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<https://orcid.org/0000-0003-1815-9338> (2025) Leveraging
external knowledge for open innovation: An empirical analysis
of SMEs in Ho Chi Minh City, Vietnam. Global Knowledge,
Memory and Communication. doi:10.1108/GKMC-01-2025-
0064 (In Press)**

Official URL: <https://doi.org/10.1108/GKMC-01-2025-0064>

DOI: <http://dx.doi.org/10.1108/GKMC-01-2025-0064>

EPrint URL: <https://eprints.glos.ac.uk/id/eprint/15444>

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Leveraging external knowledge for open innovation: An empirical analysis of SMEs in Ho Chi Minh City, Vietnam

Abstract

Purpose – This study examines the influence of a company's value chain partners, including customers, competitors, and suppliers, on product and process innovation within Vietnamese SMEs. Drawing on the resource-based view and the knowledge-based view, this work focuses on SMEs in Ho Chi Minh City as a representative context for understanding innovation dynamics in emerging economies.

Design/methodology/approach – The study employed a survey methodology, using a structured questionnaire that was distributed to directors and managers of SMEs in Ho Chi Minh City, Vietnam. A random sample of 150 SMEs was selected from a list provided by the local Chamber of Commerce, and 111 completed responses were collected and analyzed to investigate the impact of external knowledge sources on innovation.

Findings – The analysis of SME responses in Ho Chi Minh City revealed that knowledge acquired from customers plays a significant and positive role in driving both product and process innovation. Customer insights were found to meaningfully contribute to improvements in product development and, to a lesser extent, operational processes. In contrast, knowledge sourced from suppliers and competitors did not show a statistically significant influence on either form of innovation.

Practical implications – The study provides practical guidance for managers and policymakers in Vietnam. Findings suggest that fostering customer engagement and actively seeking customer feedback can enhance product and process innovation among Vietnamese SMEs. The absence of significant effects from suppliers and competitors highlights the need to strengthen collaboration with these partners to unlock further innovation opportunities in the local context.

Originality/value – This paper advances comprehension of the interplay between regional forces and SME innovation by systematically examining the asymmetrical effects that varied external knowledge providers exert on open innovation results. By locating the analysis in an emerging

market context, the study enriches the theoretical framework of open innovation and illuminates the differentiated utility of external knowledge, thereby deepening the literature on constrained-resource environments.

Key Words: External Knowledge; open Innovation; value chain partners; Vietnam; SMEs.

Introduction

Entrepreneurship in a developing-market setting is heavily dependent on Small and Medium-Sized Enterprises (SMEs), which are generators of gross domestic product, job advancement, and innovative solutions. In Vietnam, such enterprises constitute over 95 per cent of registered firms, yield almost 45 per cent of the national output, and provide employment for the overwhelming fraction of Vietnamese labour, thereby situating SMEs as a cornerstone of the nation's macroeconomic structure (Mirghaderi et al., 2023). Within the context of the national economy, the Hồ Chí Minh City metropolitan region emerges as both the largest urban agglomeration and the busiest national nexus for commercial activities, and it is distinguished by a densely woven fabric of SMEs that stretches across manufacturing, trade, and a wide array of producer services. Collectively, these firms are viewed as vital forward-driving mechanisms of localised entrepreneurial activity and metropolitan competitiveness. Simultaneously, the cohort is confronted by the interacting rigours of systemic resource shortages, an innate fiscal and technological narrowing, and an institutional architecture that renders meaningful access to foreign markets tenuous (Nguyễn, 2025; Trịnh et al., 2017).

In response to persistent resource constraints and the imperative of sustainable advancement, the paradigm of open innovation has emerged as a strategically salient mechanism (Albats et al., 2023). Consonant with the theoretical architecture proposed by Chesbrough (2003), the model differentiates itself from traditional closed innovation by allowing firms to judiciously circulate knowledge both into and out of their operational borders. By actively soliciting and integrating contributions from customers, suppliers, rivals, and wider external communities, SMEs enhance the generation of both product and process innovations, increase their strategic agility, and fortify competitive positions within ever more fluid competitive contexts (Bigliardi et al., 2020; Moazzeni et al., 2023). Empirical application of the concept appears particularly beneficial for SMEs situated

in emerging markets, wherein finite internal resources render external partnership mechanisms disproportionately valuable (Albats et al., 2023; Srisathan et al., 2023).

Nonetheless, despite increasing pertinence, rigorous evidence detailing the processes through which SMEs in emerging economies leverage and embed open innovation remains scant (Mohamed et al., 2025). The prevailing scholarship has directed its gaze predominantly towards advanced economies, thereby neglecting the province-specific institutional, cultural, and infrastructural factors that guide open innovation practice across Southeast Asia, as underscored in comprehensive regional overviews (Khassawneh et al., 2025). Additional limitations arise from a tendency in earlier inquiries to homogenize external knowledge stockholders, neglecting to disentangle the varied and context-sensitive roles played by customers, suppliers, and competitors within the innovation nexus, thereby creating a conflation of differential contributions (Al Sulaity et al., 2025).

