International Journal of Economic Literature (INJOLE) https://sociohum.net/index.php/INJOLE
Vol. 3 No. 10 2026, page., 936-947 e-ISSN: 3026-0221

ECOSYSTEM SUPPORT, DIGITAL LITERACY, AND INNOVATION CAPABILITY: EXPLAINING PRODUCT INNOVATION AND COMPETITIVE ADVANTAGE AMONG FOOD SMEs

Siwi Manganti
Universitas Bali Internasional Muhammadiyah
siwimanganti@gmail.com

Abstract

Food Micro, Small, and Medium Enterprises (MSMEs) play a strategic role in Indonesia's economy; however, increasing market competition, digital transformation, and changing consumer preferences require food SMEs to continuously strengthen their innovation capabilities to sustain competitiveness. Despite the growing importance of innovation, limited studies have simultaneously examined the combined effects of innovation capability, market orientation, ecosystem support, and digital literacy on product innovation and competitive advantage in the food SME sector. This study aims to investigate the influence of innovation capability, market orientation, ecosystem support, and digital literacy on product innovation and further examine the mediating role of product innovation in strengthening competitive advantage among food SMEs in Bali, Indonesia. This study employed a quantitative research design using a cross-sectional survey approach involving 180 food SMEs operating in Denpasar, Badung, and Gianyar, Bali Province. Data were collected through purposive sampling and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software. The findings reveal that innovation capability, market orientation, ecosystem support, and digital literacy significantly and positively influence product innovation. Among these predictors, innovation capability demonstrates the strongest effect on product innovation. Product innovation further emerges as the strongest determinant of competitive advantage, while innovation capability also exerts a significant direct effect on competitive advantage. The model explains 74.3% of the variance in product innovation and 68.1% of the variance in competitive advantage, indicating substantial explanatory power. The study contributes to the literature by integrating internal organizational capabilities and external support mechanisms within a unified framework to explain food SME competitiveness in emerging markets.

Keywords : Innovation Capability; Market Orientation; Ecosystem Support; Digital Literacy; Competitive Advantage

Introduction

Micro, Small, and Medium Enterprises (MSMEs) constitute the backbone of Indonesia's economy and play a critical role in employment generation, economic resilience, and inclusive growth. According to the *ASEAN SME Policy Index 2024*, MSMEs account for more than 99% of business entities across ASEAN countries and contribute substantially to national economic development through job creation and productivity enhancement (OECD & ERIA, 2024). In Indonesia, MSMEs also represent a strategic driver

of economic activity, particularly in the food sector, which holds a significant role in strengthening food security and supporting local industrial development.

Despite their economic importance, food sector MSMEs continue to face substantial challenges in maintaining competitiveness amid increasingly dynamic market conditions, rapid technological transformation, and continuously evolving consumer preferences (Rakib et al., 2024). Compared to other industries, food businesses operate within a unique environment characterized by food safety regulations, quality assurance requirements, perishability constraints, supply chain vulnerabilities, and changing local consumption patterns (Wijaya, 2025). These conditions require food MSMEs not only to survive but also to continuously develop innovative capabilities that enable sustainable competitive advantage.

Innovation capability has long been recognized as a strategic organizational resource that enables firms to identify opportunities, generate new ideas, and transform knowledge into products or services with superior market value (Becerra et al., 2023). Recent studies indicate that firms possessing stronger innovation capability demonstrate greater adaptability to environmental changes and achieve superior organizational performance (Carrasco et al., 2023). Within food MSMEs, innovation capability becomes increasingly important due to rising market competition and growing consumer demand for differentiated, sustainable, and higher-quality food products.

In addition to internal innovation capability, market orientation has been identified as a critical determinant of business competitiveness. Market orientation reflects an organization's ability to understand customer needs, monitor competitor activities, and respond effectively to changing market conditions. Empirical evidence from Indonesian culinary MSMEs demonstrates that market orientation significantly improves marketing performance by enhancing firms' ability to align products and services with consumer expectations (Ramdan et al., 2025). Organizations with stronger market orientation tend to exhibit higher levels of product innovation and are better positioned to sustain long-term competitiveness.

