).

The scholarly discourse presents two distinct conceptual approaches to innovation capability. The first adopts a unidimensional perspective, primarily emphasizing product innovativeness (Menguc & Auh, 2010). In contrast, the second approach presents a more comprehensive multidimensional framework (Wang & Ahmed, 2004), encompassing product development, production processes, management practices, and marketing strategies. This latter perspective conceptualizes innovation capability as an interconnected system of organizational routines (Ngo & O'Cass, 2012). The present research adopts this multidimensional approach to measuring innovation capability, as it facilitates more robust cross-study comparisons and provides a more nuanced understanding of organizational innovation dynamics (Mendoza-Silva, 2020).

In the food processing industry, consumers increasingly demand natural, nutritious products free of preservatives and additives (Khouryieh, 2021). This trend presents opportunities for innovation, which includes adopting advanced technologies and improved processing methods that enhance food safety while minimizing processing. For instance, companies are exploring high-pressure processing and natural preservation techniques, enabling them to maintain product quality and extend shelf life without compromising health standards (Khouryieh, 2021). In Vietnam, investments in employee training foster creativity and technical expertise, boosting productivity and enabling the production of high-quality products. Industries such as cashew nut, coffee, rice, and shrimp processing have embraced modern

technologies that meet regional and global standards, positioning Vietnam competitively in international markets (Nguyen & Nguyen, 2021).

2.4. Competitive advantage

Competitive advantage remains a foundational concept in strategic management literature, though its precise definition and conceptualization continue to evolve (Osorio Tinoco et al., 2020). Two seminal theoretical frameworks have shaped our understanding of this construct. First, Porter (1985) laid the groundwork by proposing that firms achieve sustainable profits through either cost leadership or differentiation. In his view, competitive advantage arises when a firm creates value for buyers that exceeds its production costs. Porter (1998) further refined this concept by identifying three crucial organizational capabilities that drive competitive advantage: operational efficiency optimization, superior delivery of product/service quality, and exceptional customer satisfaction. The second major framework, the resource-based view (RBV), developed by Wernerfelt (1984), Rumelt (1984), and Barney (1991), provides a complementary perspective. The RBV posits that sustained competitive advantage derives from resources that possess specific characteristics: rarity, durability, inimitability, non-tradability, non-substitutability, and firm-specificity (Barney, 1991). This theoretical foundation has influenced how scholars measure competitive advantage, typically focusing on either its antecedents (resource-capability factors) or outcomes (performance metrics) (Sigalas & Pekka Economou, 2013). Building on these approaches, Ma (2000) offered a relational perspective, defining competitive advantage as the differential between two competitors on any dimension that enables one to create customer value better than the other. This definition provides a practical framework for measurement by first identifying specific competitive dimensions and then comparing firms against them.

Building on this synthesis of Porter's value creation emphasis and the RBV's resource focus, this study conceptualizes competitive advantage as a higher-order construct comprising two primary dimensions: operational efficiency and customer responsiveness. This conceptualization aligns with Ma's (2000) emphasis on resource differentials in productivity and efficiency, while incorporating the customer-value creation aspect central to Porter's framework. Moreover, these dimensions satisfy the RBV criteria of firm specificity and inimitability (Nguyen, 2019) and have been empirically validated as sources of competitive advantage in previous research (Hunt & Morgan, 1995).

2.5. Market Orientation and Innovation Capability

Innovation in organizations stems from both internal and external factors (Chong et al., 2011), with external market-oriented knowledge playing a particularly crucial role (Hillebrand & Biemans, 2004). Knowledge exchange between businesses, customers, and suppliers enhances business performance and competitive advantage through innovation (Bamfo & Kraa, 2019; Lei & Chen, 2023). In today's dynamic business environment, market-oriented organizations prioritize effective communication with stakeholders, including customers, competitors, and supply chain partners (Gligor et al., 2020; Meisya & Surjasa, 2022).

Customer orientation, a key dimension of market orientation, involves comprehensively understanding target customers to create consistent value (Narver & Slater, 1990). This strategic approach (Gatignon & Xuereb, 1997; Wang et al., 2015) encompasses gathering, analyzing, and utilizing information about current and future customer needs. By systematically analyzing customer feedback, pain points, and behavioral patterns, organizations can develop innovative solutions that effectively address market demands (Racela, 2014). Existing literature demonstrated that strong customer relationships, built through feedback and engagement, lead to enhanced innovation capability and improved firm performance (Rakthin et al., 2016; Wang et al., 2015). Thus, the following hypothesis is developed:

H1*: Customer orientation is positively related to innovation capability.*

Supply chain orientation is a management philosophy that focuses on optimizing supply chain operations and views the supply chain as an integrated entity (Diniz & Costes, 2007). It requires external synchronization of operations and internal alignment of organizational elements (Gligor et al., 2020). This strategic capability contributes to competitive advantage by enabling businesses to establish coordinated response mechanisms and facilitate information sharing among stakeholders (Gligor et al., 2020; Rosell & Lakemond, 2012). Through strong supplier-company relationships, organizations can streamline processes, reduce costs, and create an environment conducive to innovation (Acar et al., 2017; Masa'deh et al., 2018). Drawing from this insight, the hypothesis below is formulated:

H2*: Supply chain orientation is positively related to innovation capability.*

Competitor orientation involves systematically gathering and analyzing information about competitors to develop a strategic competitive advantage (Park et al., 2017). This approach focuses on understanding both current and potential competitors' strengths, weaknesses, strategies, and capabilities (Adi et al., 2018). Through comprehensive competitor analysis and benchmarking, organizations can gain a clear perspective of their market position and identify opportunities for improvement (Zhou et al., 2009). This market awareness drives innovation across product development, processes, and marketing strategies, helping companies maintain their competitive advantage (Lukas & Ferrell, 2000; Ramirez et al., 2014). The aforementioned discussion provides rationale for the hypothesis below:

H3*: Competitor orientation is positively related to innovation capability.*

2.6. Innovation Capability and Competitive Advantage

Innovation encompasses significant enhancements in products, services, processes, marketing, and organizational strategies. It showcases novel innovative business practices designed to meet new or existing customer and market needs (Grubbström & Hinterhuber, 2006; Wong & Huang, 2014). Innovation is crucial in business competition, allowing for early product launches and increased market share. Organizations can prosper and broaden their reach through innovation, acquiring a competitive advantage (Goksoy et al., 2013).

Innovation serves as a critical instrument for businesses to attain a competitive advantage by delivering exceptional solutions, performance, and economical, prompt services (Aziz & Samad, 2016). This strategy fosters long-term competitiveness by acquiring technology skills, encouraging creativity, and introducing innovations to products, processes, or business models. Consequently, organizations can develop unique offerings that not only meet but exceed the expectations of current and prospective customers while achieving lower production costs than competitors (Dobni & Klassen, 2015; Kafchehi et al., 2016).