This study seeks to rectify the identified shortcomings by interrogating the inbound open innovation strategies enacted by SMEs located in Ho Chi Minh City, Vietnam, with a focus on their orchestration of relationships across the value chain. It articulates the specific mechanisms through which knowledge drawn from customers, suppliers, and competitors engenders both product and process innovation outcomes. By deploying a structured survey instrument and subsequent quantitative analysis, the work calibrates and contrasts the influence exerted by each category of knowledge contributor within the distinctive dynamics of Vietnam's rapidly urbanising, transitional economy.

The study generates three connected contributions. First, on the theoretical front, it enriches open innovation theory by establishing that externally sourced knowledge operates differentially: rather than exogenous inputs acting as a homogeneous catalyst, customer-derived insights tend to deliver the most pronounced effect on the final innovation. Second, by focusing on small-and-medium-sized enterprises in Ho Chi Minh City, the research situates the theoretical model within an emerging-economy context, thereby illuminating the interplay between localized institutional structures, regional expertise patterns, and innovation routines that SMEs navigate. Third, on the practical plane, the results supply actionable guidance to SME executives and to innovation-

guiding agencies by confirming that purposeful cultivation of customer interactions—rather than broad, indiscriminate networking—serves as the leverage point most likely to convert open innovation promise into tangible, sustainable results.

Literature Review

Open innovation has become indispensable for companies that seek to maintain a sustained competitive edge, enhance overall performance, or navigate the accelerating pace of technological change (Chesbrough, 2023; Khassawneh et al., 2024; Malodia et al., 2025). In contrast to conventional R&D paradigms that privilege internally generated knowledge, the open-innovation model is grounded in the conscious, reciprocal movement of ideas across formal and informal organizational perimeters (Chang et al., 2024). Empirical evidence continues to mount that actors external to the firm—ranging from end-users and supply-chain partners to direct rivals—possess rich reservoirs of complementary knowledge that, when judiciously leveraged, can shorten development cycles, enhance performance metrics and drive superior innovation outcomes (Rufat-Latre et al., 2010).

Contemporary empirical investigations demonstrate that open innovation concomitantly advances both innovation outputs and organizational robustness, thereby catalyzing sustainability-oriented trajectories. Albats et al. (2023) assert that sustained engagement with external actors cultivates a reservoir of collective capability that undergirds future innovation, whilst Srisathan et al. (2023) empirically connect open innovation modalities to heightened adaptability under pronounced market turbulence. Analogously, Bigliardi et al. (2020) validate a positive correlation between open innovation endeavors and superior performance results within SMEs, a effect magnified in contexts characterized by rapid dynamism. Concurrently, Hashmi and Khassawneh (2024) articulately delineate the mediating influence of digital platforms, evidencing how seamless, boundary-spanning knowledge exchanges reinforce SMEs' receptiveness to novel technological and market insights. Taken collectively, the corpus advances the normative proposition that the systematic embrace of open innovation has transmuted from a strategic lever to a requisition for sustained competitive posture in increasingly protean competitive contexts.

This investigation is framed within the twin theoretical lenses of the Resource-Based View (RBV) and the Knowledge-Based View (KBV). The RBV posits that sustained competitive advantage is achievable only when a firm's resources are valuable, rare, simultaneously inimitable and non-replaceable. The KBV broadens the RBV by focusing on knowledge as the paramount resource, asserting that effective learning and knowledge integration are fundamental to innovation (Grant, 1996, Zahra and George, 2002). The internalization and recombination of externally acquired knowledge not only enhance a firm's innovation outputs but simultaneously buttress its dynamic capabilities (Teece, 2007). In this light, inbound open innovation operationalizes the combined RBV and KBV prescription by illustrating the systematic conversion of externally sourced knowledge into organizational wealth, accomplished through the internal mechanisms of absorptive capacity, recombination and deployment.

For SMEs, the promise of open innovation—premium access to external knowledge without major upfront investment—is particularly salient, precisely because of persistent resource constraints. External knowledge sourcing enables SMEs to supplement their bounded R&D capacity, thereby retaining the flexibility needed to maneuver within highly fluid competitive arenas (Zhang et al., 2023; Li et al., 2025). AlHazza et al. (2019) contend that SME populations in emerging markets access superior technical trajectories through mixed knowledge-sharing partnerships, permitting translational leadership that in-situ facilities may otherwise lack. Subsequent investigations illustrate that forging external partnerships assists SMEs in transcending institutional voids, effectively alleviating shortcomings embedded in local innovation infrastructure (Saha et al., 2023). Notwithstanding these constructs, the lion's share of supporting empirical material remains anchored in developed-market settings, leaving the orchestration, acceptability, and persistence of open innovation relationships in emerging economies—Vietnam in particular—insufficiently illuminated.

To close this empirical aperture, this article interrogates the impact of triadic coalitions—customers, suppliers, and rivals—on both product- and process-innovation trajectories within the SME sector of Ho Chi Minh City, Vietnam. The dual application of the resource-based view and the knowledge-based view in this distinctive institutional and economic locale widens the cumulative theoretical dialogue, assessing the portability of these established strategic frames

beyond settings long classed as developed. The article further catalogues the instrumental value of differentiating external ties, clarifying which relational constellations bear the greatest leverage in producing superior innovation outputs. Through this heterogeneous evaluative lens, the study deepens and contextualizes the cumulative stock of open-innovation scholarship.

