Multidimensional Innovation and Organizational Performance: Empirical Evidence from Artisanal MSMEs in Oaxaca, Mexico

Pedro Rafael Martínez-Martínez
Facultad de Contaduría y Administración de la
Universidad Autónoma "Benito Juárez" de Oaxaca
pedro.rafael@uabjo.mx
ORCID 0009-0006-0835-3822

Carlos Arturo Gallegos-Figueroa
Facultad de Contaduría y Administración de la
Universidad Autónoma "Benito Juárez" de Oaxaca
cgallegos.fca@uabjo.mx
ORCID 0009-0009-6728-841X

Francis Palacios-Pineda
Facultad de Contaduría y Administración de la
Universidad Autónoma "Benito Juárez" de Oaxaca
fpalacios@uabjo.mx
ORCID 0009-0009-4686-2144

Enrique Cruz-Domínguez
Facultad de Contaduría y Administración de la
Universidad Autónoma "Benito Juárez" de Oaxaca
ecruz.fca@uabjo.mx
ORCID 0000-0003-3493-455X

Brenda Dennís Valadez-Solana
Corresponding author
Facultad de Contaduría y Administración de la
Universidad Autónoma "Benito Juárez" de Oaxaca
bvaladez.fca@uabjo.mx
ORCID 0000-0002-7883-7148

Abstract
Innovation constitutes a strategic capability that enables micro, small, and medium-sized enterprises (MSMEs) to adapt to changing environments. However, its relationship with organizational performance remains insufficiently explored among artisanal enterprises, where competitiveness requirements coexist with the preservation of traditional knowledge and cultural identity. This study examines the relationship between innovation and organizational performance in 337 artisanal MSMEs across ten communities in the Central Valleys of Oaxaca, Mexico, selected through non-probability quota sampling with proportional allocation. Innovation was examined across four dimensions (product, process, marketing, and

organizational innovation), while organizational performance was assessed across five dimensions (productivity, sales, profitability, customers, and growth). The final instrument comprised 48 items distributed across nine dimensions and exhibited an adequate factorial structure, with satisfactory levels of reliability and discriminant validity. The analyses revealed a positive relationship between innovation and organizational performance, although its strength and pattern varied across the different dimensions. Organizational innovation exhibited the most consistent pattern, particularly in relation to productivity, sales, and profitability. Process innovation showed a stronger association with customer-related outcomes, whereas product and marketing innovations displayed more specific associations with particular components of organizational performance. Multiple regression models and sensitivity analyses further supported these patterns. In conclusion, the findings demonstrate that different forms of innovation relate differently to the performance of artisanal MSMEs, highlighting the need to examine this relationship from a multidimensional and context-specific perspective.

Keywords: innovation; organizational performance; MSMEs; artisanal enterprises; dynamic capabilities; Mexico.

GECONTEC Vol. 14(2). 2026
ISSN 2255-5684
gecontec.org

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Recibido 26 August, 2026
Aceptado 26 October, 2026
Publicado 7 November, 2026

Introduction

Innovation plays a fundamental role in enabling organizations to remain competitive and adapt to environments characterized by technological change, emerging business models, shifts in consumer behavior, and intensifying competition (Hassan et al., 2024; Verhoef et al., 2021). The Resource-Based View (RBV) argues that organizational success depends not merely on possessing resources but also on how organizations combine, organize, and strategically deploy them (Barney, 1991; Li et al., 2023). Furthermore, dynamic capabilities theory posits that organizations must continuously integrate and reconfigure their resources to adapt to changes in their external environments (Saeedikiya et al., 2024; Teece et al., 1997).

Innovation enables organizations to reorganize their resources and capabilities by transforming knowledge, technologies, routines, and skills into new value propositions, production methods, business practices, and organizational arrangements (Hassan et al., 2024; Merín-Rodrigáñez et al., 2024). However, recent studies indicate that the relationship between innovation and

organizational performance neither follows a uniform pattern nor produces automatic benefits. Therefore, distinguishing among innovation types becomes essential, as product, process, marketing, and organizational innovations may influence productive, commercial, and economic outcomes in different ways (Bogetoft et al., 2024; Vahter & Vadi, 2024).

The typology encompassing product, process, marketing, and organizational innovation originated in the third edition of the Oslo Manual (OECD & Eurostat, 2005) and subsequently informed empirical studies, including Gunday et al. (2011). The fourth edition of the Oslo Manual reorganized business innovation into two broad categories—product innovation and business process innovation—incorporating production, distribution, marketing, sales, and organizational activities within the latter category (OECD & Eurostat, 2018). This study retains the four-dimensional classification because it facilitates comparisons among specific forms of innovation widely adopted in the empirical literature. Within this typology, different innovation modalities may exhibit distinct relationships with organizational performance.

Some studies indicate that strategies combining product innovation with other innovation modalities generate greater performance improvements, whereas process innovation may play a particularly relevant role in initially less efficient firms (Bogetoft et al., 2024). Nevertheless, the benefits of combining different innovation types remain heterogeneous, as complementarities, substitution effects, or coordination costs may emerge depending on the configuration adopted and the organizational capabilities available (Zhang, 2022; Vahter & Vadi, 2024).