Additionally, Porter (2008) highlighted that competitive advantage derived from a business's efficient production processes, high-quality goods and services, and customer-responsive services leads to high satisfaction rates. In a fiercely competitive environment, innovation can be seen as an effective strategy for maintaining a competitive advantage. Rubera and Kirca (2012) conducted a meta-analysis of 159 studies examining the innovation-performance relationship and reported a strong connection between innovation and firm value, market position, and financial standing. Thus, businesses need to enhance their adaptability and flexibility through innovation, enabling them to promptly respond to fluctuations and changes in the competitive environment (Ferreira & Coelho, 2020). Based on the above discussions, the hypothesis below is developed:

H4*: Innovation capability is positively related to competitive advantage.*

2.7. Digital Orientation and Competitive Advantage

Digital orientation has fundamentally transformed modern business operations and value creation, particularly in the food processing industry. In today's landscape, where consumer expectations are rapidly evolving and competition is intensifying, businesses must leverage digital technologies to enhance operational capabilities and market responsiveness (Kindermann et al., 2021). Advanced technologies such as blockchain and artificial intelligence have revolutionized supply chain management, enabling comprehensive visibility, quality control, and autonomous operations throughout the product cycle (Hassoun et al., 2023). These innovations form a digital ecosystem that addresses industry challenges through precise traceability, waste reduction, and rapid market response, effectively meeting consumer concerns about food safety and sustainability (Varzaru, 2024). Research demonstrates that digitally-oriented firms achieve superior business performance through improved sales transactions and stronger customer loyalty (Selase et al., 2019). Therefore, integrating digital orientation with market-focused strategies is vital for creating customer value and maintaining a competitive edge. This leads to the following hypothesis:

H5*: Digital orientation is positively related to competitive advantage.*

2.8. The Mediating Role of Innovation Capability

Customer orientation enhances innovation capability by enabling firms to understand and address both stated and latent customer needs (Narver et al., 2004). By integrating customer feedback into the early stages of product development, organizations can better drive innovation and create successful new

products (De Luca et al., 2010). Cumulative insights supported the relationship between customer orientation and innovation capability (Grinstein, 2008), showing that firms that better understand their customers typically achieve superior business performance (Han et al., 1998).

Competitor orientation enhances innovation capability (Grinstein, 2008; Huhtala et al., 2014) by driving firms toward market leadership (Božić, 2007). When firms closely monitor their competitors, they are motivated to develop differentiated offerings, thereby spurring innovative product development that creates products superior to those existing in the market (Mardiyono & Sugiyarti, 2024). This differentiation reduces direct competition and consequently improves business performance (Sigey et al., 2023).

Additionally, effective supply chain management contributes significantly to innovation, with supplier partnership serving as a valuable source of innovative ideas (Mazzola et al., 2015). Through integrated supply chain collaboration, organizations can develop innovative and sustainable solutions that create substantial value (Windahl & Lakemond, 2006). Based on the above-mentioned discussions, the following hypotheses are proposed:

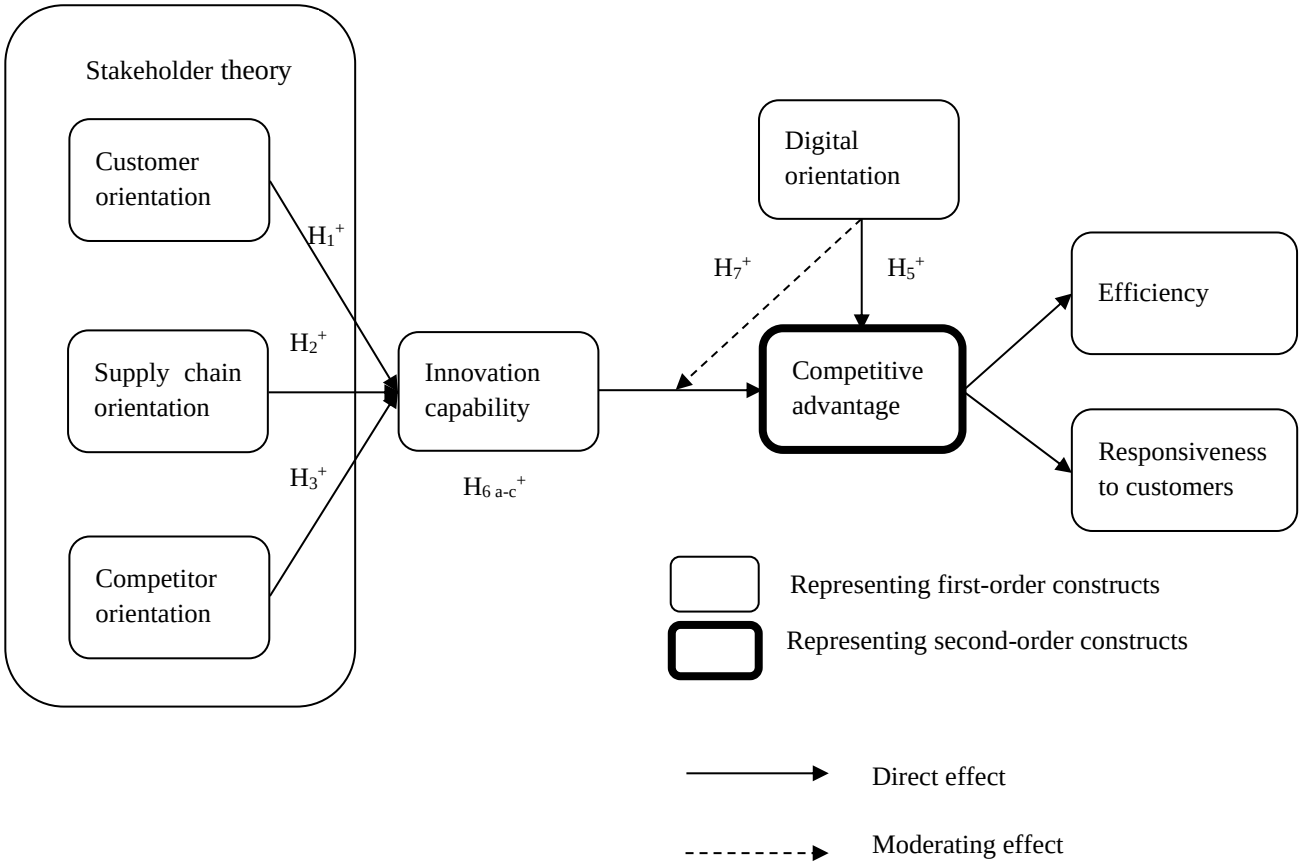
H6: *Innovation capability positively mediates the relationship between market orientation (H6a – customer orientation; H6b – supply chain orientation; H6c – competitor orientation) and competitive advantage.*