Simultaneously, digital transformation has fundamentally altered MSME business operations. The increasing adoption of digital technologies including e-commerce platforms, digital marketing systems, electronic payment infrastructure, and data driven business processes has created opportunities for MSMEs to improve operational efficiency and expand market access (OECD & ERIA, 2024). However, digital technology adoption alone does not guarantee improved business performance. The capability of entrepreneurs and organizations to effectively utilize digital tools has become equally important.

Consequently, digital literacy has emerged as a strategic capability influencing MSME innovation and competitiveness. Digital literacy refers to the ability to access, understand, evaluate, and effectively use digital technologies to support business activities. Empirical findings suggest that digital literacy enhances MSMEs' capacity to innovate, adapt to technological changes, and strengthen competitive positioning (Rakib

et al., 2024). Similarly, Wibowo and Srihandayani (2023) found that digital literacy strengthens business sustainability through its interaction with entrepreneurial orientation and market orientation, particularly within culinary-sector MSMEs.

Beyond internal organizational factors, ecosystem support also plays a vital role in facilitating MSME innovation performance. Government programs, access to financing, business mentoring, industrial collaboration, and digital infrastructure availability constitute important external resources that influence firms' capacity to innovate (OECD & ERIA, 2024). Research within Indonesia's food MSME sector indicates that technology readiness, e-commerce utilization, and external business support contribute significantly to strengthening organizational innovation capability and overall business performance (Wijaya, 2025).

Although previous studies have established the importance of innovation capability, market orientation, ecosystem support, and digital literacy for organizational performance, most investigations examine these factors independently rather than within an integrated framework (Carrasco et al., 2023; Rakib et al., 2024). Research simultaneously investigating the effects of innovation capability, market orientation, ecosystem support, and digital literacy on product innovation and subsequent competitiveness among food-sector MSMEs remains limited, particularly within Indonesia's context. Furthermore, existing quantitative studies often fail to explain contextual mechanisms underlying situations where organizations possessing strong internal capabilities still experience low innovation outcomes.

Addressing these gaps, this study aims to examine the influence of innovation capability, market orientation, ecosystem support, and digital literacy on product innovation and further investigate the mediating role of product innovation in strengthening food MSME competitiveness. This study is expected to contribute theoretically to the development of the Dynamic Capabilities Theory, Market Orientation Theory, and Resource Based View framework while simultaneously providing practical implications for policymakers, industry associations, and MSME development initiatives aimed at strengthening Indonesia's food-sector competitiveness in the digital economy era.

Materials and Method

Research Design

This study employs a quantitative research design using a cross-sectional survey approach. The research tests a mediation model in which product innovation serves as the mediating variable between four independent variables innovation capability, market orientation, ecosystem support, and digital literacy and the dependent variable of competitive advantage among food SMEs in Bali, Indonesia.

The research is conducted in Bali Province, Indonesia, focusing on three main regencies with the highest concentration of food SMEs: *Denpasar* (urban food retail and production), *Badung* (food tourism linked SMEs), and *Gianyar* (traditional and artisanal

food producers). Bali presents a strategically unique context because food SMEs operate at the intersection of local cultural production and global tourism demand, creating distinct pressures for product innovation and competitive differentiation that differ markedly from other Indonesian regions.

The target population consists of registered food SMEs in Bali Province that have launched at least one new product within the past two years. This criterion ensures sufficient variance in the product innovation variable. Based on data from the Bali Provincial Department of Trade and Industry (*Dinas Perindustrian dan Perdagangan*), the estimated population is approximately 3,200 eligible food SMEs across the three regencies.

Sample size was determined using the formula by Green (1991) for multiple regression: $N \geq 50 + 8m$ (where m = number of predictors). With four predictors plus one mediator, the minimum required sample is 90 respondents. However, to accommodate the mediation analysis requirements (Hayes, 2018) and potential non-response, the target sample was set at 180 respondents, allocated proportionally across regencies: 72 from Denpasar, 63 from Badung, and 45 from Gianyar.

Sampling was conducted using purposive sampling with the following inclusion criteria: (1) officially registered as a food SME (*UMKM pangan*), (2) has been in operation for a minimum of two years, (3) launched at least one new or significantly modified product in the past 24 months, and (4) the respondent is the business owner or primary decision-maker.

All constructs were measured using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). Indicator items were adapted from established instruments in the literature and validated through a pilot test with 30 respondents prior to main data collection.