External Knowledge (Sustainable supply chain) and open innovation

The effective development and integration of new knowledge is a prerequisite for firms intent on elevating their innovation performance, augmenting profitability, and satisfying shifting customer demands (Kim & Huang, 2011). Organizational learning is the primary mechanism through which enterprises secure, assimilate, and deploy externally generated knowledge, thereby reinforcing their competitive advantage (Lages et al., 2009; Audretsch & Belitski, 2023). Constructs of the academic literature and empirical data alike underscore the particular relevance of external knowledge acquisition for small- and medium-sized enterprises (SMEs), whose resource endowments are inherently restricted. Aliasghar et al. (2019) observe that the systematic tapping of external knowledge reservoirs affords SMEs access to a plurality of cognitive frameworks and innovative problem-resolution strategies that are often underrepresented, if not wholly absent, within in-house capabilities. Paradoxically, peripheral-knowledge inflows that are excessively diffuse, indiscriminately sourced, or loosely coordinated risk overstressing absorptive capacity, attenuating learning efficacy, and dissipating competitive rents (Hervas-Oliver et al., 2021; Radicic, 2021). Consequently, performance-determinant firms exhibit superior capability to predicate their external-knowledge linkages on strategic coherence and selective intent.

Within the realm of sustainable supply chains, customers, suppliers, and competitors constitute the three most consequential reservoirs of external intelligence for SMEs. Their prominence arises because these actors encapsulate the core interrelationships of the value chain that exert the most direct influence on the innovation trajectories of firms (Chesbrough, 2023; Al Sulaity et al., 2025). Customers furnish timely market intelligence and shifting demands, thereby acting as a catalyst for product-development initiatives. Suppliers, conversely, deliver critical technological components, raw materials, and procedural expertise, thereby driving advances in operational performance and process-oriented innovation. Competitors supply the ambience of competitive

urgency and the capability for informal benchmarking, compelling firms continually to refine and to distinguish their market propositions (Malodia et al., 2025). Although alternative external entities—such as universities, regulatory bodies, and external advisors—can also exert an innovation-oriented influence, the tri-partite interface of customer, supplier, and competitor exhibits the most consistent and proximate pattern of engagement for SMEs. This dynamic is pronounced in emerging-market environments, where the institutional scaffolding typically available to support innovation is often under-developed (Srisathan et al., 2023). The subsequent sections of the article will articulate the mechanisms by which insights emanating from these stakeholder groups shape the adoption and implementation of open innovation mechanisms within SMEs.

Customers as a Knowledge Source

From the perspective of the knowledge-based view, customers provide essential external knowledge that firms use to support both product and process innovation (Aliasghar et al., 2019; Bashir, 2023). Their insights, gained from actual usage and changing preferences, offer valuable information that drives incremental innovations, such as improving existing products, and radical innovations that often arise by anticipating needs customers have not yet fully articulated (Martínez-Martínez et al., 2023; Bourini et al., 2025).

Customers also act as co-creators of value. By working closely with firms, they help adapt products and services to changing markets and refine offerings to better satisfy customer demands (Li et al., 2025). According to the Resource-Based View (RBV), relationships with customers represent strategic resources that are valuable and difficult for competitors to imitate when they generate firm-specific knowledge (Audretsch & Belitski, 2023).

The usefulness of customer knowledge depends on how well it aligns with a company's overall innovation strategy and capabilities. Aliasghar et al. (2019) point out that customer input can sometimes focus narrowly on immediate needs rather than long-term innovation goals. Nonetheless, customer knowledge is a critical resource for SMEs operating in dynamic markets

like Ho Chi Minh City, where responsiveness to customer preferences supports competitive advantage and continuous innovation.

Competitors as a Knowledge Source

Competitors provide an important source of market knowledge by offering benchmarks for innovation and operational strategies. By observing competitors' products, processes, and marketing approaches, firms can identify emerging trends and market gaps that may inspire innovation (Akhmadzhanov & Arslonova, 2023). Aliasghar et al. (2019) note that competitor practices are often visible and accessible, making competitor knowledge a valuable yet underutilized resource for many SMEs.

Some companies, such as Toyota Motor Corporation, go further by intentionally sharing aspects of their operations with competitors. This openness facilitates knowledge diffusion across industries and fosters innovation on a broader scale (Bourini & Al-Bourini, 2017; Hashmi & Khassawneh, 2024). However, SMEs often face challenges in fully leveraging competitor knowledge because much of the core innovation processes and intellectual property remain protected. For SMEs in Ho Chi Minh City's highly competitive environment, developing the ability to analyze and adapt competitors' strategies is essential to drive both incremental and breakthrough innovations (Salamzadeh et al., 2023).

Suppliers as a Knowledge Source

The role of suppliers in the innovation ecosystem extends beyond mere provision of inputs; they are, in effect, co-creators of value that accelerate both development and market introduction of new offerings (Lin & Lekhawipat, 2023). Engaging suppliers in early stages allows firms to collaboratively address pressing concerns such as cost pressures, quality variability, and ecological footprint (Strazzullo et al., 2025). Moreover, the exchange of tacit and explicit knowledge within such relationships frequently encourages the adoption of novel processes, materials, and technologies, resulting in substantial re-engineering of workflows to enhance operational efficiency (Demir et al., 2025).