2.9. The Moderating Role of Digital Orientation

Digital orientation can significantly enhance innovation in multiple ways. First, while innovation is crucial for business growth, it poses challenges that require managers to develop effective strategies and policies (Creamer, 2012). Digital transformation addresses these innovation challenges and helps differentiate products and services, thereby establishing a competitive advantage for businesses (Zhong et al., 2020). Specifically, digital technology enables firms to overcome resource and capability constraints by leveraging external resources and capabilities, facilitating market expansion and the development of new products. Second, digital technology enhances a firm's information-processing capabilities, minimizing the impact of irrelevant information. Firms with robust information-processing capabilities are better positioned to adjust their innovation strategies in response to changing circumstances in a timely manner. Additionally, digital technologies allow firms to understand customer demands and quickly adapt their innovation efforts. Thus, the combination of digital transformation and innovation enhances performance and fosters a competitive advantage (Konopik et al., 2022). At the outset of business innovation, it is essential to investigate how innovation's impact on competitive advantage depends on digital orientation (Shehadeh et al., 2023). Based on these discussions, the hypothesis below is proposed:

H7*: Digitalization orientation positively moderates the association between innovation capability and competitive advantage.*

Figure 1. Conceptual model



Note: CUO = Customer orientation, SUO = Supply chain orientation, COO = Competitor orientation, INN = Innovation capability, DIO = Digital orientation, COA = Competitive advantage, REC = Responsiveness to customers, EFF = Efficiency. Source: Compiled by authors

Figure 1 presents the direct, indirect, and moderating variables that influence the competitive advantage of food processing firms.

3. Methodology

3.1. Research Context

Vietnam's food processing industry was selected as the research focus due to its strategic importance. As one of Vietnam's three largest manufacturing industries and a crucial contributor to exports, the industry requires participants to maintain global competitiveness. Its extensive supply chain network, linking farmers to consumers, offers an ideal setting for examining stakeholder relationships and market orientation (Nguyen & Enderwick, 2016).

The industry is characterized by a highly competitive environment dominated by small and medium enterprises (SMEs), which must innovate while maintaining cost efficiency to compete with larger producers that have scale advantages (Hanna & Walsh, 2002). This need for balanced innovation has

created an environment where companies continuously strive to develop superior value propositions (Traill & Meulenberg, 2002). It is particularly suitable for studying innovation capability and competitive advantage.

Additionally, the sector receives robust government support for technological advancement, especially in digital transformation (Nguyen & Enderwick, 2016). While modern technologies like the Internet of Things, alert systems, and smart industrial robots offer opportunities to enhance food quality and safety standards (Romanello & Veglio, 2022), research on digitalization in this context remains limited. This gap presents an opportunity for research that can guide leveraging digital technologies for competitive advantage.

3.2. Data

The questionnaire-based survey comprised three sections. It began with an outline of the research objectives and context, followed by questions about respondents' demographic characteristics. The third section contained measurement items for the constructs. All the items were scored on a 7-point Likert scale. Each construct was measured using items adapted from existing literature. Customer orientation reflects the extent to which a firm and its employees deeply understand its target customers to continuously deliver superior value. It emphasizes behaviors and strategies that place customer satisfaction at the core of business decisions, thereby fostering long-term loyalty. Customer orientation (CUO) was measured using a 4-item scale developed by Alsadi and Aloulou (2021). Supply chain orientation refers to the extent to which supply chain members view the chain as an integrated entity and work collaboratively to satisfy shared needs (Diniz & Costes, 2007). Supply chain orientation (SUO) was assessed using a 5-item scale developed by Patel et al. (2013). Competitor orientation refers to understanding current and potential competitors' short-term strengths and weaknesses, as well as long-term strategies (Narver & Slater, 1990). Competitor orientation (COO) was assessed using a 4-item scale developed by Meisya and Surjasa (2022) and Narver and Slater (1990). Innovation capability is defined as a firm's ability to continually generate and convert knowledge and ideas into new products, processes, and organizational arrangements that create value for its stakeholders (Aas & Breunig, 2017). A 5-item scale developed by Ngo and O'Cass (2012) was adopted to measure innovation capability (INN).

Digital orientation, as described by Kindermann et al. (2021), is a strategic mindset that leads firms to actively seek out and exploit opportunities enabled by digital technologies to build competitive advantage. Digital orientation (DIO) was assessed using a 5-item scale referenced from Park and Kim (2021). Competitive advantage arises when a firm adopts a strategy, such as cost leadership or differentiation, that allows it to offer superior value to customers and earn higher profits than its competitors, as outlined by Porter (1985).

Competitive advantage refers to the advantage a firm holds over its competitors (Barney, 1991; Porter, 1985). Competitive advantage was operationalized as a reflective-reflective second-order construct in which the first-order dimensions, efficiency and responsiveness, are each specified reflectively, as prior

research shows that their indicators are observable manifestations of an underlying latent trait rather than independent components that collectively define the construct (Laihonen et al., 2014; Osorio Tinoco et al., 2020; Sarstedt et al., 2019). Responsiveness to customers measures a firm's speed and effectiveness in addressing customer inquiries, needs, and feedback (Osorio Tinoco et al., 2020). Responsiveness to customers (REC) was assessed using a 5-item scale developed by Osorio Tinoco et al. (2020). Efficiency refers to an organization's ability to deliver products and services with minimal waste of resources. In business contexts, it emphasizes streamlined operations and the optimal use of resources to maximize output and profitability (Laihonen et al., 2014). Efficiency (EFF) was measured using a 3-item scale adapted from Laihonen et al. (2014). Table 1 presents the items and their sources. Following Le et al. (2024), the scales were translated from English to Vietnamese and then back to English using the back-translation technique. To ensure the face and content validity of the items, a pretest was conducted with eight strategic management researchers and food enterprise managers (Lim, 2024). Subsequently, a pilot study with 32 participants was performed to identify and resolve potential issues related to clarity, question wording, and response format.

Table 1. Constructs and items

Constructs	Items	References
Customer orientation (CUO)	CUO1. Our organization demonstrates a strong commitment to customer satisfaction	Alsadi and Aloulou (2021)
	CUO2: Customer satisfaction is a primary objective guiding our operational strategies	
	CUO3: We consistently implement customer satisfaction assessment protocols	
	CUO4: Our organizational culture prioritizes the continuous enhancement of customer satisfaction	
Supply chain orientation (SUO)	SUO1: Our organization prioritizes the cultivation and maintenance of robust relationships with supply chain partners	Patel et al. (2013)
	SUO2: Our organization recognizes the strategic significance of effective supply chain management practices	
	SUO3: Our organization emphasizes the importance of seamless integration among supply chain stakeholders	
	SUO4: We proactively engage in garnering and updating comprehensive information about our supply chain partners	
	SUO5: Our organization adopts a holistic approach to supply chain management, prioritizing system-wide optimization over individual component performance	
Competitor orientation (COO)	COO1: Our research team conducts regular analyses of competitors' marketing strategies and initiatives	Meisya and Surjasa (2022); Narver and Slater (1990)
	COO2: We employ regular data collection procedures to gather comprehensive information about our competitors	
	COO3: Our organization demonstrates agile responsiveness to competitive actions within the market	
	COO4: We implement structured processes for analyzing competitors' core competencies and strategic approaches	