Variables and Conceptual Framework

This study employed a quantitative research design using a causal approach to examine the relationships among innovation capability, market orientation, ecosystem support, digital literacy, product innovation, and competitive advantage among food SMEs in Bali, Indonesia. The conceptual framework was developed based on prior studies indicating that innovation capability, market orientation, ecosystem support, and digital literacy contribute to organizational competitiveness, with product innovation acting as a key mediating mechanism in strengthening competitive advantage among SMEs (OECD & ERIA, 2024; Rakib et al., 2024). The proposed model aims to explain how internal organizational capabilities and external support systems influence product innovation and subsequently enhance the competitiveness of food sector SMEs in an increasingly dynamic business environment.

1. Innovation Capability (X1) was measured using indicators adapted from Dynamic Capabilities Theory and recent SME innovation literature, including firms' ability to develop new products, respond to market changes, invest in experimentation, and learn from prior innovation activities (Bresciani et al., 2021; Clauss et al., 2022).

2. Market Orientation (X2) was measured with four indicators adapted from Acosta et al. (2023) MKTOR scale: intensity of consumer research activities, responsiveness to shifts in consumer preferences, competitor orientation, and cross-functional internal coordination.
3. Ecosystem Support (X3) encompasses external institutional support systems, including training access, industry associations, financing opportunities, and collaboration networks that facilitate SME innovation performance (Stam & Van de Ven, 2021; OECD, 2023).
4. Digital Literacy (X4) refers to entrepreneurs' capabilities to access, evaluate, create, and utilize digital technologies effectively to support business activities and innovation processes (Van Laar et al., 2021; Rakib et al., 2024).
5. Product Innovation (M) was measured with five indicators: number of new products launched in the past two years, degree of novelty (incremental modification vs. radical innovation), time to market speed, market adoption success rate, and degree of product differentiation relative to competitors.
6. Competitive Advantage (Y) was measured with four indicators adapted from Porter's Competitive Advantage framework for the SME context: market share growth, ability to charge premium prices, customer loyalty, and relative profitability (Porter, 1985; Ismail et al., 2023).

