BUILDING COMPETITIVE ADVANTAGE THROUGH ABSORBTIVE CAPACITY AND OPEN INNOVATION IN INDONESIA SME'S (CASE STUDY IN BALIKPAPAN, INDONESIA)

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ABSTRACT

Small and Medium Enterprises (SMEs) are vital contributors to Indonesia's economy, particularly in the culinary sector, which faces intense competition and rapidly shifting consumer demands. This study investigates the effects of innovation strategy, absorptive capacity, and open innovation (inbound and outbound) on the performance of culinary SMEs in Balikpapan, East Kalimantan. An explanatory quantitative design was employed, with data collected through structured questionnaires distributed to 180 SMEs and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS 4. The measurement model confirmed construct validity and reliability, with all outer loadings, Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE) exceeding recommended thresholds. Results of the structural model indicate that absorptive capacity has a significant positive influence on innovation strategy as well as on inbound and outbound open innovation. Innovation strategy positively affects inbound open innovation, but its relationship with outbound open innovation was not supported. Both inbound and outbound open innovation significantly enhance SME performance, with inbound open innovation showing the stronger effect. The model demonstrated moderate to substantial explanatory power (R^2 = 0.446–0.757) and good predictive relevance (Q^2), particularly for inbound open innovation and SME performance. These findings emphasize the importance of absorptive capacity as the foundation for innovation and competitiveness, while inbound open innovation emerges as the key driver of performance improvement. The study contributes to the SME innovation literature by integrating absorptive capacity, innovation strategy, and open innovation in an emerging economy context, while also offering practical guidance for SME managers and policymakers to strengthen innovation capabilities and foster sustainable growth.

Keywords: Innovation Strategy, Absorptive Capacity, Open Innovation, SME Performance, PLS-SEM

ABSTRAK

Usaha Mikro, Kecil, dan Menengah (UMKM) merupakan kontributor penting bagi perekonomian Indonesia, khususnya di sektor kuliner yang menghadapi persaingan ketat serta perubahan permintaan konsumen yang cepat. Penelitian ini meneliti pengaruh strategi inovasi, kapasitas serap, dan inovasi terbuka (inbound dan outbound) terhadap kinerja UMKM kuliner di Balikpapan, Kalimantan Timur. Desain penelitian yang digunakan adalah kuantitatif eksplanatori, dengan pengumpulan data melalui kuesioner terstruktur yang dibagikan kepada 180 UMKM dan dianalisis menggunakan Partial Least Squares Structural Equation Modeling (PLS-SEM) pada SmartPLS 4. Model pengukuran mengonfirmasi validitas dan reliabilitas konstruk, dengan seluruh outer loading, Cronbach's Alpha, Composite Reliability, dan Average Variance Extracted (AVE) melampaui ambang batas yang direkomendasikan. Hasil model struktural menunjukkan bahwa kapasitas serap berpengaruh positif signifikan terhadap strategi inovasi serta inovasi terbuka inbound dan outbound. Strategi inovasi berpengaruh positif terhadap inovasi terbuka inbound, tetapi hubungannya dengan inovasi terbuka outbound tidak didukung. Baik inovasi terbuka inbound maupun outbound terbukti meningkatkan kinerja UMKM secara signifikan, dengan inovasi terbuka inbound menunjukkan pengaruh yang lebih kuat. Model penelitian menunjukkan daya jelaskan yang moderat hingga substansial (R^2 = 0,446–0,757) serta relevansi prediktif (Q^2) yang baik, khususnya untuk inovasi terbuka inbound dan kinerja UMKM. Temuan ini menekankan pentingnya kapasitas serap sebagai fondasi inovasi dan daya saing, sementara inovasi terbuka inbound muncul sebagai penggerak utama peningkatan kinerja. Penelitian ini berkontribusi pada literatur inovasi UMKM dengan mengintegrasikan kapasitas serap, strategi inovasi, dan inovasi terbuka dalam konteks ekonomi berkembang, serta memberikan panduan praktis bagi manajer UMKM dan pembuat kebijakan untuk memperkuat kapabilitas inovasi dan mendorong pertumbuhan berkelanjutan.