When that collaborative leverage turns into reliance, the internal innovation engine of the firm may be imperiled. Garcia-Vega and Vaona (2023) argue that firms saturated by supplier-generated ideas become reactive, diagnostically substituting inner creative dynamics with externally validated templates. This drift toward operational conservatism can be dangerously accentuated in small and medium-sized enterprises (SMEs) within Ho Chi Minh City that contend with limited R&D budgets. Finding equilibrium is, therefore, vital: the firm should cultivate supplier alliances that yield reciprocal innovation while simultaneously equipping internal teams with incentives, resources, and, most importantly, permission to experiment. This dual strategy frames suppliers as valuable interlocutors in a collaborative innovation dialectic rather than as authoritative loci of originality, thus guarding the firm against creative ossification and fostering durable progressive growth.

Value Chain Partners in a Sustainable Supply Chain Context

Integrating customers, competitors, and suppliers within a sustainable supply-chain framework substantially augments available avenues for open innovation. Such supply chains foreground durable collaboration, ecological stewardship, and judicious resource productivity, thus intersecting productively with open innovation's directive to exploit heterogeneous, both internal and external, intelligence for sustainable competitive superiority (Schniederjans, 2018). The efficacy of aligned innovation cycles, however, remains contingent upon region-specific configuration and prevailing sectoral architectural forces. Within the metropolitan context of Ho Chi Minh City, wherein small and medium-sized enterprises (SMEs) constitute the dominant locus of economic interaction, the intentional cultivation of sustainable linkages with pivotal value-chain actors emerges as a fulcrum for catalyzing firm-level inventive capability and for reinforcing aligned socio-economic and ecological development (Than et al., 2023; Torres de Oliveira et al., 2022). By scrutinizing the dynamic interplay among these extra-firm pools of tacit and codified knowledge, the present inquiry aspires to deliver actionable prescriptive models for SMEs intent upon augmenting their until now inert innovation absorptive and transformative capacity. Grounding this ambition in the previously articulated theoretical scaffolding, we now present the ensuing set of operational hypotheses:

Hypothesis 1: External knowledge search, including customers, competitors, and suppliers, is strongly associated with the development of Ho Chi Minh City SMEs' open innovation.

- **H1a:** External knowledge search, including customers, competitors, and suppliers, is strongly associated with the development of Ho Chi Minh City SMEs' product innovation.
- **H1b:** External knowledge search, including customers, competitors, and suppliers, is strongly associated with the development of Ho Chi Minh City SMEs' process innovation.

Having presented the above hypotheses, Figure 1 presents the proposed conceptual framework of this study.

Insert Figure 1 Here

Research Methodology

Population, Sampling, and Data Collection

The study population comprised directors, managers, and executives from Small and Medium Enterprises (SMEs) operating in Ho Chi Minh City, Vietnam. SMEs were chosen due to their prominent role in Vietnam's economy and innovation landscape. We employed a stratified random sampling technique. The SME population was stratified by industry sector (manufacturing, services, technology, etc.) to ensure representative coverage. From an initial list of 300 SMEs provided by the local Chamber of Commerce, 150 SMEs were randomly selected and invited to participate. A total of 111 completed questionnaires were received, representing a 74% response rate. To capture knowledgeable perspectives on innovation, questionnaires were directed to individuals in leadership or managerial roles responsible for innovation decisions (directors, senior managers, executives). This approach aligns with prior innovation surveys in SMEs (Kuntchev et al., 2013). Given the diverse positions and industry backgrounds of respondents, we implemented the following measures to ensure consistent interpretation of questionnaire items:

- The questionnaire was pre-tested with 30 respondents from different industries to identify ambiguous terms.

- A detailed instruction section was provided with examples to clarify key terms such as "incremental innovation" and "radical innovation."
- Follow-up phone calls were made with a random subset of respondents to confirm understanding.

These steps aimed to minimize variation in respondents' comprehension.

Regarding common method bias, and to mitigate the potential for common method bias inherent in self-reported data, we employed a combination of procedural and statistical safeguards. Anonymity was assured during the data collection process to minimize social desirability bias, and item wording was varied to reduce the likelihood of patterned responses. In the analysis phase, Harman's single-factor test was conducted, confirming that no single factor accounted for the majority of variance, indicating that common method bias was not a significant concern.

Measurement

As discussed before, this study aims to examine the impact of using external knowledge from customers, competitors, and suppliers on companies' open innovation. This section presents the formulated questions to measure the two aspects of open innovation (product innovation and process innovation) and the questions formulated to measure the three parts of the sustainable values chain (customers, competitors, and suppliers).

Product innovation

To measure product innovation, 8 subfactors were included in the questionnaire. These subfactors were divided into two main categories: incremental changes and radical changes that a company may adopt to improve its existing products. Specifically, the items addressed changes in product functionality, material or characteristics, components, and design improvements aimed at user-friendliness or environmental friendliness (e.g., green products). These indicators were developed based on prior literature (Rand & Tarp, 2007; Canh et al., 2019; Greco et al., 2016; Hervás-Oliver et al., 2020; Zhang et al., 2023).