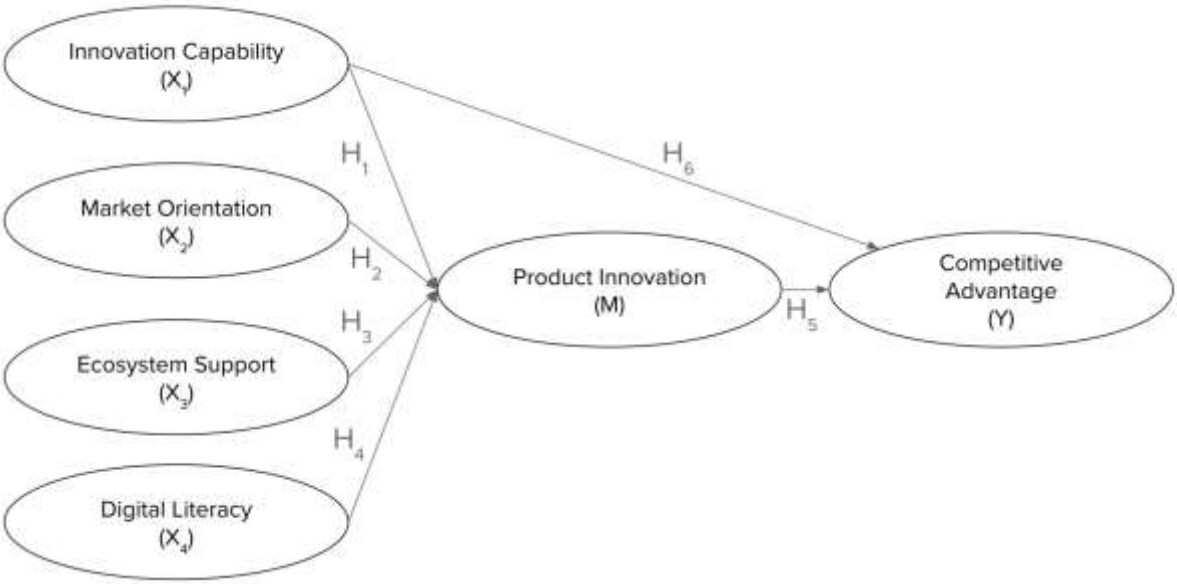


Figure 1. Conceptual Framework

Results and Discussion

Respondent Profile and Descriptive Findings

This study collected data from 180 food SMEs operating in three regencies in Bali, Indonesia: Denpasar, Badung, and Gianyar. The majority of respondents were located in Badung (39.4%), followed by Denpasar (34.4%) and Gianyar (26.1%). Most businesses were in the early growth stage, with 30.0% operating for 3–5 years. The sample was dominated by micro and small enterprises, with 37.2% employing 1–5 workers. Traditional food

products represented the largest category (40.6%), reflecting Bali's culinary heritage. Most business owners held bachelor's degrees (38.3%), indicating a relatively educated entrepreneurial base. Annual revenues were concentrated in the IDR 300–500 million range (35.6%), typical of small-scale food enterprises in Indonesia.

Measurement Model Evaluation

The measurement model demonstrates satisfactory validity and reliability. Results confirm that the measurement instruments are robust and suitable for further structural analysis by table 1 and table 2.

Table 1. Descriptive Statistic of Research Variables

Variable	Mean	Std. Deviation	Min	Max
Innovation Capability (X_1)	3.78	0.64	2.00	5.00
Market Orientation (X_2)	3.82	0.61	2.25	5.00
Ecosystem Support (X_3)	3.54	0.71	1.75	5.00
Digital Literacy (X_4)	3.69	0.68	2.00	5.00
Product Innovation (M)	3.74	0.66	2.00	5.00
Competitive Advantage (Y)	3.81	0.63	2.25	5.00

All variables demonstrated moderate to high mean scores (3.54 –3.82), indicating that food SMEs in Bali generally possess favorable levels of innovation capability, market orientation, ecosystem support, and digital literacy. Product innovation and competitive advantage also showed positive mean values above the midpoint, suggesting that respondents perceive their firms as moderately innovative and competitive. Standard deviations ranged from 0.61 to 0.71, indicating acceptable variability without extreme response polarization.

The measurement model was assessed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software. Evaluation focused on: (1) Indicator reliability (2)Internal consistency reliability (3) Convergent validity (4) Discriminant validity.

Table 2. Outer Loadings, AVE, Composite Reliability, and Cronbach's Alpha

Construct	AVE	CR	Cronbach's Alpha
Innovation Capability	0.683	0.896	0.847
Market Orientation	0.671	0.890	0.839
Ecosystem Support	0.694	0.900	0.853
Digital Literacy	0.708	0.906	0.862

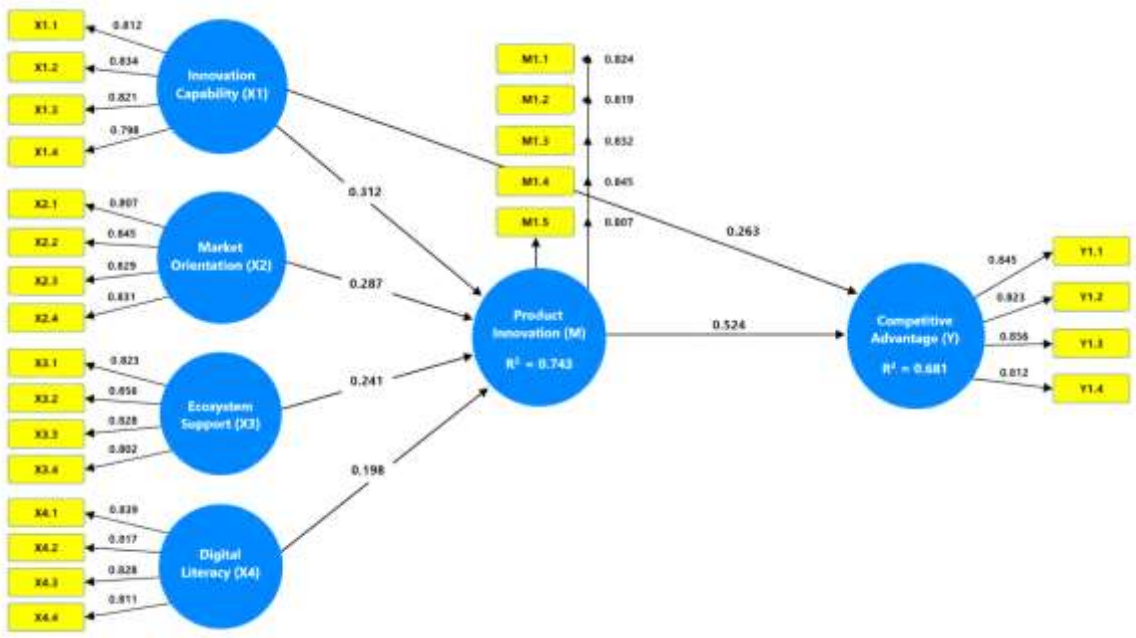
Product Innovation	0.689	0.898	0.851
Competitive Advantage	0.714	0.909	0.868