***Kata kunci**: Strategi Inovasi, Kapasitas Serap, Inovasi Terbuka, Kinerja UMKM*, PLS-SEM

1. INTRODUCTION

Small and Medium Enterprises (SMEs) are a cornerstone of Indonesia's economy and play a critical role in supporting national development. According to Law No. 7 of 2021, SMEs are divided into micro, small, and medium enterprises based on business capital and annual turnover. Micro enterprises operate with capital of up to IDR 1 billion and annual sales of up to IDR 2 billion, small enterprises with capital between IDR 1–5 billion and annual sales up to IDR 15 billion, and medium enterprises with capital between IDR 5–10 billion and annual sales up to IDR 50 billion ((Peraturan Pemerintah (PP) Nomor 7 Tahun 2021 Tentang Kemudahan, Pelindungan, Dan Pemberdayaan Koperasi Dan Usaha Mikro, Kecil, Dan Menengah, 2021)). Within this broad landscape, the culinary sector is particularly significant as part of the food and beverage industry. This sector contributes 39.1% to the non-oil and gas GDP and 6.55% to Indonesia's total national GDP (Harian Ekonomi Neraca, 2024). Culinary businesses, as explained by Hall and Gossling (2013) encompass the full spectrum of activities from food production and distribution to preparation and consumption, thereby combining economic value creation with ethical and sustainable practices. Consequently, the sector is both a cultural and economic driver, highlighting the importance of continuous innovation for long-term survival and competitiveness.

Balikpapan, located strategically in East Kalimantan, has emerged as an economic hub and the gateway to Indonesia's future capital city (IKN Nusantara). The city benefits from extensive infrastructure, such as Semayang Port, Sultan Aji Muhammad Sulaiman Airport, and interconnected national highways, making it an attractive location for businesses (Indrayani & Nurlia, 2024). A growing population, increasing urbanization, and rising purchasing power further create opportunities for local SMEs (Asih, 2025)However, culinary SMEs in Balikpapan face intense competition, rapid shifts in consumer preferences, and increasing operational costs (Kusuma, 2024). In 2024, the decline in consumer purchasing power led to a 50% drop in SME revenues, particularly in the food sector, highlighting the vulnerability of these enterprises to economic fluctuations (Hasanah, 2024). These conditions emphasize the urgency of innovation as a strategic response to market and environmental pressures.

Innovation has become a crucial strategy for SMEs to adapt and grow in dynamic environments. Puspita (2023) highlights that the ability of SMEs to innovate—whether in terms of products, processes, organization, or services—is essential for enhancing competitiveness both domestically and internationally. Trott (2017) differentiates between product innovation, which focuses on new or improved products, and process innovation, which enhances production efficiency and quality. In this study, innovation is defined broadly to include product, process, organizational, managerial, commercial, and service innovations. Previous research underscores the importance of this capability. Carrasco-Carvajal et al.(2023), in a study of Chilean SMEs, found that absorptive capacity combined with a deliberate innovation strategy significantly improves performance. Absorptive capacity, or the ability of firms to recognize, assimilate, and apply external knowledge, has been identified as a critical enabler for productivity and competitiveness (Ortigueira-Sánchez et al., 2021). Moreover, (Yeh-Yun Lin & Yi-Ching Chen, 2007) argue that administrative innovation can sometimes be more influential than technological innovation in improving performance, showing that innovation does not always require advanced technology but can also take the form of simplified processes and managerial improvements.

The concept of open innovation, introduced by Chestbrough in 2003 (Chesbrough, 2006), has gained increasing attention as a means of enabling firms to leverage external knowledge and resources. Inbound open innovation refers to the integration of ideas and technologies from external sources into a firm's innovation processes, while outbound open innovation

involves sharing, licensing, or commercializing internally developed knowledge and technology with external partners (Huizingh, 2011). Studies have shown that both inbound and outbound open innovation enhance the adaptability, agility, and market responsiveness of SMEs (Liao et al., 2019). Nevertheless, risks arise when SMEs depend excessively on external sources without strengthening their internal absorptive capacity, which may negatively impact performance (Alfarobi & Hartono, 2022). For SMEs in Balikpapan's culinary sector, open innovation provides opportunities to access resources, collaborate with external stakeholders, and adapt to dynamic consumer needs, but its effectiveness depends on a balance between external engagement and internal capability.

Against this backdrop, this study aims to analyze how innovation strategy, absorptive capacity, and open innovation—both inbound and outbound—affect the performance of culinary SMEs in Balikpapan. The central research problem is to determine how innovation strategies and absorptive capacity shape open innovation practices, and how these practices ultimately influence SME performance.

The objectives of this research are aligned with these questions. Specifically, the study seeks to examine the influence of absorptive capacity on both inbound and outbound open innovation, investigate the relationship between absorptive capacity and innovation strategy, assess how innovation strategy impacts both forms of open innovation, and determine the effects of open innovation on SME performance. In doing so, the study contributes to both theory and practice. Theoretically, it extends the literature on absorptive capacity and innovation strategies in the context of Indonesian culinary SMEs, highlighting the mediating role of absorptive capacity and the joint effects of inbound and outbound open innovation on performance. Practically, the study provides recommendations for SMEs to develop structured innovation strategies, enhance absorptive capacity, and pursue balanced approaches to open innovation. This can help SMEs sustain competitiveness, expand collaborations, and respond effectively to dynamic market conditions.