Innovation capability (INN)	INN1: Our organization demonstrates a high frequency of new product introductions to the market	Ngo and O'Cass (2012)
	INN2: Our organization exhibits a consistent pattern of innovation in production processes	
	INN3: Our organization frequently implements management innovations	
	INN4: Our company shows consistent innovation in our distribution systems	
	INN5: Our organization shows frequent innovation in pricing methodologies	
Digital orientation (DIO)	DIO1: Our organization is committed to comprehensively digitizing all business operations	Park and Kim (2021)
	DIO2: We have a plan for transformation	
	DIO3: Our organization is prepared to invest resources into our digitalization initiatives	
	DIO4: We are leveraging advanced technologies, such as artificial intelligence and big data analytics to optimize our processes	
	DIO5: Our business operations are undergoing a transition toward integrating cutting-edge digital technologies, including cloud computing, artificial intelligence, and big data analytics	
Competitive advantage (COA)		
Responsiveness to customers (REC)	REC1: Our company brings to the market products with superior quality compared to competitors	Osorio Tinoco et al. (2020)
	REC2: Our company offers superior after-sales service compared to our main competitors	
	REC3: Our company has a faster customer response time compared to our main competitors	
	REC4: Our company has a lower product defect rate compared to our main competitors	
	REC5: Our company provides superior added value compared to the main competitors	
Efficiency (EFF)	EFF1: Our organization consistently outperforms major competitors in terms of sales volume	Laihonen et al. (2014)
	EFF2: We maintain a superior market share position relative to our primary competitors	
	EFF3: Our company demonstrates higher profitability compared to industry peers	

Note: CUO = Customer orientation, SUO = Supply chain orientation, COO = Competitor orientation, INN = Innovation capability, DIO = Digital orientation, COA = Competitive advantage, REC = Responsiveness to customers, EFF = Efficiency. Source: Compiled by authors

This study examines the relationships between market orientation, innovation capability, digital orientation, and competitive advantage in food processing enterprises. The survey targeted both manufacturing companies and businesses trading processed food products. The questionnaire was administered both face-to-face and via email to business representatives between May and June 2024.

Non-probability convenience sampling was used in the absence of an appropriate sampling frame (T. M. N. Nguyen et al., 2024). A total of 157 questionnaires were returned. However, after discarding erroneous or incomplete responses, only 122 observations remained in the effective sample for subsequent analysis.

The minimum sample size was estimated using G*Power 3.1 via a linear multiple regression procedure (Faul et al., 2009). A medium effect size of 0.15 was specified, with statistical power (1 - β) set at 0.95, a significance level (α) of 0.05, and five predictors. Based on a fixed-model, linear multiple regression analysis, G*Power indicated that a minimum of 89 observations was required for the proposed model. The final sample of 122 responses, therefore, exceeded this recommended threshold.

Table 2. The sample profile (n=122)

Variable	Frequency	Percent
Firm age		
Less than 3 years	12	9.84%
3-less than 5 years	58	47.54%
5-less than 10 years	27	22.13%
Over 10 years	25	20.49%
Firm size		
Small and medium-sized	103	84.43%
Large-scale	19	15.57%
Position		
Directors	47	38.52%
Vice-directors	44	36.07%
Department heads	23	18.85%
Other positions (e.g., deputy department heads, team leaders,…)	8	6.56%
Respondents' tenure with the company		
Less than 1 year	10	8.20%
1-3 years	45	36.89%
Over 3 years	67	54.92%
Gender of respondents		
Male	90	73.77%
Female	32	26.23%

Source: Created by authors

Table 2 describes the characteristics of the respondents. The sample consists predominantly of small and medium-sized enterprises, which fairly mirror the composition of Vietnam's food processing industry (Nguyen & Enderwick, 2016).

3.3. Model Specification

To formally represent the hypothesized relationships within the structural model, the following equations are specified. Equation 1 represents the first stage of the conceptual framework, where Innovation (INN) is modeled as an endogenous construct driven by three market orientations.

$$INN = \beta_1 CUO + \beta_2 SUO + \beta_3 COO + \varepsilon_1, \quad (1)$$

where *INN* represents Innovation, CUO denotes Customer Orientation, SUO represents Supply Chain Orientation, COO denotes Competitor Orientation, β_1 through β_3 are the path coefficients, and ε_1 is the residual error term.

As discussed in Section 2.4, Competitive Advantage (COA) is operationalized as a reflective-reflective second-order construct comprising two first-order dimensions: Efficiency (EFF) and Responsiveness to Customers (REC). In a reflective second-order specification, the lower-order construct serves as a reflective manifestation of the higher-order latent variable (Sarstedt et al., 2019). The second-order measurement model is expressed as follows:

$$\text{EFF} = \lambda_1 \text{COA} + \delta_1,$$

$$\text{REC} = \lambda_2 \text{COA} + \delta_2, \quad (2)$$

where λ_1 and λ_2 represent the outer loadings of the first-order constructs on the second-order construct COA, and δ_1 and δ_2 are the corresponding residual error terms. This specification ensures that the structural equations are consistent with the measurement model estimated in PLS-SEM, in which COA is not directly observed but instead a higher-order abstraction manifested through EFF and REC.

The next stage of the model, as delineated in Equation 3, evaluates the determinants of COA. This equation incorporates both a mediation path through *INN* and a moderation mechanism via Digital Orientation (DIO).

$$\text{COA} = \beta_4 \text{INN} + \beta_5 \text{DIO} + \beta_6 (\text{INN x DIO}) + \varepsilon_2, \quad (3)$$

where COA represents Competitive Advantage, INN denotes Innovation, DIO represents Digital Orientation, (INN x DIO) represents the interaction term for moderation, β_4 through β_6 are the path coefficients, and ε_2 signifies the residual error. Since standardized data are used in PLS-SEM, the constant terms (intercepts) are set to zero and omitted from the equations (Becker et al., 2022).

3.4. Analysis Methods

All constructs were measured using multi-item 7-point Likert-type scales, which are formally ordinal. In line with common practice in PLS-SEM research, the analysis treated these multi-item Likert-type scales as approximately continuous indicators, given that they include a sufficient number of categories (more than five points) (Rhemtulla et al., 2012). Simulation and empirical investigations indicate that Likert-type data that approximate continuous distributions yield unbiased parameter estimates in structural equation modeling (SEM) (Norman, 2010; Rhemtulla et al., 2012). Accordingly, treating Likert-type responses as interval-level data is methodologically aligned with prevailing best practices in recent PLS-SEM applications in management and decision-making research (Boadu et al., 2025).