This diversity holds particular significance for MSMEs, which operate with limited resources and must carefully select which innovations to develop and how to combine them (Ángeles et al., 2022; Pingali et al., 2023). In a study involving 1,139 manufacturing SMEs, Zhang (2022) demonstrated that simultaneously implementing multiple innovation types does not necessarily improve performance. Some forms of innovation complement one another, whereas others may act as substitutes. For instance, efficiency-oriented and flexibility-oriented innovations generated no additional benefits when combined on their own; however, incorporating organizational innovation strengthened their relationship with performance. Thus, innovation's impact on organizational performance depends both on how innovative practices are configured and on the complementarities among them.

Vahter and Vadi (2024) likewise found that combining technological and organizational innovation can significantly improve organizational performance. However, these benefits depend on the sequence, duration, and coordination of the innovations involved. Their findings indicate that certain combinations, whether implemented simultaneously or sequentially, strengthen organizational performance, whereas others may prove costly, difficult to sustain, or less beneficial. Consequently, researchers should approach innovation complementarities from a dynamic perspective: implementing multiple innovations alone does not suffice; organizations must align them with their resources, capabilities, and strategic objectives.

Accordingly, the positive relationship between innovation and organizational performance observed among MSMEs (Rosenbusch et al., 2011) requires examination within its specific context. Recent studies indicate that innovation's impact depends on firms' internal characteristics, the availability and configuration of their capabilities, and the mechanisms

through which innovation generates value. These mechanisms include integrating new technologies into business processes, adapting management models, and aligning innovative practices with organizational objectives (Hassan et al., 2024; Merín-Rodrigáñez et al., 2024; Vahter & Vadi, 2024).

In their study of 434 innovative Spanish SMEs, Merín-Rodrigáñez et al. (2024) found that digital transformation positively relates to organizational performance, although business model innovation mediates part of this effect by helping firms realize and capture the value generated. Furthermore, the authors emphasize the diversity of capabilities among SMEs and point out that acquiring new technological resources does not guarantee better outcomes unless firms develop the processes and structures needed to adapt these resources and align them with value creation, delivery, and capture.

Overall, organizational performance depends on the type of innovation pursued, the combination of innovation modalities, the capabilities available for their implementation, and the context in which the organization operates (Bogetoft et al., 2024; Merín-Rodrigáñez et al., 2024; Vahter & Vadi, 2024; Zhang, 2022). This relationship holds particular relevance for MSMEs because their structural characteristics entail both distinctive advantages and specific challenges. Although limited capital, personnel, and technological resources may constrain the scope of their innovation projects, the organizational flexibility inherent in MSMEs enhances their ability to adapt to environmental changes (Ángeles et al., 2022; Pingali et al., 2023).

Therefore, for MSMEs, decisions regarding which types of innovation to implement and how to combine different innovation modalities remain critical and must account for both available resources and the specific characteristics of their operating environments. Accordingly, strategies that have proven successful in large corporations cannot be assumed to yield equivalent results in small and medium-sized enterprises, as MSMEs require approaches tailored to their own conditions and organizational dynamics (Ángeles et al., 2022; Pingali et al., 2023).

Artisanal enterprises operate within a distinctive context, as their activities extend beyond economic outcomes and contribute to preserving and transmitting knowledge, techniques, materials, designs, and production practices associated with their communities' cultural identities (Shafi, 2020). In these organizations, craftsmanship, traditional knowledge, territorial reputation, and intergenerational continuity constitute cultural resources and sources of competitive differentiation. Their main challenge involves developing capabilities that enable market adaptation without undermining the cultural attributes that underpin product authenticity. Recent evidence confirms the close relationship between culture, creativity, and innovation, highlighting the combination of tradition and modernity as a key factor in sustaining artisanal activities (Li et al., 2025; Nguyen & Phan, 2025; Roy & Mohapatra, 2023).

From this perspective, innovation in an artisanal enterprise does not necessarily entail industrializing production or replacing traditional techniques. Instead, firms can pursue selective innovation through changes in products and designs, improvements in production and environmental practices, the adoption of digital technologies, new marketing channels, and the reorganization of relationships with customers, suppliers, and other stakeholders, while

preserving the processes and knowledge that underpin cultural authenticity (Harsanto et al., 2026; Nguyen & Phan, 2025; Roy & Mohapatra, 2023; Shafi et al., 2025).

Recent studies indicate that artisanal enterprises can selectively adopt technology, particularly in promotion and sales, while maintaining the manual production processes essential to their authenticity (Harsanto et al., 2026). Furthermore, empirical evidence suggests that innovation can enhance both the economic and cultural performance of small artisanal enterprises, with organizational innovation potentially playing a particularly important role in their financial and non-financial outcomes (Avolio et al., 2025; Shafi et al., 2025).