The scope of this study is limited to culinary SMEs operating legally in Balikpapan. The analysis focuses on the effects of innovation strategy, absorptive capacity, and open innovation practices on performance, using data collected through structured surveys. By narrowing the scope to this specific sector and location, the study seeks to generate insights that are contextually relevant while also offering implications for broader SME innovation practices in Indonesia.

2. LITERATURE REVIEW

2.1. Variable Development

2.1.1. Innovation Strategy (INSTR)

Innovation strategy is the firm's structured approach to embedding innovation into its long-term objectives. Rather than pursuing innovation in an ad hoc manner, innovation strategy ensures that activities such as product development, process improvement, or market expansion are aligned with broader goals (Kalay, 2015). For SMEs, particularly in competitive and resource-constrained environments, innovation strategy plays a crucial role in determining how limited resources are allocated. Govindarajan & Trimble (2010) highlight that innovation strategy covers not only the creation of new ideas but also the execution and commercialization processes that bring those ideas to market. In the context of culinary SMEs, innovation strategy can include developing new menu items, adopting new distribution channels such as online delivery platforms, or forming partnerships with suppliers to ensure quality and efficiency. Without a clear innovation strategy, SMEs may struggle to respond effectively to shifting consumer preferences and increasing competition.

2.1.2. Absorptive Capacity (ACAP)

Absorptive capacity, as defined by Cohen & Levinthal (1990), is a firm's ability to recognize valuable external knowledge,

assimilate it into organizational routines, and apply it to achieve commercial outcomes. This capacity is not merely about accessing information but about learning and applying it in ways that enhance competitiveness. Zahra & George (2002) further conceptualized absorptive capacity as a dynamic capability that enhances innovation outcomes. For SMEs with limited formal R&D capabilities, absorptive capacity is often reflected in their ability to learn from customers, observe competitors, and collaborate with suppliers or industry associations (Prakasa et al., 2022). In the culinary sector, absorptive capacity might involve identifying consumer trends, such as increasing demand for healthy or sustainable food options, and then adapting menus and production processes accordingly. Studies from Vanhaverbeke et al., (2008) highlight that SMEs with strong absorptive capacity are more likely to innovate successfully and sustain growth.

2.1.3. Open Innovation (OI)

Open innovation, introduced by Chestbrough in 2003 (Chesbrough, 2006), refers to the paradigm where firms leverage both internal and external ideas, technologies, and resources to accelerate innovation. It contrasts with the traditional "closed innovation" model by emphasizing collaboration and knowledge exchange across organizational boundaries. Open innovation is commonly categorized into inbound and outbound dimensions (Huizingh, 2011). Inbound open innovation involves sourcing and integrating external knowledge from stakeholders such as customers, suppliers, universities, or research institutions. Outbound open innovation, by contrast, focuses on sharing or commercializing a firm's internal innovations, for example through licensing, partnerships, or spin-offs. For SMEs, inbound open innovation often takes the form of adopting best practices or technologies from external partners, while outbound open innovation may involve franchising concepts or collaborating with delivery platforms to reach broader markets. Previous research (Carrasco-Carvajal et al., 2023; Liao et al., 2019) demonstrates that both inbound and outbound open innovation can enhance SME agility and performance, though their impacts may differ in strength.

2.1.4. SME Performance (PERF)

SME performance is a multidimensional construct that includes both financial and non-financial outcomes. Financial indicators such as revenue growth, profitability, and market share provide evidence of economic success, while non-financial indicators such as customer satisfaction, employee engagement, innovation outcomes, and operational efficiency capture broader aspects of organizational health (Brem et al., 2008). Rosenbusch et al. (2011) emphasize that innovation is a key driver of SME performance, particularly in dynamic and competitive environments. For culinary SMEs, performance is not limited to short-term revenue growth but also includes the ability to maintain consistent quality, retain loyal customers, adapt menus to changing tastes, and build sustainable operations. In this study, SME performance is treated as the ultimate outcome variable influenced by absorptive capacity, innovation strategy, and open innovation practices.