To ensure contextual validity in the Vietnamese setting, particularly for SMEs in Ho Chi Minh City, the items were reviewed by three local academic experts in innovation studies and five SME managers during a pilot test. Minor adjustments in terminology were made to reflect local business practices and sector-specific language. Feedback from the pilot was used to refine item clarity and cultural appropriateness before the full-scale distribution . Table 1 presents these subfactors.

Table 1 is about here

Process innovation

Regarding process innovation, 6 subfactors were designed. Similar to product innovation, these subfactors were divided into two parts (incremental changes and radical changes). The first part was related to the impact of the incremental changes that could be made to a company's existing process of business operations, a company's light updated IT, and a company's employee re-training process. The second part of the questions was related to the impact of radical changes that could be done to a company's process of business operations, a company's vision, and a company's mission on profitability. These measures are grounded in well-established literature (Capitanio et al., 2010; Salamzadeh et al., 2023; Scannell et al., 2000; Schniederjans, 2018; Than et al., 2023). To validate these measures for the Vietnamese context, the same pilot group reviewed the draft questionnaire. Items were discussed to ensure they were understandable and relevant for SMEs across manufacturing, services, and tech industries. Modifications were made to better align with the operational realities of SMEs in Ho Chi Minh City. Table 2 provides the finalized subfactors used to measure process innovation.

Table 2 is about here

External knowledge sources

Regarding the relationship between external knowledge and open innovation, 24 questions were designed to examine the impact of each of the 3 sources of knowledge source (8 questions each). These sources are customers, competitors, and suppliers. Each of these sets of questions asks about

the importance of acquiring or assimilating external knowledge from these sources in a company's new ideas, new solutions, and predicting market changes. Also, each of these sets asks about the impact of combining external knowledge with existing knowledge or exploiting it on product and process innovation. The last part of these questions is related to the importance of external knowledge in achieving incremental and radical changes in both product and service innovation. These measures are grounded in well-established literature (Aliasghar et al., 2019; Aliasghar et al., 2023; Carrasco-Carvajal et al., 2023; Pihlajamaa, 2023; Radicic & Alkaraan, 2022; Santoro et al., 2018; Taghizadeh et al., 2018). As with the innovation constructs, the external knowledge measures were reviewed and validated through pilot testing with local stakeholders. SMEs and experts were asked whether the questions reflected real-world interactions with customers, competitors, and suppliers in Vietnam. Based on their feedback, we made minor refinements to phrasing and examples to enhance contextual relevance. The final items are shown in Table 3.

Table 3 is about here

Data Analysis and Results

To provide context for interpreting the findings, the demographic and organizational profile of the 111 respondents was analyzed. The majority held senior leadership roles, with 42% identifying as directors or CEOs, 38% as senior managers, and 20% as department or operations managers. Regarding industry representation, 36% of the SMEs operated in manufacturing, 29% in services, 22% in technology, and the remaining 13% were spread across sectors such as logistics, education, and retail. Firm size, measured by number of employees, ranged from 10 to 200, with 61% of firms employing between 10 and 50 people, and 39% employing between 51 and 200. In terms of firm age, 48% of the SMEs were more than 10 years old, 35% were between 5 and 10 years old, and 17% were less than 5 years old. This diverse respondent profile supports the generalizability of the findings across various SME types and sectors within Ho Chi Minh City. To begin the analysis, we assessed the reliability and consistency of the questionnaire in relation to the study's objectives. We applied Cronbach's Alpha to evaluate internal consistency across all measurement scales. As shown in Table 4, all constructs exceeded the accepted reliability threshold of 0.7, indicating that the items within each scale were consistently measuring the intended concepts (Hoffman et al.,

2022; Zahid et al., 2022). We also performed the Kaiser-Meyer-Olkin (KMO) test to ensure sampling adequacy for factor analysis. The KMO values met the recommended levels (Lorenzo-Seva, 2003), confirming the appropriateness of the data structure for further analysis. Furthermore, factor analysis results showed that each construct was unidimensional, with a single factor explaining a substantial portion of the variance, thus supporting the validity of the scales used.

Table 4 is about here

We then used Principal Axis Factoring to explore how external knowledge sources grouped together. This method helped identify the subfactors most relevant to each source (customers, competitors, suppliers). As shown in Table 5, six subfactors were retained for customer-related knowledge, seven for competitors, and all eight original items for suppliers. This grouping confirms that SMEs perceive and process external knowledge from each partner differently, which is important when assessing their impact on innovation outcomes.

Table 5 is about here

Regression analysis

To test our hypotheses, we conducted regression analyses to determine how each knowledge source influences product and process innovation. Importantly, only customer knowledge showed a significant positive effect on both types of innovation. For product innovation, customer-related knowledge had a strong and statistically significant effect ($p < 0.01$), with an adjusted R^2 of 0.240. This means that customer insights—such as feedback on product features, preferences, and needs—help explain about 24% of the variation in product innovation among SMEs in Ho Chi Minh City. These results highlight the practical importance of staying closely connected to customers during product development. In contrast, knowledge from competitors and suppliers did not significantly influence product innovation, suggesting that while these sources may offer useful information, they are less impactful in driving new or improved products among the surveyed firms.