Despite recent advances, research on innovation and performance in artisanal enterprises remains limited and fragmented. The literature tends to focus on specific types of innovation, such as technological, sustainable, or product innovation, and on broad performance outcomes. However, little empirical evidence simultaneously examines product, process, marketing, and organizational innovation in relation to specific performance dimensions, including productivity, sales, profitability, customers, and growth (Avolio et al., 2025; Rodrigues et al., 2024; Shafi et al., 2025).

This research gap carries particular significance for artisanal MSMEs operating in regions with strong cultural identities, where innovation remains closely intertwined with local identity, traditional knowledge, and territorial context. A multidimensional examination of these factors would help identify more precisely which innovation capabilities relate to each performance dimension and under what cultural and territorial conditions (Harsanto et al., 2026; Nguyen & Phan, 2025; Roy & Mohapatra, 2023).

In this regard, the Central Valleys region of Oaxaca, Mexico, provides a particularly suitable setting for examining the relationship between innovation and the performance of artisanal MSMEs. This study encompasses economic units located in San Bartolo Coyotepec, Santa María Atzompa, San Martín Tilcajete, San Antonio Arrazola, Santo Tomás Jalieza, San Antonino Castillo Velasco, Ocotlán de Morelos, Teotitlán del Valle, San Pablo Villa de Mitla, and Santa Ana del Valle. Collectively, these localities account for a population of 2,688 artisanal MSMEs engaged in productive activities representative of the region, including pottery, textiles, embroidery, wood carving, alebrije making, and knife making (INEGI, 2024). This productive and territorial diversity provides an opportunity to examine the phenomenon in an environment where business activities remain closely linked to traditional knowledge, cultural identity, and artisanal specialization (Hasanah et al., 2023; Nguyen & Phan, 2025).

From the Resource-Based View, different innovation modalities represent ways in which firms combine and leverage resources to generate value (Barney, 1991; Li et al., 2023). Complementarily, the dynamic capabilities perspective posits that adaptation depends on an organization's ability to integrate and reconfigure these resources in response to environmental changes (Teece et al., 1997; Saeedikiya et al., 2024). Based on these theoretical premises, product, process, marketing, and organizational innovations are expected to exhibit positive, albeit differentiated, associations with the various components of organizational performance. Accordingly, this study proposes the following hypotheses:

H1a. Product innovation exhibits a positive and statistically significant relationship with the components of organizational performance.

H1b. Process innovation exhibits a positive and statistically significant relationship with the components of organizational performance.

H1c. Marketing innovation exhibits a positive and statistically significant relationship with the components of organizational performance.

H1d. Organizational innovation exhibits a positive and statistically significant relationship with the components of organizational performance.

Therefore, this article aims to examine the relationship between innovation—operationalized through the dimensions of product, process, marketing, and organizational innovation—and organizational performance, as well as innovation's statistical explanatory power regarding performance. Organizational performance encompasses specific dimensions, including productivity, sales, profitability, customer base, and growth, among artisanal MSMEs in the Central Valleys of Oaxaca.

This study contributes to the literature in three ways. First, it examines innovation in a context where competitiveness and cultural identity intersect. Second, it adopts a multidimensional perspective to identify which types of innovation associate with specific performance outcomes. Third, it provides empirical evidence from a region in southern Mexico that international research on business innovation has rarely addressed.

Literature Review

Innovation as a Multidimensional Phenomenon

Innovation encompasses the ability to introduce changes in products, processes, business activities, and organizational arrangements aimed at generating value and responding to environmental transformations (Bogetoft et al., 2024; OECD & Eurostat, 2018; Vahter & Vadi, 2024). Among MSMEs, access to technological or digital resources does not, in itself, guarantee better outcomes, as their effective utilization depends on strategic integration, organizational capabilities, and the adaptation of value creation and capture mechanisms (Hassan et al., 2024; Merín-Rodrigáñez et al., 2024).

This study examines innovation through four dimensions: product, process, marketing, and organizational innovation, consistent with recent evidence on multidimensional innovation strategies (Bogetoft et al., 2024). This distinction acknowledges that different innovation modalities do not produce equivalent outcomes and that their effects depend on how firms combine them. Some configurations generate complementarities, whereas others may act as substitutes or require additional organizational capabilities to improve performance (Bogetoft et al., 2024; Vahter & Vadi, 2024; Zhang, 2022). Therefore, conceptualizing innovation as a

multidimensional phenomenon enables a more precise identification of the innovative practices associated with specific components of organizational performance.

Product Innovation

Product innovation involves introducing new or significantly improved goods through modifications to their design, materials, functionality, quality, presentation, or other attributes that enhance their value proposition. Its strategic importance lies in differentiating the firm's offerings, addressing emerging market needs, strengthening competitive positioning, and improving business performance (Bogetoft et al., 2024; Nathan & Rosso, 2022; Rubio-Andrés et al., 2024; Zuhroh & Rini, 2026). Innovative product launches can enhance performance, particularly when they deliver sufficient quality and value to consumers (Nathan & Rosso, 2022).