2.2. Hypothesis Development

2.2.1. Absorptive Capacity and Open Innovation

SMEs with strong absorptive capacity are better equipped to acquire, assimilate, and apply external knowledge. This enhances their ability to engage in open innovation practices, particularly in sourcing ideas (inbound) and sharing innovations externally (outbound). For instance, an SME that actively learns from suppliers may improve its production process (inbound), while one that adapts customer-driven innovations may later license or franchise its products (outbound). Prior studies (Carrasco-Carvajal et al., 2023; Naqshbandi, 2016) confirm that absorptive capacity positively affects both inbound and outbound open innovation. Therefore, it is hypothesized that:

H1: Absorptive capacity positively influences outbound open innovation.

H2: Absorptive capacity positively influences inbound open innovation.

2.2.2. Absorptive Capacity and Innovation Strategy

Absorptive capacity also supports the development of formalized innovation strategies by providing firms with the knowledge needed to anticipate trends and make informed decisions. SMEs that can effectively learn from their environment are more capable of crafting strategies that align innovation with long-term objectives. For example, a restaurant that recognizes growing demand for plant-based diets may formalize a strategy to diversify its menu accordingly. (Rahman et al., 2024) show that absorptive capacity significantly contributes to building stronger innovation strategies. Thus:

H3: Absorptive capacity positively influences innovation strategy.

2.2.3. Innovation Strategy and Open Innovation

A clear innovation strategy provides the framework that guides SMEs in engaging with open innovation. Firms with formalized innovation strategies are more deliberate in acquiring external knowledge (inbound) and in deciding when to share or commercialize internal ideas (outbound). For example, SMEs with clear product development goals are more likely to collaborate with external partners for new ideas while selectively commercializing existing ones. Fadhilah (2018) highlights the role of innovation strategy in structuring knowledge flows between the firm and its environment. Hence:

H4: Innovation strategy positively influences outbound open innovation.

H5: Innovation strategy positively influences inbound open innovation.

2.2.4. Open Innovation and SME Performance

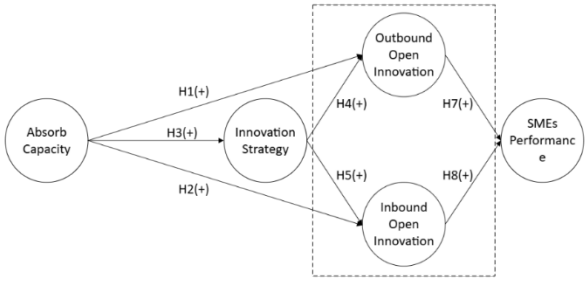
Both inbound and outbound open innovation practices are important drivers of SME performance. Inbound open innovation enables firms to access external expertise, reduce risks in product development, and increase responsiveness to consumer demands (Liao et al., 2019). Outbound open innovation allows firms to extract additional value from underutilized ideas, expand into new markets, and build stronger networks. In the context of SMEs, inbound innovation tends to have a stronger effect as firms rely heavily on external knowledge to complement their limited resources, though outbound practices also contribute to growth. Carvajal et al. (2023) provide evidence that both forms of open innovation enhance firm performance. Therefore, the following hypotheses are proposed:

H6: Outbound open innovation positively influences SME performance.

H7: Inbound open innovation positively influences SME performance.

Following the hypotheses development, the research framework is replicated from Carrasco-Carvajal et al. (2023), as illustrated in Figure 1.

Figure 1. Research Framework



3. METHODOLOGY

3.1. Research Design

This study adopts an explanatory quantitative research design to investigate the relationships among innovation strategy, absorptive capacity, open innovation, and the performance of culinary SMEs in Balikpapan. The quantitative approach was chosen because it allows for hypothesis testing and the identification of causal relationships between constructs that were previously developed through theoretical and empirical studies (Creswel & Creswell, 2018; Hair Jr et al., 2019). This design is particularly suitable for testing complex structural models in which multiple independent and dependent variables interact. By using this approach, the study ensures that the proposed framework can be

empirically validated and generalized to similar SME contexts.

3.2. Population and Sample

The population of the study consists of culinary SMEs that are legally registered and operating in Balikpapan, East Kalimantan. The city's strategic position as the gateway to Indonesia's new capital (IKN Nusantara) makes it an important site for analyzing SMEs operating in a dynamic and competitive environment. The sample was selected using purposive sampling, focusing on SMEs that had been in operation for at least two years and were actively engaged in culinary business activities. A total of 180 SMEs participated in the study, which provides adequate statistical power for Partial Least Squares Structural Equation Modeling (PLS-SEM).

Data were collected through a structured questionnaire distributed directly to SME owners or managers. These individuals were chosen as respondents because they possess the most comprehensive understanding of their firms' strategic practices and performance. The questionnaire was prepared in Bahasa Indonesia to ensure clarity and avoid misinterpretation. Prior to distribution, a pre-test involving a small number of SMEs was conducted to refine the items, assess their reliability, and ensure comprehensibility. The main data collection occurred over a two-month period, covering various sub-districts in Balikpapan.