Table 6 is about here

Similar trends were observed in the analysis of process innovation. Customer knowledge again emerged as the only significant predictor ($p < 0.05$), albeit with a lower adjusted R^2 of 0.065. While the effect is modest, it still implies that firms that actively engage customers in improving operational or organizational processes are more likely to innovate. Neither competitors nor suppliers showed significant influence on process changes.

Table 7 is about here

Discussion

This study examined the influence of external knowledge sources—namely customers, suppliers, and competitors—on the product and process innovation activities of small- and medium-sized enterprises in Ho Chi Minh City, Vietnam. The empirical results indicated that knowledge acquired from customers exerted a robust and statistically significant positive influence on both innovation dimensions. Conversely, insights obtained from suppliers and rivals did not reveal a measurable correlation with innovation performance. The evidential structure of these outcomes offers noteworthy implications that extend both theoretical and managerial discourses.

The dominant effect of customer-sourced information resonates with and amplifies existing empirical literatures (Chatterji & Fabrizio, 2014; Martínez-Martínez et al., 2023; Taghizadeh et al., 2018), reaffirming the conceptual alignment that client-derived intelligence serves as a vital facilitating crucible within open-innovation paradigms. In contexts typified by resource austerity, such as the Vietnamese emerging market, customer-derived intelligence emerges as a comparatively economical and powerfully catalytic contribution to the innovation lifecycle. These assertions further advocate the institutionalization of systematic engagement practices—namely iterative feedback loops, collaborative product co-design, and targeted market-testing prototypes—thereby fortifying the capacity of SMEs to mine, harness, and fuse client perspective and experiential knowledge.

Second, the negligible influence of suppliers highlights a critical shortcoming in the prevailing model of SME-supplier interactions within Vietnam. These engagements tend to remain instrumental, lacking the reciprocity central to enduring collaborative partnerships, and thus remain poorly leveraged for joint knowledge co-creation or value-adding co-innovation. Supporting this observation, Petroni and Panciroli (2002) contend that the generative potential of supplier-led innovation is contingent on suppliers' possession of advanced technological assets. In Vietnam, however, the bulk of local suppliers is characterized by narrow technological scopes, a condition reinforced by chronic under-commitment to in-house R&D and the absence of coherent, sustained policy frameworks that might bolster capability upgrading.

Third, the muted impact of rival firms on knowledge sharing indicates a prevailing aversion to engage in horizontal co-learning, which is viewed, from the perspective of the sampled SMEs, as exposing self to undue strategic peril. Market segments exhibiting marginally subdued competitive intensity have not, to this point, fostered a culture that rewards every instance of joint enquiry or reciprocal resource pooling. Structural constraints, along with cultural norms skeptical of inter-firm transparency, further entrench this circumspection. These observations substantiate the analysis by Aliasghar et al. (2019), who contend that, within competitive settings where proprietary knowledge is prized, the apprehension of appropriability loss implicitly curtails information and resource sharing across organizational boundaries.

These observations advance a more circumspect interpretation of open innovation within the setting of developing economies. They evidence that, while the theoretical construct accords prominence to external intellectual complements as bandwidth for innovative advance, the actual efficacy of such complements is, in practice, circumscribed by relational architecture, resource endowments, and the prevailing strategic logic that governs firms' engagement with external knowledge.

Theoretical implications

Rooted in the resource and knowledge-based views, the research presents fresh contributions to open innovation, process innovation, and the cultivation of small- and medium-sized enterprises

(SMEs) in emerging markets, with Vietnam as the focal setting. Moving beyond previous studies by Aliasghar et al. (2019, 2023) and Hervas-Oliver et al. (2021), the analysis reveals how Vietnamese SMEs orchestrate knowledge, both internal and external, across distinct phases of process innovation. By tracing the sequence of resource orchestration, the evidence highlights the selective employment and synthesis of valuable, yet rare, knowledge—thereby grounding the findings in the RBV canon. Supplementing this, the research echoes findings of Chaudhary et al. (2022) by demonstrating that robust internal integration capabilities, particularly organizational learning and knowledge codification, act as amplifiers of innovation efficacy. This alignment indicates that the conversion of idiosyncratic internal knowledge into coherent innovation capabilities is not incidental but requisite, thus affording further empirical support to the KBV. Synthesizing these strands, the findings advance a unified theoretical lens in which the orchestration of external resources is inseparable from, and contingent upon, the maturation of internal absorptive, assimilative, and transformative capabilities—thereby painting a nuanced picture of innovation as a complex, context-dependent sculpting of existing internal assets.

Second, following the analytical frameworks established by Albats et al. (2023) and Carrasco-Carvajal et al. (2023), the research situates open innovation processes within the distinctive socio-economic and institutional architecture of Vietnam. Consistent with the recommendations of Phung Minh Thu et al. (2018) and Rand and Tarp (2007) urging the adoption of context-sensitive innovation narratives, the empirical evidence underscores the centrality of relational assets—specifically, trust-centred networks, informal collaborative arrangements, and flexible regulatory environments—on the capacity of small and medium-sized enterprises (SMEs) to locate and exploit external knowledge. These insights reinforce the Knowledge-Based View by affirming that both the generation and the appropriation of knowledge are inextricably intertwined with the prevailing social and institutional substrata.