In artisanal enterprises, product innovation can take the form of new designs, modifications to materials and functional attributes, product diversification, and adaptation to different market segments, while preserving the cultural elements that underpin product authenticity and differentiation (Harsanto et al., 2026; Li et al., 2025; Nguyen & Phan, 2025; Roy & Mohapatra, 2023). Furthermore, combining product innovation with other innovation modalities generally yields better outcomes than focusing exclusively on a single type of innovation (Bogetoft et al., 2024).

Process Innovation

Process innovation involves introducing new or significantly improved production methods aimed at reducing costs and defects, shortening production times, increasing capacity, and enhancing quality and operational flexibility. This innovation modality holds particular relevance for MSMEs because it enables them to improve efficiency and productivity through more effective utilization and reorganization of existing resources. However, its benefits depend on organizational capabilities and the extent to which firms integrate process innovation with other innovation modalities (Appiah et al., 2025; Bogetoft et al., 2024; Wadho & Chaudhry, 2024). These benefits also vary according to the degree of complementarity between process innovation, organizational capabilities, and other forms of innovation (Bogetoft et al., 2024; Zhang, 2022).

In artisanal activities, process innovation does not necessarily entail industrializing production; rather, it involves selectively adapting tools, technologies, and operational practices that remain compatible with the authenticity of traditional craftsmanship. Such innovations may focus on improving material utilization, strengthening quality control, reducing and treating waste, and reorganizing production activities (Harsanto et al., 2026). Their adoption depends on factors such as creativity, artistic vision, competence, learning, and resource availability, and can contribute positively to the economic and cultural performance of artisanal enterprises (Shafi et al., 2025). Furthermore, recent evidence indicates that digitalization in this sector tends to follow a selective adoption pattern shaped by cultural values and collective mechanisms, allowing firms to incorporate innovation without necessarily displacing traditional production processes (Krismajayanti et al., 2026).

Marketing Innovation

Marketing innovation involves significant changes in communication, promotion, presentation, distribution, and the commercialization of a firm's offerings. Among MSMEs, it may take the form of social media engagement, e-commerce, new sales channels, and digital tools that reshape interactions with consumers and facilitate access to new markets. These practices can strengthen business legitimacy, viability, and growth, although their outcomes depend on complementary organizational resources and capabilities (Dwivedi & Pawsey, 2023; Tarazona-Montoya et al., 2024). Furthermore, evidence indicates that stronger marketing capabilities enhance the relationship between innovation and market performance among SMEs (Rubio-Andrés et al., 2024).

In artisanal enterprises, marketing innovation assumes particular importance because it enables firms to transform cultural attributes—such as origin, authenticity, production techniques, and territorial identity—into sources of differentiation and perceived value. Culture and creativity shape innovation processes in artisanal activities and can influence their commercialization, while market orientation helps align culturally embedded attributes with customer needs and market requirements (Nguyen & Phan, 2025; Roy & Mohapatra, 2023). Furthermore, artisanal MSMEs can adopt digital tools, particularly in market-oriented activities, without necessarily replacing the production processes that underpin their authenticity (Harsanto et al., 2026).

Organizational Innovation

Organizational innovation encompasses changes in structures, administrative practices, coordination, training, communication, learning, and internal or external relationships that enable firms to reorganize and integrate their resources and capabilities. Its importance lies in its potential to complement other forms of innovation and facilitate their translation into improved business outcomes. Evidence indicates that coordination between technological and organizational innovation can generate performance premiums when both evolve in a mutually compatible manner (Vahter & Vadi, 2024). Similarly, organizational innovation can reduce incompatibilities between innovations that simultaneously pursue efficiency and flexibility (Zhang, 2022).

Among MSMEs, organizational and network learning constitutes a relevant mechanism for acquiring, sharing, and transforming knowledge into new business capabilities. Interactions with customers, suppliers, partners, and other organizations expand access to information, experiences, and opportunities that firms can incorporate into their innovation processes. Complementarily, structured human resource management practices, continuous training, and effective information integration strengthen employee skills, improve internal coordination, and support more informed decision-making. Collectively, these capabilities enable MSMEs to make better use of their resources, develop more flexible responses to environmental changes, and transform accumulated knowledge into innovations with greater potential to enhance organizational performance (Alkhalaf & Al-Tabbaa, 2024; Alma Çallı et al., 2024; Anjaningrum et al., 2024).

Organizational Performance

Organizational performance constitutes a multidimensional phenomenon that extends beyond financial outcomes (Richard et al., 2009; Santos & Brito, 2012). A comprehensive assessment requires incorporating non-financial indicators related to customers, operations, and internal capabilities (Alves & Lourenço, 2022; Yahaya & Nadarajah, 2023). In MSMEs, performance assessments may encompass operational, commercial, and economic outcomes, particularly when access to objective financial information remains limited (Yahaya & Nadarajah, 2023).

This study considers five dimensions: productivity, sales, profitability, customers, and growth, thereby capturing different manifestations of business performance (Lestari et al., 2024). This perspective aligns with recent evidence indicating that different innovation modalities account for varying proportions of organizational, economic, commercial, and operational performance. Consequently, improvements in one business dimension do not necessarily produce equivalent changes in the others (Larios-Francia & Ferasso, 2023).