The partial least squares structural equation modeling (PLS-SEM) approach, implemented in SmartPLS 4.0 software, was used to test the research hypotheses. PLS-SEM was chosen over covariance-based structural equation modeling (CB-SEM) for several reasons. First, PLS-SEM was more appropriate for studies with a complex model, such as the present model, which includes both lower-order and higher-order constructs (i.e., competitive advantage) and a moderating variable (i.e., digital orientation) (Hair et al., 2019). Second, the PLS-SEM approach is suitable for studies that extend or confirm a theory (Reinartz et al., 2009). Given that this study identifies the components of market orientation by integrating market orientation and stakeholder theory, it is considered an extension of both frameworks. Third, PLS-SEM can accommodate relatively small sample sizes and does not require normally distributed data, making it ideal for social science and management research, where data distributions often deviate from normality (Hair et al., 2014). This study followed the two-stage approach recommended by Anderson and Gerbing (1988), which first analyzed the measurement model to assess the reliability and validity of the constructs. The structural model was then examined to test the hypothesized relationships.

Although spurious or misleading conclusions can arise in regression-based analyses even when variables are stationary, as demonstrated by Wong et al. (2024), the present study addresses this concern through a comprehensive set of diagnostics appropriate to its cross-sectional design, including full collinearity assessment, distributional screening, measurement validation, and model fit evaluation, collectively confirming the integrity of the reported findings.

4. Results

4.1. Diagnostic test

Given that the dataset employed in this study is cross-sectional, comprising single-wave survey responses with one observation per participant and no temporal ordering or repeated measurements, diagnostic procedures designed for time-series data are not applicable to this research design. Specifically, Unit Root Tests (URT) for stationarity and the Durbin-Watson statistic for serial autocorrelation presuppose time-indexed processes in which persistence, lag dependence, and non-stationarity may distort regression-based inference and give rise to spurious associations (Cheng et al., 2021, 2022; Wong et al., 2024; Wong & Pham, 2022, 2023, 2025). Similarly, the nonlinearity test advanced by Hui et al. (2017) was developed specifically for time-series contexts, relying on lead/lag vectors and residual dependence structures that have no counterpart in cross-sectional survey data. Model adequacy was therefore evaluated through diagnostics suited to the present design, encompassing distributional screening via the Kolmogorov-Smirnov test, which indicated significant deviation from normality, further justifying the adoption of PLS-SEM over CB-SEM, multicollinearity assessment through the full collinearity procedure recommended by Kock (2015), in which all inner VIF values fell below 3.3 threshold, measurement validation (internal consistency reliability, convergent, and discriminant validity), and model fit indices confirm no substantial departures from linearity. Within this cross-sectional SEM framework, the risk of spuriousness attributable to non-stationary time-series dynamics does not arise.

As data were collected from a single informant per respondent, common method bias (CMB) was a potential source of concern because it can artificially inflate inter-construct correlations and produce misleading significance (MacKenzie & Podsakoff, 2012; Podsakoff et al., 2003). To evaluate this, Harman's single-factor test was conducted using an unrotated exploratory factor analysis on all measurement items simultaneously. The first extracted factor explained 45.776% of the total variance, falling below the widely accepted 50% threshold, suggesting that CMB does not pose a substantial threat to the integrity of the findings (Podsakoff et al., 2003). Beyond statistical testing, the survey instrument incorporated several procedural safeguards, including randomizing question order and separating construct blocks, as recommended by MacKenzie and Podsakoff (2012) as procedural remedies for CMB.

4.2. Measurement Model

Table 3. Results for the measurement model

Type of constructs	Constructs	Items	Outer loadings	Cronbach's alpha	CR	AVE
First order	Customer orientation	CUO1	0.932	0.937	0.939	0.841
		CUO2	0.906			
		CUO3	0.930			
		CUO4	0.899			
	Supply chain orientation	SUO1	0.878	0.923	0.928	0.764
		SUO2	0.876			
		SUO3	0.879			
		SUO4	0.904			
		SUO5	0.833			
	Competitor orientation	COO1	0.781	0.866	0.900	0.711
		COO2	0.869			
		COO3	0.923			
		COO4	0.792			
	Innovation capability	INN1	0.899	0.960	0.960	0.862
		INN2	0.936			
		INN3	0.927			
		INN4	0.936			
		INN5	0.941			
	Digital orientation	DIO1	0.812	0.893	0.895	0.701
		DIO2	0.880			
		DIO3	0.847			
		DIO4	0.816			
		DIO5	0.830			
	Responsiveness to customers	REC1	0.903	0.944	0.945	0.818
		REC2	0.916			
		REC3	0.913			
		REC4	0.910			
		REC5	0.880			
	Efficiency	EFF1	0.912	0.929	0.931	0.876
		EFF2	0.931			
		EFF3	0.964			
Second order	Competitive advantage	REC	0.953	0.905	0.955	0.914

EFF	0.958

Note: CUO = Customer orientation, SUO = Supply chain orientation, COO = Competitor orientation, INN = Innovation capability, DIO = Digital orientation, COA = Competitive advantage, REC = Responsiveness to customers, EFF = Efficiency. Source: Created by authors

The measurement model was assessed for indicator reliability, convergent validity, discriminant validity, and internal consistency reliability (Hair et al., 2019). As shown in Table 3, all items of the first-order constructs have outer loadings exceeding the threshold of 0.70, indicating satisfactory indicator reliability (Hair et al., 2019). All latent variables show Cronbach's alpha values between 0.866 and 0.960 and composite reliability (CR) values between 0.895 and 0.960, exceeding the 0.70 threshold. Thus, all variables show good reliability in this study. Additionally, all average variance extracted (AVE) values range from 0.701 to 0.876, exceeding the 0.50 threshold. Thus, convergent validity is confirmed (Hair et al., 2019). Discriminant validity of the constructs was assessed using the HTMT values. As shown in Table 4, the HTMT ratios for the first-order constructs were below the 0.85 threshold (Henseler et al., 2015). Therefore, the scale for all first-order constructs in the model has satisfactory discriminant validity.