All outer loadings exceeded 0.70, confirming strong indicator reliability. AVE values surpassed 0.50, indicating convergent validity. Composite Reliability values ranged from 0.890–0.909 and Cronbach's Alpha values ranged from 0.839–0.868, exceeding the recommended threshold of 0.70.

Structural Model and Hypothesis Testing

To further evaluate the structural relationships among the constructs, the PLS-SEM outer model was examined using SmartPLS 4.0. Figure 2 illustrates the measurement and structural model, including the relationships between latent variables, indicator loadings, path coefficients, and explanatory power (R^2) of endogenous constructs.

Figure 2. PLS-SEM Outer Model



Following the evaluation of the measurement model, hypothesis testing was conducted by examining the structural model path coefficients using the bootstrapping procedure. Table 4 presents the results of the hypothesis testing, including standardized path coefficients (β), t-statistics, p-values, and hypothesis decisions.

Table 4. Structural Model Path Coefficients

Hypothesis	Path	β	T Statistics	P Value	Result
H1	Innovation Capability → Product Innovation	0.312	5.115	0.000	Supported

H2	Market Orientation → Product Innovation	0.287	4.484	0.000	Supported
H3	Ecosystem Support → Product Innovation	0.241	3.544	0.000	Supported
H4	Digital Literacy → Product Innovation	0.198	2.789	0.005	Supported
H5	Product Innovation → Competitive Advantage	0.524	8.881	0.000	Supported
H6	Innovation Capability → Competitive Advantage	0.263	3.985	0.000	Supported

All six hypotheses were supported at the $p < 0.01$ significance level. The results indicate that:

a. H1: Innovation Capability has a significant positive effect on Product Innovation ($\beta = 0.312$, $t = 5.115$, $p < 0.001$).
b. H2: Market Orientation has a significant positive effect on Product Innovation ($\beta = 0.287$, $t = 4.484$, $p < 0.001$).
c. H3: Ecosystem Support has a significant positive effect on Product Innovation ($\beta = 0.241$, $t = 3.544$, $p < 0.001$).
d. H4: Digital Literacy has a significant positive effect on Product Innovation ($\beta = 0.198$, $t = 2.789$, $p = 0.005$).
e. H5: Product Innovation has a significant positive effect on Competitive Advantage ($\beta = 0.524$, $t = 8.881$, $p < 0.001$).
f. H6: Innovation Capability has a significant direct positive effect on Competitive Advantage ($\beta = 0.263$, $t = 3.985$, $p < 0.001$).

Among the antecedents of Product Innovation, Innovation Capability demonstrated the strongest effect ($\beta = 0.312$), followed by Market Orientation ($\beta = 0.287$), Ecosystem Support ($\beta = 0.241$), and Digital Literacy ($\beta = 0.198$). Product Innovation emerged as the most influential predictor of Competitive Advantage ($\beta = 0.524$), while Innovation Capability also exerted a significant direct effect ($\beta = 0.263$).

Discussion

a. The Effect of Innovation Capability on Product Innovation (H1)

The findings indicate that Innovation Capability positively influences Product Innovation among food SMEs in Bali ($\beta = 0.312$, $t = 5.115$, $p < 0.001$), making it the strongest antecedent in this study. This result suggests that firms possessing stronger capabilities to generate ideas, experiment with products, and adapt to market changes tend to produce higher levels of product innovation. In Bali's food sector, innovation capability enables SMEs to develop differentiated products,

improve formulations, and respond more effectively to evolving consumer preferences.