Productivity

Productivity reflects an organization's ability to efficiently transform resources, materials, labor, and time into outputs. In artisanal enterprises, productivity can improve through better planning and coordination of activities, efficient material utilization, waste reduction, and enhancements to production processes, without necessarily relying on intensive automation (Harsanto et al., 2026; Singhvi et al., 2026). Furthermore, evidence indicates that the selective adoption of technological innovations can enhance the efficiency and performance of small artisanal enterprises when firms adapt these innovations to their resources, capabilities, and production characteristics (Shafi et al., 2025). Process- and efficiency-oriented innovations can improve productivity, although their outcomes depend on integration with organizational capabilities and other innovative practices (Bogetoft et al., 2024; Zhang, 2022).

Sales

Sales reflect a firm's ability to convert its offerings into actual market transactions. This dimension depends on differentiation, quality, market positioning, and the marketing and distribution capabilities that connect products and services with consumers. Innovation and marketing capabilities can strengthen market performance by enhancing competitive differentiation, facilitating access to new markets, and increasing firms' ability to translate products and services into commercial outcomes (Dwivedi & Pawsey, 2023; Nathan & Rosso, 2022; Rubio-Andrés et al., 2024; Tarazona-Montoya et al., 2024). Introducing new or improved products can boost commercial outcomes, particularly when firms deliver high-quality innovations and support them with appropriate positioning and marketing strategies (Nathan & Rosso, 2022; Rubio-Andrés et al., 2024).

Profitability

Profitability reflects a firm's ability to generate returns from the resources employed and the costs incurred. Its trajectory does not necessarily coincide with sales or productivity, as innovation activities may require investments, organizational adjustments, and learning processes whose financial effects vary in magnitude and timing. Consequently, innovation-related benefits may not materialize immediately and may produce different effects over the short and medium term (Adewumi, 2024; Quintero-Sepúlveda & Zúñiga-Collazos, 2025). Innovation capabilities and strategies generally exhibit positive associations with financial performance, although outcomes depend on the type of strategy pursued and the complementary capabilities available (Quintero-Sepúlveda & Zúñiga-Collazos, 2025; Vahter & Vadi, 2024).

Customers

The customer dimension encompasses outcomes associated with customer acquisition, satisfaction, retention, and the strengthening of business relationships. Marketing and communication capabilities enable MSMEs to better understand market needs, intensify consumer engagement, and improve customer-related performance (Butkouskaya et al., 2024; Eng et al., 2026). Complementarily, process innovation can enhance attributes that customers directly perceive, such as quality, defect reduction, and responsiveness, thereby contributing to more consistent and reliable offerings (Wadho & Chaudhry, 2024). The commercial success of innovation largely depends on a firm's ability to understand the market and translate innovations into value propositions that customers recognize and appreciate (Dwivedi & Pawsey, 2023; Rubio-Andrés et al., 2024).

Growth

Business growth encompasses expansion into new markets, increased business operations and capabilities, diversification, and employment generation. Among MSMEs, innovation can support these processes by strengthening expansion and adaptation capabilities; however, its effects on growth do not occur automatically (Kobusingye et al., 2026; Korosteleva et al., 2025). Evidence indicates that the relationship between innovation and performance depends on the quality of the innovations introduced and a firm's ability to translate them into market outcomes through effective marketing capabilities (Nathan & Rosso, 2022; Rubio-Andrés et al., 2024). Product and marketing innovations contribute to growth when they generate sustainable market opportunities and receive adequate organizational support (Dwivedi & Pawsey, 2023; Nathan & Rosso, 2022).

Relationship Between Innovation and Organizational Performance

The relationship between innovation and organizational performance generally exhibits a positive pattern, although its magnitude and characteristics vary according to the innovation modality, complementary capabilities, business strategy, and performance dimension under consideration. Product and process innovations may exert different influences on operational, commercial, economic, and organizational outcomes. Furthermore, combining different innovative practices may generate either complementary or substitution effects (Bogetoft et al., 2024; Larios-Francia & Ferasso, 2023; Zhang, 2022).

This relationship also depends on an organization's ability to transform resources and knowledge into new forms of value creation. Business model innovation, marketing capabilities, and coordination between technological and organizational innovations can strengthen the conversion of innovation activities into business outcomes (Merín-Rodrigáñez et al., 2024; Rubio-Andrés et al., 2024; Vahter & Vadi, 2024). In creative and artisanal sectors, learning, networks, and innovation capabilities also exhibit positive associations with organizational performance (Anjaningrum et al., 2024; Shafi et al., 2025).