Table 4. Results for discriminant validity by HTMT ratios

	COA	**COO**	**CUO**	**DIO**	**INN**	**SUO**
COA						
COO	0.841					
CUO	0.755	0.673				
DIO	0.832	0.779	0.627			
INN	0.839	0.769	0.751	0.685		
SUO	0.860	0.805	0.669	0.761	0.778	

Table 5. Results for discriminant validity by Fornell and Larcker (1981) criterion

	COA	**COO**	**CUO**	**DIO**	**INN**	**SUO**
COA	0.956					
COO	0.796	0.843				
CUO	0.761	0.711	0.917			
DIO	0.792	0.777	0.672	0.837		
INN	0.813	0.814	0.782	0.702	0.928	
SUO	0.818	0.808	0.703	0.761	0.803	0.874

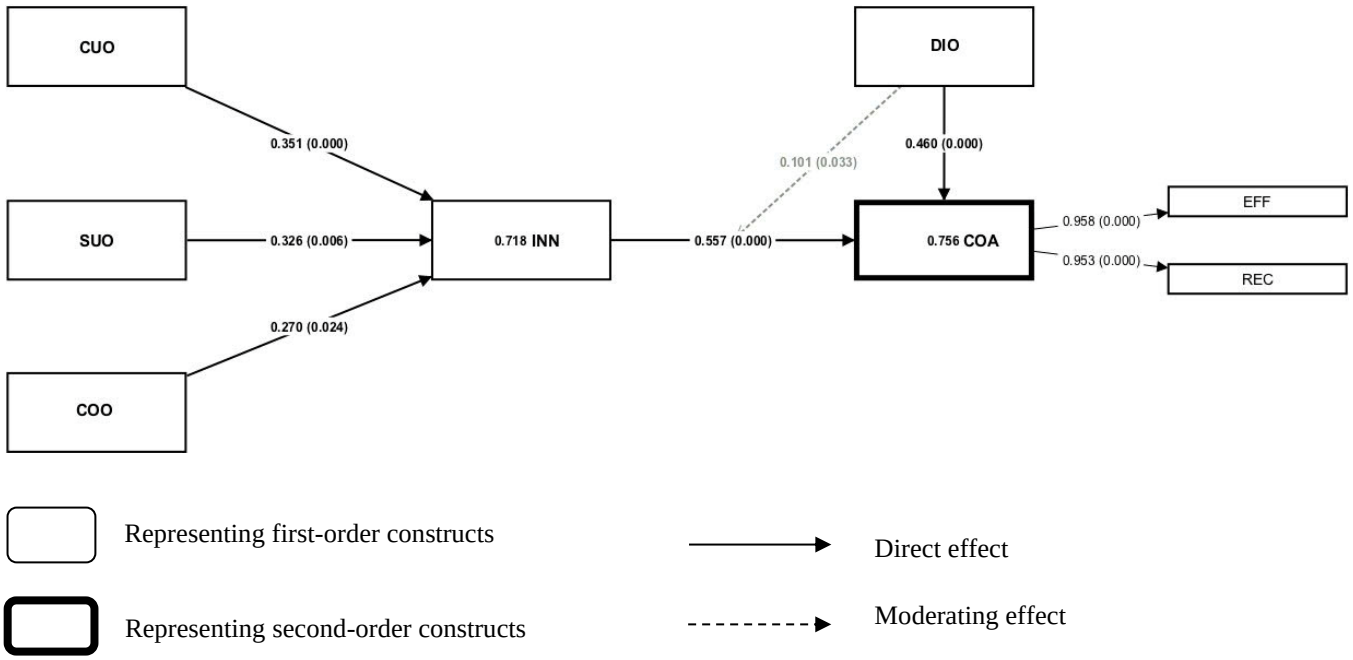
Note: CUO = Customer orientation, SUO = Supply chain orientation, COO = Competitor orientation, INN = Innovation capability, DIO = Digital orientation, COA = Competitive advantage. Source: Created by authors

After assessing the first-order measurement model, the study proceeded to evaluate the second-order measurement model. The second-order COA variables exhibited satisfactory consistency and met the recommended convergent and discriminant validity criteria. As shown in Table 5, the square roots of AVE on the main diagonal exceeded the correlations between variables in the corresponding rows and columns, providing evidence of discriminant validity (Fornell & Larcker, 1981). Moreover, the variance inflation factor (VIF) values for all measures range from 1.463 to 3.129, well below the critical threshold of 5.0.

This aligns with Hair et al.'s (2019) guidelines, indicating that multicollinearity is not an issue among the variables studied. These findings strengthen the statistical model and the credibility of the results.

4.3. Structural model

Figure 2. Structural Model



Note: CUO = Customer orientation, SUO = Supply chain orientation, COO = Competitor orientation, INN = Innovation capability, DIO = Digital orientation, COA = Competitive advantage, REC = Responsiveness to customers, EFF = Efficiency. Values on paths represent standardized path coefficients with p-values in parentheses. Values within the rectangle for endogenous constructs represent the coefficient of determination (R^2).

Source: Created by authors

Figure 2 reports the path coefficients and their statistical significance levels for the links between the constructs. Customer orientation, supply chain orientation, and competitor orientation all make significant contributions to the development of innovation capability, which in turn enhances the competitive advantage of food processing firms. Notably, customer orientation emerges as the strongest predictor of innovation capability, underscoring the central role of customer satisfaction in stimulating firms' innovative efforts. The findings also confirm the positive direct effect of digital orientation on competitive advantage. In addition, digital orientation positively moderates the relationship between innovation capability and competitive advantage, indicating that even strong innovation capability must be coupled with a high level of digital orientation to translate into superior competitive advantage. Figure 3 shows the cross-level moderation effects of digital orientation on the relationship between innovation capability and competitive advantage.

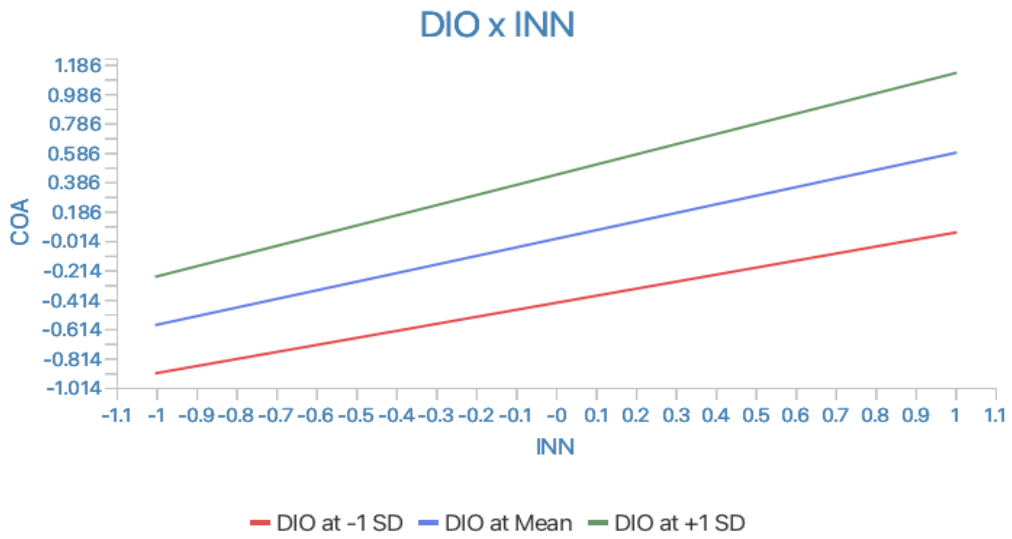
Table 6. Results for structural model analysis