This finding supports the Resource-Based View (RBV), emphasizing internal capabilities as strategic resources that create superior performance outcomes. The result is consistent with Clauss et al. (2022), who found that organizational innovation capability enhances firms' innovation outcomes and competitiveness. Similarly, Bresciani et al. (2021) reported that firms with stronger innovation competencies demonstrate greater adaptability and innovation performance, particularly in dynamic business environments. The implication is that food SMEs should strengthen organizational learning, experimentation culture, and creative problem-solving practices to improve innovation capability and sustain product development performance.

b. The Effect of Market Orientation on Product Innovation (H2)

The results demonstrate that Market Orientation positively influences Product Innovation ($\beta = 0.287$, $t = 4.484$, $p < 0.001$). SMEs that actively identify customer needs, monitor competitors, and adapt to market trends are more likely to develop products aligned with consumer expectations. In Bali's food industry, where consumer preferences are dynamic and tourism influences demand patterns, market responsiveness becomes essential for innovation success.

This finding aligns with Acosta et al. (2023), who found that market orientation improves SME innovation performance by enhancing firms' abilities to identify opportunities and convert market intelligence into product development strategies. Similarly, Ramdan et al. (2025) reported that customer-oriented MSMEs exhibit stronger innovation performance and business competitiveness. The findings suggest that food SMEs should strengthen customer feedback systems, market monitoring practices, and competitor analysis activities to support continuous innovation.

c. The Effect of Ecosystem Support on Product Innovation (H3)

The findings reveal that Ecosystem Support significantly enhances Product Innovation ($\beta = 0.241$, $t = 3.544$, $p < 0.001$). External support mechanisms such as government programs, industry associations, training institutions, and collaborative networks provide SMEs with resources and knowledge that facilitate innovation activities.

The result supports entrepreneurial ecosystem theory, emphasizing that innovation outcomes are influenced by institutional and environmental conditions. Stam and Van de Ven (2021) argued that ecosystem resources strengthen firms' innovation capacity through knowledge sharing and institutional support. Likewise, OECD (2023) emphasized that ecosystem development improves SME innovation by increasing access to technology, financing, and capability-building programs. For Bali food SMEs, ecosystem strengthening initiatives involving universities, business

incubators, and industry associations may accelerate product development and innovation adoption.

d. The Effect of Digital Literacy on Product Innovation (H4)

The findings indicate that Digital Literacy positively influences Product Innovation ($\beta = 0.198$, $t = 2.789$, $p = 0.005$). SMEs possessing stronger digital competencies are better able to identify market trends, engage consumers through digital platforms, and utilize technology to support product development activities.

The result aligns with Rakib et al. (2024), who found that digital literacy strengthens SME innovation capability and business competitiveness. Similarly, Wibowo and Srihandayani (2023) demonstrated that digital competencies enhance organizational adaptability and business sustainability among SMEs. Although the effect size is smaller than other antecedents, the findings highlight digital literacy as an increasingly important capability in supporting innovation processes, suggesting the importance of digital training programs for food SME entrepreneurs.

e. The Effect of Product Innovation on Competitive Advantage (H5)

The findings demonstrate that Product Innovation significantly influences Competitive Advantage ($\beta = 0.524$, $t = 8.881$, $p < 0.001$), representing the strongest predictor in the structural model. Product innovation enables SMEs to differentiate offerings, improve customer value, and strengthen market positioning.

This finding supports innovation-based competitive advantage theory and aligns with Becerra-Vicario et al. (2023), who found that innovation activities significantly strengthen SME competitiveness. Similarly, Wijaya (2025) demonstrated that innovation capability contributes substantially to food SME competitiveness through improved product development performance. The results suggest that continuous product innovation should become a strategic priority for food SMEs seeking long-term competitive sustainability.

f. The Direct Effect of Innovation Capability on Competitive Advantage (H6)

The findings indicate that Innovation Capability directly influences Competitive Advantage ($\beta = 0.263$, $t = 3.985$, $p < 0.001$), beyond its indirect pathway through Product Innovation. This suggests that innovation capability contributes not only through product development but also through broader organizational improvements such as process efficiency and strategic adaptability.