Methodology

Context, Research Design, and Unit of Analysis

The study was conducted in the Central Valleys of Oaxaca, Mexico, using a quantitative approach and a non-experimental, cross-sectional design (Wang & Cheng, 2020), with descriptive and correlational scopes (Saunders et al., 2023). The analysis focused on artisanal MSMEs located in San Bartolo Coyotepec, Santa María Atzompa, San Martín Tilcajete, San Antonio Arrazola, Santo Tomás Jalieza, San Antonino Castillo Velasco, Ocotlán de Morelos, Teotitlán del Valle, San Pablo Villa de Mitla, and Santa Ana del Valle. These enterprises primarily engage in textile production, pottery, wood carving, alebrije making, embroidery, and knife making. The owner or person responsible for each establishment served as the key informant, given their direct involvement in decisions concerning production, marketing, organization, resource acquisition, and administration. Accordingly, the variables primarily reflect perceived organizational innovation and performance.

Population and Sample

The target population comprised 2,688 artisanal MSMEs, identified primarily through the National Statistical Directory of Economic Units (Directorio Estadístico Nacional de Unidades Económicas, DENUE), maintained by the National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía, INEGI, 2024). The finite population sample size formula provided a reference sample size, following established principles of sample design for populations of known size (Lohr, 2021):

$$n = (N Z^2 p q) / [e^2 (N - 1) + Z^2 p q]$$

The following parameters were considered: N = 2,688, a 95% confidence level, Z = 1.96, p = q = .50, and a reference margin of error of e = .05. The calculation yielded approximately 337 economic units. This calculation served exclusively to establish the reference sample size, as the actual selection process relied on non-probability quota sampling with proportional allocation.

In addition to the finite population sample size calculation, sample size adequacy was assessed for the multiple regression models. Given N = 337, four predictors, $\alpha = .05$, and a small effect size of $f^2 = .05$, the estimated statistical power reached approximately $1 - \beta = .923$, exceeding the conventional .80 threshold. This analysis provides supplementary justification for the sample size's ability to detect small effects in models involving four predictors (Faul et al., 2009).

$$n_h = (N_h / N) n$$

Proportional allocation preserved approximately the relative weight of each community within the target population. However, within each quota, units were included according to their availability; therefore, no individual random selection took place. In non-probability samples, the absence of known inclusion probabilities limits population-level inference and requires caution when generalizing findings to units with similar contextual characteristics (Andrade, 2021). Table 1 presents the distribution of the population and sample across the communities.

Table 1. Distribution of the Population and Sample by Community

Community	**Artisanal activity**	**Population**	**Quota**
San Bartolo Coyotepec	Black clay pottery	135	17
Santa María Atzompa	Green glazed pottery	437	55
San Martín Tilcajete	Wood carving and alebrijes	177	22
San Antonio Arrazola	Wood carving and alebrijes	35	4
Santo Tomás Jalieza	Backstrap loom textiles	145	18
San Antonino Castillo Velasco	Traditional embroidery and textiles	20	3
Ocotlán de Morelos	Knife making, embroidery, and polychrome pottery	35	4
Teotitlán del Valle	Wool textiles and handwoven rugs	742	93
San Pablo Villa de Mitla	Textiles and handcrafted fabrics	754	95
Santa Ana del Valle	Textiles and loom weaving	208	26
Total		2,688	337

Source: Authors' own elaboration.

Operationalization of Variables

Operationalization involves translating theoretical concepts into measurable dimensions, indicators, and items. Using multiple indicators enables researchers to represent complex constructs through distinct dimensions that can be observed and assessed through specific items (DeVellis & Thorpe, 2021). In this study, variable operationalization drew on the conceptual definitions identified through the literature review.

Innovation was defined as the extent to which artisanal MSMEs had implemented changes, improvements, or new practices in their products, production processes, marketing strategies, and organizational arrangements over the previous three years. Product innovation encompassed the development of new products, improvements in product design, the incorporation of new materials or inputs, diversification of artisanal offerings, and product adaptation to market requirements.

Process innovation included improvements in production methods, the adoption of tools and technology, optimization of raw material utilization, reductions in production time, and enhancements to quality control. Marketing innovation covered the implementation of new promotional strategies, the use of social media and new digital platforms for commercialization, the adoption of new marketing channels, innovations in product design and presentation, and the development of strategies to access new markets. Organizational innovation encompassed the implementation of new management practices, improvements in work organization, employee training and skills development, stronger internal communication and coordination, and the development of partnerships or collaborative networks with other organizations.

Organizational performance, in turn, was operationally defined as the level of outcomes perceived by artisanal MSMEs in terms of productivity, sales, profitability, customers, and growth over the previous three years. Productivity encompassed production efficiency, production process quality, and order fulfillment. Sales incorporated sales growth, commercial diversification, and market expansion. Profitability covered economic profitability, financial liquidity, and reinvestment capacity. The customer dimension included customer acquisition, customer loyalty, satisfaction, and recommendations. Finally, growth encompassed production growth, organizational growth, and commercial expansion.