3.3. Measurement Method

The measurement of variables was based on multi-item scales adapted from previous validated research. Innovation strategy was measured using items from Kalay and Henseler (2015) and Govindarajan and Trimble (2010), which capture strategic alignment, execution, and commercialization. Absorptive capacity was measured using indicators developed by Cohen and Levinthal (1990) and Zahra and George (2002), focusing on recognition, assimilation, and application of external knowledge. Inbound and outbound open innovation were measured using items from Chesbrough (2003), Huizingh (2011), and Carvajal et al. (2023), reflecting the extent to which firms integrate external knowledge and share internal innovations externally. SME performance was measured through both financial and non-financial indicators, adapted from Brem et al. (2008) and Rosenbusch et al. (2011), including profitability, revenue growth, customer satisfaction, and innovation outcomes. In the article, it is important to provide the number of items for each construct, example questionnaire items, and the reliability and validity statistics (Cronbach's alpha, composite reliability, and Average Variance Extracted).

3.4. Data Analysis

For the data analysis, this study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4 software. This method was selected because it is suitable for analyzing complex models, is robust with relatively small sample sizes, and allows the simultaneous testing of both measurement and structural models. The analysis followed a two-step procedure. First, the measurement model (outer model) was evaluated in terms of indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Second, the structural model (inner model) was assessed using path coefficients, significance levels (t-values and p-values obtained via bootstrapping), the coefficient of determination (R^2), and predictive relevance (Q^2).

3.5. Ethical Considerations

Ethical considerations were observed throughout the study. Respondents participated voluntarily and were assured of confidentiality and anonymity. Informed consent was obtained prior to data collection, and respondents were informed that the data would be used solely for academic purposes. The use of standardized questionnaires minimized risks of bias and ensured consistency across responses.

3.6. Pretest and Preliminary Study

Before conducting the main survey, a pre-test was carried out to ensure that the research instrument was valid, reliable, and

clearly understood by respondents. The questionnaire was distributed to 30 culinary SME owners and managers in Balikpapan who were not part of the final sample. This pre-test allowed the researcher to check the clarity of items, appropriateness of wording, and initial measurement consistency. Feedback from participants was used to make minor adjustments, particularly in simplifying language and providing clearer examples for innovation-related items.

The pre-test data were analyzed to assess validity and reliability. Convergent validity was tested using factor loadings and Average Variance Extracted (AVE). According to Hair et al. (2019) , factor loadings above 0.70 and AVE values above 0.50 indicate acceptable validity. In this pre-test, all constructs met these thresholds. Reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR). Following (Hair et al., 2019), Cronbach's Alpha values above 0.70 confirm internal consistency, while CR values between 0.70 and 0.95 (Fornell & Larcker, 1981in Hair et al., 2019)) demonstrate construct reliability. The results indicated that all constructs met these standards. Innovation Strategy (INSTR) and Inbound Open Innovation (OI-IN) showed particularly high reliability, with Cronbach's Alpha values above 0.90.

Overall, the pre-test results confirmed that the questionnaire items were valid, reliable, and suitable for the main survey. After final adjustments, the validated questionnaire was distributed to the full sample of 180 culinary SMEs in Balikpapan for data collection.

4. RESULT AND DISCUSSION

4.1. Result

The analysis of data from 180 culinary SMEs in Balikpapan reveals strong empirical support for all seven hypotheses. The descriptive statistics of respondents, including demographic profiles and business characteristics, illustrate the diversity of SMEs in terms of age, years of operation, and product focus as shown in Table 1 and Table 2.

Table 1. Respondents Demography

Category	Details Category	Frequency	Percentage
Years of Operation	2-3 years	54	30%
	4-6 years	48	26.7%
	7-10 years	36	20%
	More than 10 years	42	23.3%
Role in Company	Owner	120	66.7%
	Director	36	20%
	Manager	24	13.3%
Annual Revenue	IDR 100-300 Million	48	26.7%
	IDR 300 Million-2.5 Billion	48	26.7%
	IDR 2.5-50 Billion	72	40%
	More than IDR 50 Billion	12	6.6%

The demographic profile of 180 culinary SMEs in Balikpapan shows a mix of young and mature firms, with nearly half operating for more than six years, indicating resilience. Most respondents are owners (66.7%), ensuring that the findings reflect key decision-makers. Revenue levels are diverse, though a large share (40%) achieve IDR 2.5–50 billion annually, signaling growth potential.