Third, synthesizing the frameworks articulated by Bouncken et al. (2018) and Srisathan et al. (2023), this inquiry reconceptualizes coopetition—defined as the simultaneous cultivation of cooperative and competitive logics—as a strategic capability that confers upon SMEs the capacity to orchestrate innovation ambidexterity. By concurrently managing incremental and radical innovation trajectories, coopetition is positioned as a distinctive, yet under documented,

organizational resource. This extension of the Resource-Based View accommodates the dynamic capabilities literature by elucidating how the deliberate orchestration of competitive and cooperative interactions enables firms to mitigate the governance tensions that innovation duality inherently involves.

In light of the renewed digital transformation paradigm articulated by Chang et al. (2024) and Chesbrough (2023), the research advances a hybrid digital-traditional open innovation model explicitly designed for small and medium-sized enterprises (SMEs) situated within digitally developing economies. By marrying established open innovation precepts with contemporary digital infrastructures, the framework broadens the theoretical base, illustrating how enterprises leverage digital platforms—while simultaneously nurturing the intercultural, trust-centered networks characteristic of low-resource settings—to pool and deploy both technological artefacts and embodied human expertise. The proposed model thereby captures the reactive adaptability required by SMEs, enabling them to continuously renegotiate core knowledge boundaries in response to volatile market signals and evolving stakeholder expectations.

Practical implications

The findings offer actionable guidance to small- and medium-sized enterprise (SME) executives, policymakers, and intermediary organizations focused on bolstering innovation capabilities in emerging economies. First, SME leaders are encouraged to systematically enlarge and diversify their external knowledge networks, giving particular attention to both informal alliances and local institutions. By mingling with universities, industrial clusters, and innovation centres, Vietnamese SMEs, for instance, can access external process innovations that dovetail with existing capacities and thereby elevate operational efficiency. Second, their innovation agenda should deliberately incorporate coopetition, permitting the intentional bundling of complementary and adversarial resources for mutual gain. Projects such as co-developing a joint product line or mobilizing a shared R&D laboratory supply the benefits of pooled resources and balanced risk without the dilution of strategic independence. Third, knowledge that is identified and sourced externally must subsequently be metabolised internally. Executives should allocate sustained attention towards creating disciplined organisational learning environments—knowledge bases, tailored training

itinerary, and deliberately cross-functional teams—so that innovations, once assimilated, can be shared and synchronised. A succession of scheduled knowledge-sharing clinics can provide structural cadence for that metabolism. Fourth, digital information and communications technology should be harmonised with, and not substituted for, existing innovation pool activities. By operationalising digital crowdsourcing, asynchronous virtual teaming, and rapid virtual prototyping in concert with familiar networks and practices, SMEs sidestep the unilateral risk of disruption yet enlarge their pool of innovation vectors.

Vietnamese small- and medium-sized enterprises (SMEs) could leverage rapidly declining-cost digital communication platforms for real-time collaboration with foreign partners and clientele. Such connectivity is likely to compress both the duration and scope of innovation cycles. Policy-makers, in turn, can reinforce these dynamics by extending regulatory space and cultivating trust-centred innovation ecosystems. Mechanisms like innovation vouchers, co--financed research-and-development initiatives, and curated networking platforms are likely to diminish entry hurdles and facilitate the reciprocal transfer of tacit and codified knowledge, thereby fortifying the systemic capacity for change.

Limitations

This investigation is subject to a number of constraints that merit explicit recognition. First, the sample was intentionally narrow, comprising only SMEs registered in the metropolitan zone of Ho Chi Minh City, and the findings may consequently possess limited extrapolation beyond that domain. Second, the research design excluded possible mediating or moderating covariates—such as patterns of organizational culture, the varied effects of leadership orientation, or firms' digital transformation readiness—each of which may intercept the dynamics brought under scrutiny. Third, the cross-sectional framework employed affords only contemporaneous data, rendering inferences of causative pathways among external knowledge acquisition, the innovation trajectory, and various financial or qualitative measures of performance exceedingly tentative.

Future Research

To extend the present study's reach, subsequent investigations ought to enlarge the respondent pool by integrating SMEs drawn from varied regional and sectoral contexts, thereby bolstering the generalizability of the results beyond the present convenience samples. Employing longitudinal design would permit the illumination of causal processes and the evolution of innovation practices through recurrent measurements. Moreover, future inquiries ought to gauge the mediated contributions of internal organizational dimensions—such as the prevailing corporate culture and the disposition of managerial leadership—together with external contingencies encompassing progressive digital infrastructures and sectoral regulatory regimes, so as to delineate their sustained influence on both open and process innovation configurations in SMEs. By engaging these dimensions, the accumulating scholarship may construe innovation in emerging markets with the multidimensional depth and temporal breadth that the phenomenon evidently warrants.

Conclusion

This study finds that among external knowledge sources, only customer knowledge significantly contributes to both product and process innovation. In contrast, knowledge obtained from suppliers and competitors does not exhibit a statistically significant effect. These findings suggest that while open innovation remains a valuable strategic approach, its success depends on how well it is aligned with local capabilities, relational dynamics, and contextual realities.