Instrument Development and Administration

Data were collected through a structured questionnaire developed deductively from the conceptual definitions, dimensions, and indicators of the study variables. When constructing measurement scales, researchers must ensure consistency among construct definitions, their underlying dimensions, and the items used to represent them (DeVellis & Thorpe, 2021). The initial version comprised 60 items: 34 measuring innovation and 26 measuring organizational performance. Respondents rated each item on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Participants assessed changes and outcomes within their economic units over the previous three years. The questionnaire was administered directly to

owners or managers familiar with the operations of their respective MSMEs and completed independently in Spanish. All participants spoke Spanish; therefore, neither translation into other languages nor linguistic clarification proved necessary.

Fieldwork took place between February and June 2026. The research team contacted 558 economic units, of which 337 participated, yielding a response rate of 60.39%; the remaining 221 units did not participate (39.61%). To classify firms by size, the study adopted an operational stratification based on the number of employees: microenterprises (up to 10 employees), small enterprises (11–50 employees), and medium-sized enterprises (51 or more employees within the observed range). These thresholds correspond to the employment component of the classification applicable to the industrial sector (Secretaría de Economía, 2009). The sample comprised 285 microenterprises, 45 small enterprises, and 7 medium-sized enterprises. The number of employees had a mean of 8.36, a median of 3, a standard deviation of 15.27, and a range of 1 to 114.

To distinguish data reduction from the identification of latent constructs, exploratory factor analysis (EFA) based on common factors was conducted using principal axis factoring and oblique Oblimin rotation. The analyses were performed separately for innovation and organizational performance. The following item-retention criteria guided the refinement process: communality below .30, primary factor loading below .40, or a relevant cross-loading when the secondary loading exceeded .30 and the difference between the primary and secondary loadings fell below .20 (Goretzko et al., 2021; Tavakol & Wetzel, 2020).

Item refinement followed an iterative procedure involving the joint examination of communalities, primary factor loadings, cross-loadings, and the conceptual consistency of each indicator with its assigned dimension. Items exhibiting low communalities, insufficient primary loadings, substantial loadings on multiple factors, or conceptual overlap with other indicators were considered for removal. This procedure resulted in the elimination of 12 items, six related to innovation and six related to organizational performance, yielding a final version comprising 48 indicators, as presented in Table 2.

Table 2. Factorial Adequacy

Matrix	Items	Factors	KMO	Bartlett's χ^2	df	Communalities
Innovation (Initial)	34	4	.937	5516.468	561	—
Innovation (Final)	28	4	.932	4763.759	378	.356–.708
Organizational performance (Initial)	26	5	.883	3100.049	325	—
Organizational performance (Final)	20	5	.859	2313.527	190	.352–.651

Note. Bartlett's test of sphericity was statistically significant in all cases ($p < .001$). The initial matrices included the 60 original items, whereas the final matrices correspond to the 48 retained items.

Table 3 presents the ranges of factor loadings and communalities obtained from the final EFA solution using Oblimin rotation. Primary factor loadings ranged from .565 to .834, while secondary loadings remained low, indicating a factor structure that was both interpretable and consistent with the proposed dimensions.

Table 3. EFA with Oblimin Rotation by Dimension

Dimension	Primary factor loading	Maximum secondary loading	Communality
Product	.608–.762	.075	.356–.606
Process	.658–.834	.098	.470–.708
Marketing	.589–.812	.124	.427–.653
Organizational	.594–.772	.130	.396–.542
Productivity	.657–.724	.086	.423–.626
Sales	.584–.796	.080	.400–.647
Profitability	.565–.770	.097	.352–.617
Customers	.639–.813	.145	.455–.651
Growth	.621–.754	.073	.396–.562

Note. EFA = Exploratory Factor Analysis. Oblimin denotes the oblique rotation method.

The internal consistency of the refined instrument was assessed using Cronbach's alpha and McDonald's omega (Table 4). Given the multidimensional nature of the overall composites, stratified alpha was also calculated for innovation and organizational performance.

Table 4. Scale Reliability

Scale	Items	Cronbach's α	McDonald's ω	Stratified α
Product	7	.866	.867	—
Process	7	.915	.916	—
Marketing	7	.894	.895	—
Organizational	7	.861	.862	—
Productivity	3	.747	.750	—
Sales	5	.827	.828	—
Profitability	4	.787	.790	—
Customers	4	.805	.808	—
Growth	4	.793	.794	—
Overall innovation	28	.919	—	.948
Overall organizational performance	20	.847	—	.901

Note. α = Cronbach's alpha; ω = McDonald's omega. Dashes indicate that the corresponding coefficient was not calculated or reported.

Discriminant validity was assessed using the heterotrait–monotrait ratio (HTMT), with .85 serving as a conservative threshold (Table 5). A single Cronbach's alpha coefficient calculated across all 48 items was not considered sufficient evidence of the reliability of the nine dimensions (Hayes & Coutts, 2020). The 36 pairwise HTMT coefficients across dimensions ranged from 0.126 to 0.605. The highest value corresponded to Sales–Profitability (HTMT = 0.605), remaining below the .85 threshold.