Table 2. Innovation Categories

Innovation Category	Frequency	Percentage
Product Innovation (new products)	23	12.8%
Process Innovation (process development)	11	6.1%
Organizational Innovation	0	0%
Management Innovation (new practices)	0	0%
Product Innovation (production initiative)	38	21.1%
Commercial Innovation (marketing initiative)	19	10.6%
Service Innovation	17	9.4%
Managerial Innovation (improvements)	31	17.2%
Product Innovation (improvement)	26	14.4%
Other minor product innovations	4	2.2%

From Table 2 shows Innovation is concentrated on product improvements and management practices, while process and organizational innovations remain limited. The key insight is that owner-led SMEs are financially diverse and resilient but focus

narrowly on incremental innovation, suggesting the need to broaden innovation capacity for sustained competitiveness.

The measurement model evaluation confirmed that all constructs—innovation strategy, absorptive capacity, inbound open innovation, outbound open innovation, and SME performance—were measured reliably and validly, with Cronbach's Alpha, Composite Reliability (CR), Average Variance Extracted (AVE), and outer loadings exceeding recommended thresholds, as presented in Table 3. Following Hair et al. (2019), indicator outer loadings should ideally be above 0.70, indicating that the construct explains at least 50% of the indicator's variance. Loadings between 0.60 and 0.70 may be retained if other validity and reliability criteria (e.g., AVE and CR) are satisfied, whereas loadings below 0.40 are typically removed. In this study, all indicators exceeded the 0.70 threshold, confirming that each item made a substantial contribution to its respective construct.

Table 3. Outer Loading Final Test

Indikator	ACAP	INSTR	OI-IN	OI-OT	PERF
ACAP 1	0,788				
ACAP 3	0,720				
ACAP 5	0,661				
ACAP 6	0,780				
ACAP 7	0,753				
INSTR 2		0,900			
INSTR 3		0,866			
INSTR 4		0,896			
INSTR 6		0,905			
INSTR 7		0,922			
OI-IN 2			0,927		
OI-IN 3			0,927		
OI-IN 6			0,918		
OI-IN 7			0,931		
OI-OT 1				0,901	
OI-OT 2				0,875	
OI-OT 4				0,902	
OI-OT 5				0,852	
PERF 2					0,878
PERF 3					0,841
PERF 4					0,885
PERF 5					0,865
PERF 7					0,761

For reliability, Cronbach's Alpha values above 0.70 (Nunnally & Bernstein, 1994) and Composite Reliability (CR) between 0.70 and 0.95 (Hair et al., 2019) confirmed internal consistency. For convergent validity, an AVE greater than 0.50 (Fornell & Larcker, 1981 in Hair et al., 2019)) demonstrated that constructs captured more than half of the variance of their indicators. Together, these results confirm that the measurement model met the accepted standards of validity and reliability.

Table 4. Reliability and Validity Test Result

Construct	**AVE**	**Cronbach's Alpha**	**Composite Reliability**	
			(ρA)	**ρC)**
INSTR	0,55	0,94	0,954	0,954
ACAP	0,807	0,796	0,806	0,859
OI-OT	0,857	0,906	0,922	0,934
OI-IN	0,779	0,944	0,946	0,96
PERF	0,718	0,902	0,911	0,927

The result of structural model testing using PLS-SEM, as in table 5, showed that absorptive capacity had a significant positive influence on outbound open innovation, inbound open innovation, and innovation strategy; innovation strategy also strongly

influenced both inbound and outbound open innovation. Furthermore, both forms of open innovation significantly enhanced SME performance, with all path coefficients being statistically significant

Table 5. Hypothesis test Result

Construct	Original Sample (O)	T-statistics	P-value	Remarks
ACAP → OI-OT	0,678	8,844	0,000	Supported
ACAP → OI-IN	0,207	3,589	0,000	Supported
ACAP → INSTR	0,668	16,100	0,000	Supported
INSTR → OI-OT	-0,419	5,093	0,000	Un-supported
INSTR → OI-IN	0,718	14,467	0,000	Supported
OI-IN → PERF	0,662	19,845	0,000	Supported
OI-OT → PERF	0,168	3,116	0,002	Supported

The path coefficient analysis shows that most hypothesized relationships are supported, with only one exception. Absorptive capacity (ACAP) has strong positive effects on outbound open innovation (OI-OT, $\beta = 0.678$, $p < 0.001$), inbound open innovation (OI-IN, $\beta = 0.207$, $p < 0.001$), and innovation strategy (INSTR, $\beta = 0.668$, $p < 0.001$), confirming its central role in driving both strategic and innovation outcomes. Innovation strategy (INSTR) significantly influences inbound open innovation (OI-IN, $\beta = 0.718$, $p < 0.001$), but its effect on outbound open innovation (OI-OT) is negative and not supported ($\beta = –0.419$, $p < 0.001$), suggesting that structured innovation strategies may be more oriented toward internal knowledge absorption rather than external commercialization.