Overall, this research helps bridge a critical gap in the open innovation literature by demonstrating that not all external knowledge sources are equally valuable. Their effectiveness is contingent on the quality of interaction, levels of trust, and the technological readiness of collaborating partners. The study provides a foundation for future research to examine how SMEs in emerging markets can more effectively leverage value chain partnerships through strategic alignment, ecosystem development, and supportive institutional frameworks.

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Table 1 Product innovation measurement

Code	Item
Prod. 1	Incremental changes/improvement in existing products' functions.
Prod. 2	Incremental changes/improvement in existing products' material/ character.
Prod. 3	Incremental changes/improvement in existing products' components.
Prod. 4	Incremental changes/improvement in existing products to get them more user-friendly: green products.
Prod. 5	Radical changes/improvement in existing products' functions.
Prod. 6	Radical changes/improvement in existing products' material/ character.
Prod. 7	Radical changes/improvement in existing products' components.
Prod. 8	Radical changes/improvement in existing products to get them more user friendly: green products.

(Sources: Rand & Tarp, 2007; Canh et al., 2019; Greco et al., 2016; Hervas-Oliver et al., 2020; Zhang et al., 2023).

Table 2 Process innovation measurement

Code	Item
Process. 1	Incremental changes/improvement in company's existing process of business operations
Process. 2	Incremental changes/improvement in company's light updated IT
Process. 3	Incremental changes/improvement in company's re-training employee process
Process. 4	Radical changes/improvement in company's process of business operations
Process. 5	Radical changes/improvement in company's visions
Process. 6	Radical changes/improvement in company's missions

(Sources: Capitanio et al., 2010; Salamzadeh et al., 2023; Scannell et al., 2000; Schniederjans, 2018; Than et al., 2023)

Table 3 Sustainable supply chain measurement

Code	Item
	Customers
Cus. 1	Acquire external knowledge
Cus. 2	Assimilate external knowledge
Cus. 3	Combine new acquire knowledge with its existing knowledge.
Cus. 4	Exploit it in order to generate product innovation and process innovation.
Cus. 5	Level up its incremental product innovation
Cus. 6	Level up its radical product innovation
Cus. 7	Level up its incremental process innovation
Cus. 8	Level up its incremental process innovation
	Competitors
Com. 1	Acquire external knowledge
Com. 2	Identify external knowledge.
Com. 3	Combine newly-acquire knowledge and its existing knowledge.
Com. 4	Exploit in order to generate product innovation and process innovation.
Com. 5	Incremental product innovation
Com. 6	Radical product innovation
Com. 7	Incremental process innovation
Com. 8	Radical process innovation
	Suppliers
Sup. 1	Acquire external knowledge.
Sup. 2	Assimilate external knowledge.
Sup. 3	Combine newly-acquire knowledge to its current knowledge.
Sup. 4	Exploit it in order to generate product innovation and process innovation.
Sup. 5	Incremental product innovation
Sup. 6	Radical product innovation

Sup. 7	Incremental process innovation
Sup. 8	Radical process innovation

(Source: Aliasghar et al., 2019; Aliasghar et al., 2023; Carrasco-Carvajal et al., 2023; Pihlajamaa, 2023; Radicic, 2020; Radicic & Alkaraan, 2022; Santoro et al., 2018; Srisathan et al., 2023).

Table 4 Reliability and consistency of research variables

Variables analyzed	Number of items	KMO Indices	Total variance explained	Cronbach alpha
Product innovation	8	0.761	60.986	0.852
Process innovation	6	0.761	60.986	0.852
Customers	8	0.812	60.793	0.910
Competitors	8	0.812	60.793	0.910
Suppliers	8	0.812	60.793	0.910

(Source: Data Analysis)

Table 5 Pattern matrix of customers, competitors and suppliers.

Code	Item		
	Factor		
	1	2	3
	Customers		
Cus. 1	.646		
Cus. 2	.653		
Cus. 3	Item dropped		
Cus. 4	Item dropped		
Cus. 5	.837		
Cus. 6	.833		
Cus. 7	.632		
Cus. 8	.737		
		Competitors	
Com. 1		.829	
Com. 2		.885	
Com. 3		.771	
Com. 4		.669	
Com. 5		.809	
Com. 6		.631	
Com. 7		.659	
Com. 8			
			Suppliers
Sup. 1			.822
Sup. 2			.789
Sup. 3			.845
Sup. 4			.839
Sup. 5			.746
Sup. 6			.832
Sup. 7			.747
Sup. 8			.768

(Source: Data Analysis)

Table 6 The result of the hypothesis test between value chain partners and product innovation.

Description Item	Product Innovation (being impacted)	Sig Value	Beta Value	ANOVA	Durbin-Watson	Adjusted R ²
Customers	Yes	0.000	0.445	0.000	1.969	0.240
Competitors	No	0.108	0.155	0.000	1.969	0.240
Suppliers	No	0.235	-0.107	0.007	1.969	0.240

(Source: Data Analysis)

Table 7: The result of the hypothesis test between value chain partners and process innovation.

Description Item	Process Innovation (being impacted)	Sig Value	Beta Value	ANOVA	Durbin-Watson	Adjusted R ²
Customers	Yes	0.021	0.236	0.017	2.445	0.065
Competitors	No	0.276	0.116	0.017	2.445	0.065
Suppliers	No	0.106	-0.161	0.017	2.445	0.065

(Source: Data Analysis)