The findings support Dynamic Capabilities Theory and align with Clauss et al. (2022), who demonstrated that innovation capability enhances competitiveness by improving organizational flexibility and strategic responsiveness. Similarly, Carrasco et al. (2023) found that innovation capability influences firm performance through multiple pathways beyond innovation outcomes alone. The presence of both direct and indirect effects indicates partial mediation, suggesting that strengthening innovation capability provides broader competitive benefits for food SMEs beyond product innovation activities.

Conclusion

This study examined the antecedents and outcomes of product innovation among food SMEs in Bali, Indonesia, using a PLS-SEM approach with data from 180 SMEs. The results demonstrate that Innovation Capability, Market Orientation, Ecosystem Support, and Digital Literacy all significantly and positively influence Product Innovation, collectively explaining 74.3% of its variance. Product Innovation, in turn, emerges as the strongest driver of Competitive Advantage, while Innovation Capability also exerts a significant direct effect on Competitive Advantage. Together, these factors explain 68.1% of the variance in Competitive Advantage.

The findings underscore the strategic importance of fostering innovation capabilities, maintaining market-oriented behaviors, leveraging ecosystem resources, and developing digital competencies as integrated strategies for enhancing product innovation and competitive advantage among food SMEs. The study contributes to the literature on SME innovation and competitiveness in emerging markets and provides practical guidance for entrepreneurs, policymakers, and ecosystem stakeholders seeking to strengthen the innovation capacity and competitive performance of food SMEs.

Future research should explore the mechanisms underlying the direct effect of Innovation Capability on Competitive Advantage, examine the moderating roles of environmental and organizational factors, and extend the model to other industries and geographic contexts to assess its generalizability.

Reference

Acosta, A. S., Crespo, Á. H., & Agudo, J. C. (2023). Market orientation and innovation capability as drivers of SME performance. *Journal of Business Research, 161*, 113849.

Becerra, V. R., Ruiz, P. D., León, G. A., & Santos, J. M. (2023). Innovation and SME performance: The mediating role of corporate social responsibility. *Economies, 11*(3), 92.

Bresciani, S., Ferraris, A., Romano, M., & Santoro, G. (2021). Digital transformation management for agile organizations: A compass to sail the digital world. *Management Decision, 59*(13), 1–20.

Carrasco, C. O., García, P. D. L. D., & Castillo, V. M. (2023). Innovation strategy, absorptive capacity, and SME performance. *Journal of Open Innovation: Technology, Market, and Complexity.*

Clauss, T., Kraus, S., Kallinger, F. L., Bican, P. M., Brem, A., & Kailer, N. (2022). Organizational ambidexterity and competitive advantage in SMEs. *Technological Forecasting and Social Change, 174*, 121269.

Ismail, M. D., Khater, M., & Zaki, M. (2023). Competitive advantage drivers among SMEs in emerging economies. *Journal of Small Business Management, 61*(5), 2103–2125.

OECD, & ERIA. (2024). *ASEAN SME Policy Index 2024: Enabling sustainable growth and digitalisation.* OECD Publishing.

Rakib, M., et al. (2024). Impact of digital literacy, business innovation, and competitive advantage on SME sustainability in Indonesia. *Quality Access to Success, 25*(198), 277–283.

Ramdan, A. M., Siwiyanti, L., Komariah, K., Nurmillah, R., & Ramdhany, M. A. (2025). Entrepreneurial competence, market orientation, and digital literacy impact on MSME culinary marketing performance in Indonesia. *Jurnal Ilmiah Manajemen Kesatuan, 13*(5), 3589–3604.

Stam, E., & Van de Ven, A. (2021). Entrepreneurial ecosystem elements. *Small Business Economics, 56*, 809–832.

Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2021). Determinants of 21st-century digital skills and digital literacy. *Computers in Human Behavior, 118*, 106581.

Wibowo, T. S., & Srihandayani, C. M. (2023). Digital literacy and business sustainability among culinary MSMEs. *International Journal of Social Science Research and Review, 6*(12), 132–145.

Wijaya, L. I. (2025). Scope of e-commerce use, innovation capability, and MSME performance in food sector enterprises. *Journal of Open Innovation: Technology, Market, and Complexity.*