Both inbound and outbound open innovation contribute positively to SME performance (OI-IN → PERF, $\beta = 0.662$, $p < 0.001$; OI-OT → PERF, $\beta = 0.168$, $p = 0.002$), although the effect of inbound innovation is much stronger, highlighting the importance of integrating external knowledge for performance gains. Overall, the results emphasize absorptive capacity as a foundational enabler, innovation strategy as a pathway to inbound innovation, and inbound open innovation as the most influential factor for improving SME performance.

Table 6. R Square and Q Square

Construct	R-square (R^2)	Q-square (Q^2 Predict)
INSTR (Innovation Strategy)	0,446	0,439
OI-IN (Inbound Open Innovation)	0,757	0,465
OI-OT (Outbound Open Innovation)	0,255	0,148
PERF (Performance)	0,503	0,403

The analysis of the structural model, as in table 6, shows that the explanatory power (R^2) and predictive relevance (Q^2) of the constructs vary in strength. Innovation Strategy (INSTR) recorded an R^2 of 0.446, which falls into the moderate range, while its Q^2 of 0.439 indicates strong predictive relevance. Inbound Open Innovation (OI-IN) achieved the highest R^2 at 0.757, categorized as substantial, with a Q^2 of 0.465, confirming strong predictive capability. Outbound Open Innovation (OI-OT), however, showed the weakest values, with an R^2 of 0.255 and a Q^2 of 0.148, suggesting only weak explanatory power and medium predictive relevance. SME Performance (PERF) was explained with an R^2 of 0.503, placing it in the moderate-to-substantial range, and a Q^2 of 0.403, which indicates good predictive relevance. Referring to the guidelines by Hair et al. (2019), R^2 values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak respectively, while Q^2 values above 0, with benchmarks of 0.35, 0.15, and 0.02, are categorized as large, medium, and small predictive relevance. Based on these thresholds, the results suggest that the model is particularly strong in explaining and predicting inbound open innovation and SME performance, while its explanatory and predictive power for outbound open innovation is relatively limited.

4.2. Discussion

The findings of this study provide empirical support for most of the proposed hypotheses, offering important insights into the role of absorptive capacity, innovation strategy, and open innovation in shaping SME performance.

First, absorptive capacity was shown to have a significant positive effect on both inbound and outbound open innovation, as well as on innovation strategy. This result as seen from table 5 reinforces prior studies (Carrasco-Carvajal et al., 2023; Naqshbandi, 2016) which emphasize that firms with strong learning capabilities are better able to acquire, assimilate, and apply external knowledge. For culinary SMEs in Balikpapan, this suggests that the ability to observe market trends, listen to customer preferences, and adopt supplier innovations is critical for engaging in innovation activities and formulating strategies.

Second, also from table 5, innovation strategy demonstrated a strong positive relationship with inbound open innovation, but unexpectedly showed a negative path coefficient with outbound open innovation, which was not supported. This indicates that SMEs with structured innovation strategies tend to focus more on integrating external knowledge rather than commercializing their internal ideas externally. One possible explanation is that culinary SMEs in Balikpapan prioritize internal adaptation and responsiveness to consumer needs over franchising, licensing, or external commercialization. This finding contributes to the literature by showing that innovation strategy may play a more inward-looking role in resource-constrained SMEs.

Third, both inbound and outbound open innovation were found to have positive effects on SME performance, with inbound open innovation showing the stronger influence. This result as shown in Table 6, aligns with prior research (Liao et al., 2019) which argues that knowledge inflows from external stakeholders are especially critical for SMEs that lack large-scale R&D capacity. For Balikpapan's culinary SMEs, leveraging external knowledge—such as customer feedback, competitor practices, or new product ideas from partners—directly contributes to improved customer satisfaction, product quality, and revenue growth. Outbound open innovation also contributes positively, though to a lesser extent, by allowing SMEs to generate additional value through collaboration with external platforms or networks.

The explanatory power of the model as in Table 6, was moderate to substantial, with R^2 values showing that absorptive capacity and innovation strategy together explained a large portion of variance in inbound open innovation (75.7%) and SME performance (50.3%). Predictive relevance (Q^2 values) confirmed that the model was effective in predicting inbound open innovation and SME performance, but weaker for outbound open innovation. These results indicate that the integration of external knowledge is more central than external commercialization in improving performance for culinary SMEs.