Relationship	Beta coefficient	t-value	p-value	Results
Direct effects				
H1. CUO → INN	0.351***	3.512	0.000	Accepted
H2. SUO → INN	0.326***	2.756	0.006	Accepted
H3. COO → INN	0.270**	2.255	0.024	Accepted
H4. INN → COA	0.557***	6.601	0.000	Accepted
H5. DIO → COA	0.460***	5.871	0.000	Accepted
Indirect effects				
H6a: CUO → INN → COA	0.196***	2.920	0.004	Accepted
H6b: SUO → INN → COA	0.181***	2.599	0.009	Accepted
H6c: COO → INN → COA	0.150**	2.153	0.031	Accepted
Moderating effect				
H7: DIO x INN → COA	0.101**	2.133	0.033	Accepted

Note: CUO = Customer orientation, SUO = Supply chain orientation, COO = Competitor orientation, INN = Innovation capability, DIO = Digital orientation, COA = Competitive advantage, REC = Responsiveness to customers, EFF = Efficiency. ****p < 0.05, ***p < 0.01**. Source: Created by authors

Table 6 reports the hypothesis testing results. All proposed hypotheses were supported, indicating that the research model rests on a solid theoretical foundation and robust empirical evidence. The values of adjusted R^2 suggest that customer orientation, supply chain orientation, and competitor orientation explain 71.8 percent of the variance in innovation. Innovation and digital orientation explain 75.6 percent of the variance in competitive advantage. Following the rule of thumb suggested by Henseler et al. (2009), these adjusted R^2 values indicated a substantial predictive accuracy. Moreover, the effect sizes (f^2) range from 0.049 to 0.556, indicating that the impact of exogenous constructs on endogenous constructs ranges from negligible to substantial (Cohen, 1988).

Figure 3. Simple slope plot



Source: Created by authors

The blindfolding procedure was employed to assess the model's predictive relevance. The values of Q^2 for innovation capability (0.755) and competitive advantage (0.750) exceeded 0, indicating satisfactory predictive relevance. SRMR was used to evaluate the fit of the proposed research model. The SRMR for the estimated model was 0.038, which was below the 0.5 cutoff, indicating a good fit to the sample data (Hair et al., 2019).

5. Discussion of Results

This study delved into the intricate relationships between market orientation dimensions, innovation, digital orientation, and competitive advantage in the food processing industry, with digital orientation serving as a crucial moderator. The findings support hypothesis H1 ($\beta = 0.351$, $p < 0.01$), which posits that customer orientation positively influences the innovation capability of food processing firms. The results not only confirm but also significantly extend previous research by Wang et al. (2016) and Racela (2014). While these earlier studies identified customer orientation's role in firm innovation, this research specifically demonstrates its emergence as the dominant stakeholder in the food processing industry. This is particularly relevant given the industry's unique challenges, as highlighted by recent research (Oyekunle et al., 2024) on rapidly evolving consumer preferences and dietary requirements. Customer orientation is the strongest predictor of innovation capability because it channels customer insights into idea generation, resource prioritization, and rapid iteration, outperforming a focus on technology or competitors (Santos et al., 2020). In Vietnam's food processing sector, amid urbanization and safety concerns, customer-led innovations often align with dynamic demands from retailers and consumers (H. Nguyen et al., 2024).

Furthermore, the findings support hypothesis H2 ($\beta = 0.326$, $p < 0.01$), which proposes a positive relationship between supply chain orientation and the innovation capability of food processing firms. The results build upon existing literature while offering new insights regarding supply chain orientation. While previous studies by Patrucco et al. (2017) and Kähkönen et al. (2017) identified the general importance of supplier collaboration, this research specifically demonstrates how this orientation manifests in the food processing industry. The study extends the work of Zimmermann et al. (2016) by showing that supply chain collaboration goes beyond mere resources to enable proactive innovation and market responsiveness, particularly in the context of agricultural raw materials. This finding is especially crucial given Gligor et al.'s (2020) emphasis on operational integration.

Moreover, the results support hypothesis H3 ($\beta = 0.270$, $p < 0.05$), which posits a positive impact of competitor orientation on the innovation capability of food processing firms. The analysis of competitor orientation provides novel insights while building on established research. While O'Dwyer and Gilmore (2017) demonstrated the importance of competitive benchmarking in SMEs, this study reveals how this orientation has evolved in the food processing industry. The findings show that the industry has moved beyond the focus on cost minimization by Bigliardi et al. (2020) to encompass a comprehensive concern for competitor strategies. This evolution represents an important shift in how competitor orientation influences innovation and competitive strategy.

In addition, the results support hypothesis H4 ($\beta = 0.557$, $p < 0.01$), which confirms a positive relationship between innovation capability and the competitive advantage of food processing firms. While previous studies by Bayona-Saez et al. (2017) and Bigliardi et al. (2020) established a positive link between innovation and competitive advantage, this research provides deeper insights into the specific mechanisms underlying this relationship as it manifests in the food processing industry. Beyond confirming the findings by Galati et al. (2016) in innovation's role in cost reduction and market expansion, this study revealed that innovation in food processing enterprises uniquely integrates customer needs, supply chain coordination, and competitive positioning in ways not previously documented.

Importantly, the result supports hypothesis H5 ($\beta = 0.460$, $p < 0.01$), which posits that digital orientation is essential for the formation of competitive advantage in food processing firms. This finding aligns with prior work by Masoud and Basahel (2023) and Krakowski et al. (2022), suggesting that successful digital transformation will be essential for enterprises seeking to gain and maintain competitive advantages in today's business environment.

The results support hypothesis H6 (a) - H6 (c), confirming the mediating effect of innovation capability on the link between customer orientation ($\beta = 0.196$, $p < 0.01$), supply chain orientation ($\beta = 0.181$, $p < 0.01$), and competitor orientation ($\beta = 0.150$, $p < 0.05$), on the competitive advantage of food processing firms. Thus, there is an established causal chain leading to the competitive advantage of food processing firms through innovation capability, initiated by market orientation players.

The moderating effect of digital orientation on the relationship between innovation capability and competitive advantage was statistically significant ($\beta = 0.101$, $p < 0.05$), supporting H7. Although the effect size is modest, this pattern aligns with prior moderation research showing that interaction effects in field studies are often smaller than those observed in experimental designs (Aguinis et al., 2005; McClelland & Judd, 1993). The relatively small coefficient may reflect partial substitution between innovation capability and digital orientation. Firms with strong innovation systems may already embed digital practices, leaving less incremental variance for the moderator to explain. Nonetheless, as illustrated in Figure 3, the interaction plot shows a consistent pattern across all three conditions. Firms with higher digital orientation (+1SD) exhibit a clearly steeper positive slope than firms with low digital orientation (-1SD), indicating that digital orientation strengthens the strategic returns of innovation capability rather than simply shifting the relationship. This finding extends Shehadeh et al. (2023) by showing that the returns of innovation capability on competitive advantage are contingent on the firm's level of digital orientation. Firms that pair strong innovation capability with high digital orientation gain the greatest competitive returns.

The above results validate the suitability of integrating stakeholder theory and market orientation theory to explain the formation of innovation capability and competitive advantage, and provide further support for their application in food processing sector research. The mediated and moderated model verified in the current study can serve as a theoretical framework for future research in innovation and strategic management.

6. Conclusions

Drawing on stakeholder theory and market orientation theory, this study proposes and empirically validates a conceptual model examining how customer orientation, supply chain orientation, and competitor orientation shape innovation capability, which in turn enhances the competitive advantage of food processing firms. The study also investigates the direct effect of digital orientation on competitive advantage and its contingency effect on the relationship between innovation capability and competitive advantage. Data were collected in Vietnam and analyzed using PLS-SEM. The empirical results indicate that customer orientation, supply chain orientation, and competitor orientation all exert a positive influence on innovation capability, which subsequently strengthens competitive advantage, therefore confirming the mediating role of innovation capability. In addition, the findings show that digital orientation serves as an antecedent of competitive advantage while simultaneously reinforcing the link between innovation capability and competitive advantage.

6.1. Theoretical Implications

From a theoretical standpoint, this study has some important contributions. First, the results strongly align with previous research while offering new perspectives on how external stakeholder factors shape innovation capability. While Galati et al. (2016) and Meisya and Surjasa (2022) established the basic connection between market orientation and stakeholder requirements, this study provides a more nuanced understanding of how these relationships function in practice. Particularly noteworthy is the finding that market orientation serves as the primary interface through which firms engage with their environment, supporting and expanding the foundational work by Day and Wensley (1988).

Second, this study strongly reinforces and extends existing research on the relationship between innovation and competitive advantage. While previous studies by Bayona-Saez et al. (2017) and Bigliardi et al. (2020) established a positive link between innovation and competitive advantage, this research provides deeper insights into the specific mechanisms underlying this relationship in the food processing industry. Beyond confirming the findings by Galati et al. (2016) in innovation's role in cost reduction and market expansion, this study revealed that innovation in food processing enterprises uniquely integrates customer needs, supply chain coordination, and competitive positioning in ways not previously documented.

Third, this study sheds new light on the relationship between digital orientation and competitive advantage. This study found that digital orientation not only directly facilitates competitive advantage but also serves as a crucial enabler of technology-driven innovation activities. This extends beyond previous research by demonstrating how digitization creates a synergistic effect on both operational agility and innovation capacity. In addition, this research offers fresh insights into the moderating role of digital orientation in the relationship between innovation capability and competitive advantage. Unlike previous studies that examined these factors in isolation (Zhang et al., 2020), the study demonstrates that high levels of digital orientation are a prerequisite for maximizing the benefits of innovation capability. This builds upon

previous research by Kindermann et al. (2021) while revealing new insights into how digital infrastructure and processes enable more effective innovation implementation. The findings significantly extend the prior work of Shehadeh et al. (2023) by explicitly mapping this pathway.

Fourth, this study sheds new light on how innovation capability mediates the relationship between market orientation factors and competitive advantage, while digital orientation moderates the connection between market orientation components and competitive advantage. These dual mechanisms offer a comprehensive understanding of how market orientation factors influence both innovation capability and competitive advantage in a digitally enabled environment, contributing valuable knowledge to the digitalization and strategic management literature.

Finally, given the limited research on innovation and competitive advantage in food processing firms in emerging economies, the research presents and validates a novel model using data from Vietnam. The findings provide a foundation for future research on the interplay among stakeholders, innovation capability, digital orientation, and competitive advantage in the food processing industries of developing nations.

6.2. Practical Implications

The research provides important insights for food processing enterprise managers on how to enhance firms' competitive advantage. First, enterprises need to encourage innovation activities to meet customer needs and reduce production costs. Adopting an open mindset and considering shifts in customer demand, supply chains, and competitive landscapes as opportunities to develop adaptive strategies is essential to foster innovation. Second, our findings highlight the crucial role of customer orientation in promoting innovation. Managers should prioritize customer-centric approaches when crafting and executing innovative strategies. They should regularly conduct market research to understand changes in consumer preferences and perceptions of existing products, and develop creative ideas that satisfy customers' needs. Listening to the customer's voice should be emphasized in daily operations.

Third, given the growing importance of supply chain orientation, food enterprises should build long-term cooperation with suppliers through regular discussions to understand mutual needs and benefits. Such an approach facilitates goal alignment, transparent communication, and equitable distribution of resources, risks, and rewards. Food enterprises should implement robust information management systems to effectively manage geographically distant suppliers. These systems streamline data exchange and enhance communication with supply chain partners, improving overall operational efficiency and coordination.

Fourth, food enterprise managers should focus on competitive activities and strategies. Firms that follow a competitor orientation should avoid heavy investment in similar products that do not drive innovation or product differentiation. Instead, they should conduct a thorough market analysis to respond to competitors' moves.

In the current digital era, managers of food processing companies must embrace a digital-oriented approach to enhance market-oriented activities, foster innovation, and strengthen competitive advantage. This digital orientation extends beyond merely acquiring or utilizing digital technologies for data collection and analysis. It requires a comprehensive strategy development process that involves multiple internal stakeholders. Organizations should create a detailed roadmap that identifies the specific departments requiring digital transformation to align with the company's overall strategic goals. This strategic implementation should focus on leveraging digital technologies to streamline operations, improve decision-making processes, and respond more effectively to evolving market demands. By adopting this systematic approach, food processing companies can enhance their operational efficiency while positioning themselves for long-term success in an increasingly digitalized business landscape. The strategic integration of digital technologies supports innovation and strengthens the company's competitive position in the market.

6.3. Limitations and Future Research Directions

This study has several limitations that point to avenues for future research. First, using a survey questionnaire to collect data over a short period yields cross-sectional data, potentially limiting the study's ability to establish causal relationships between variables. Future studies should consider employing longitudinal data collection methods to examine variable relationships over an extended timeframe, which will offer a clearer understanding of their dynamic nature. Second, the survey questionnaire approach has inherent limitations for testing causal relationships because it cannot control for various exogenous variables. Hence, future research should explore alternative research designs, such as controlled experiments, to further validate and scrutinize the results of this study's model. Third, the sample size was quite humble, which may restrict the representativeness and generalizability of the findings. Thus, future scholars should scrutinize the proposed model using a larger sample size. Fourth, this study focused specifically on the roles of market orientation, innovation, and digital orientation in fostering competitive advantage within food processing companies. Future research could expand this scope to include other industries or additional variables that may influence competitive advantage in today's rapidly evolving business landscape. Fifth, the proposed model was validated using data from Vietnamese food processing enterprises only. This single-country focus potentially limits the broader applicability of the findings. Therefore, future studies should test whether the proposed model stands up to scrutiny in other emerging markets.

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