Taken together, these findings suggest that absorptive capacity is the foundation for innovation and performance in SMEs, while inbound open innovation acts as the strongest pathway to performance improvement. The results also highlight a contextual nuance: in resource-constrained environments, SMEs may rely more on learning and adapting knowledge from external sources rather than engaging in outbound commercialization of their own innovations. This provides both theoretical contributions to the open innovation literature in SME contexts and practical guidance for managers and policymakers.

5. CONCLUSION

This study set out to examine the influence of innovation strategy, absorptive capacity, and open innovation on the performance of culinary SMEs in Balikpapan, East Kalimantan. Using an explanatory quantitative design and PLS-SEM analysis, the findings provide strong empirical support for most of the proposed hypotheses. The measurement model evaluation confirmed that

all constructs were valid and reliable, with outer loadings, Cronbach's Alpha, Composite Reliability, and AVE exceeding recommended thresholds.

The structural model results confirmed that H1, H2, and H3 were supported, indicating that absorptive capacity positively influences outbound open innovation, inbound open innovation, and innovation strategy. H4 was not supported, as the path from innovation strategy to outbound open innovation was negative and insignificant, suggesting that SMEs prioritize internal adaptation over external commercialization when implementing innovation strategies. H5 was supported, confirming that innovation strategy positively affects inbound open innovation. Finally, H6 and H7 were both supported, showing that outbound and inbound open innovation significantly enhance SME performance, with inbound open innovation having the stronger effect.

Overall, these results confirm that absorptive capacity acts as the foundation of innovation, enabling SMEs to build strategies and engage in open innovation practices that drive performance. Inbound open innovation emerges as the most critical pathway for performance improvement, while outbound innovation plays a complementary but weaker role. The study contributes to the SME innovation literature by clarifying the interplay between absorptive capacity, innovation strategy, and open innovation, and by confirming that knowledge acquisition and integration are central to SME competitiveness in emerging economies.

5.1. Practical and Managerial Implications

The study provides several practical insights that SMEs and policymakers can implement:

1. Building Absorptive Capacity: SME owners should actively invest in developing learning systems within their businesses. This can be achieved by training employees to gather and analyze customer feedback, setting up routine competitor benchmarking, and adopting simple digital tools for knowledge management (e.g., customer feedback apps or point-of-sale data analytics). *How*: A small café, for example, can create a weekly review session where staff share customer comments and propose small menu adjustments.
2. Formalizing Innovation Strategy: Culinary SMEs should move beyond informal, ad hoc innovations and instead establish structured innovation plans. This involves setting yearly innovation goals (e.g., launching two new menu items, adopting one new cooking process) and linking them to measurable business outcomes. *How*: Managers can use tools like the Business Model Canvas or simple strategy maps to align innovation activities with business objectives.
3. Leveraging Inbound Open Innovation: SMEs can expand their innovation capacity by engaging with external stakeholders such as suppliers, universities, or culinary communities. *How*: For instance, partnering with local universities to test new recipes or adopting packaging innovations from suppliers can reduce costs and increase product appeal.
4. Utilizing Outbound Open Innovation: SMEs should not only adopt external knowledge but also explore ways to commercialize or share their internal innovations. *How*: Culinary SMEs can franchise their business concepts, license unique recipes, or collaborate with delivery platforms to expand their reach beyond their immediate locality.
5. Policy and Ecosystem Support: Government agencies and business associations should provide platforms for SMEs to collaborate, share best practices, and access training programs. *How*: Creating innovation hubs, mentorship programs, and knowledge-sharing workshops will allow SMEs to enhance both absorptive capacity and innovation strategies more effectively.

By operationalizing these implications, culinary SMEs in Balikpapan can enhance their resilience, adaptability, and

competitiveness in dynamic market environments.

5.2. Limitations and Future Research

While the findings provide valuable insights, this study has limitations that should be acknowledged. First, the study focused exclusively on culinary SMEs in Balikpapan, which may limit the generalizability of the results to other sectors or regions. Second, the cross-sectional research design prevents strong causal conclusions, as the data capture relationships at a single point in time. Third, the reliance on self-reported measures may introduce common method bias. Future research should address these limitations by conducting comparative studies across multiple sectors and regions, employing longitudinal designs to capture changes over time, and incorporating objective performance measures alongside self-reports. In addition, qualitative approaches could provide deeper insights into the mechanisms through which absorptive capacity and innovation strategy foster open innovation.

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