Table 5. HTMT Matrix Among the Nine Dimensions

Dimension	**IP**	**IPr**	**IM**	**IO**	**Pdt**	**Ven**	**Ren**	**Cli**	**Cre**
IP	1.000	—	—	—	—	—	—	—	—
IPr	.280	1.000	—	—	—	—	—	—	—
IM	.404	.522	1.000	—	—	—	—	—	—
IO	.439	.348	.570	1.000	—	—	—	—	—
Pdt	.297	.239	.253	.475	1.000	—	—	—	—
Ven	.410	.279	.247	.459	.570	1.000	—	—	—
Ren	.226	.126	.216	.380	.515	.605	1.000	—	—
Cli	.232	.501	.411	.227	.246	.151	.213	1.000	—
Cre	.245	.235	.258	.243	.435	.248	.211	.233	1.000

Note. The lower triangular portion of the matrix is reported. IP = product innovation; IPr = process innovation; IM = marketing innovation; IO = organizational innovation; Pdt = productivity; Ven = sales; Ren = profitability; Cli = customers; Cre = growth. All 36 HTMT values fell below the .85 threshold; the highest value corresponded to Sales–Profitability (.605).

Statistical Analysis Strategy

Means, medians, standard deviations, skewness, and kurtosis were calculated. The distribution of process innovation was examined specifically in terms of skewness, kurtosis, and the identification of outliers using the 1.5 interquartile range rule. Subsequently, two-tailed Pearson correlations were estimated between the four innovation dimensions and the five organizational performance dimensions. Given the 20 innovation–performance comparisons, the Bonferroni correction was applied ($\alpha = .05/20 = .0025$). Since hypotheses H1a–H1d were formulated in terms of the relationship between each type of innovation and the performance components, their testing relied on these correlations adjusted for multiple comparisons. A hypothesis received support when all five associations predicted for a given type of innovation exceeded the adjusted significance threshold; support was considered partial when one or more associations did not meet this criterion. Multiple regression analyses were used as a complementary approach to examine the unique contribution of each type of innovation while simultaneously controlling for the others, rather than to redefine the hypothesis-testing criterion post hoc.

To address the multidimensional research objective, five multiple linear regression models were estimated. In each model, product, process, marketing, and organizational innovation were simultaneously included as predictors, while productivity, sales, profitability, customers, and growth were alternately analyzed as dependent variables. Multicollinearity was assessed using the

variance inflation factor (VIF); linearity, using the RESET test; homoscedasticity, using the Breusch–Pagan test; residual distribution, using the Jarque–Bera test; and influential observations, using Cook's distance. Given that the firms were grouped into only ten communities and that cluster sizes were unbalanced, conventional cluster-robust standard error inference was not used as the primary criterion.

Following the alternative recommended for this scenario, the main models incorporated community fixed effects and HC3 heteroskedasticity-consistent standard errors. Thus, the coefficients for the innovation dimensions can be interpreted while controlling for average differences across communities, and statistical inference does not rely on the asymptotic approximation associated with only ten clusters (Cameron et al., 2008; Roodman et al., 2019). To maintain a consistent approach to controlling the familywise error rate, the 20 innovation–performance coefficients from the multiple regression models were evaluated using the same Bonferroni criterion applied to the correlations ($\alpha = .05/20 = .0025$). Table 8 reports both the unadjusted HC3 p-values and the Bonferroni-adjusted p-values.

Ethical Considerations and Methodological Scope

Participation was voluntary, and before administering the questionnaire, participants were informed of the academic purpose of the study. The information collected was used to analyze the relationship between innovation and organizational performance in the economic units examined. The interpretation of the findings takes into account three limitations. First, the variables rely primarily on the perceptions of owners or managers. Second, the non-probability sampling approach limits the statistical generalizability of the findings to the entire population (Andrade, 2021). Third, the cross-sectional design precludes establishing temporal precedence or causal relationships (Wang & Cheng, 2020).

Results

General Sample Characteristics

The analysis drew on data from 337 artisanal MSMEs located in ten communities across the Central Valleys of Oaxaca. San Pablo Villa de Mitla accounted for the largest share of participating enterprises, with 95 economic units (28.19%), followed by Teotitlán del Valle, with 93 (27.60%), and Santa María Atzompa, with 55 (16.32%). Together, these three communities accounted for 243 of the 337 units analyzed, representing 72.11% of the sample.

Territorial diversity was accompanied by a marked concentration of productive activities. For descriptive purposes, activities were grouped according to each enterprise's main artisanal activity. The textile category included loom-woven products and embroidery; the pottery/clay category comprised units whose main activity involved clay products; and the other activities category primarily included wood carving, alebrije making, and knife making. Within this classification, 70.33% of the units engaged in textile activities, while 21.66% were involved in pottery and clay products. Firm age ranged from three to 24 years, with a mean of 10.17 years

and a median of nine years. A total of 80.12% of the units had been operating for up to 15 years, allowing the sample to include both established businesses and younger enterprises.

Regarding respondent characteristics, owners completed 293 questionnaires (86.94%), while managers or other individuals in charge completed the remaining 44 (13.06%). The high proportion of owner respondents is relevant because owners typically participate in decisions concerning production, innovation, marketing, organization, and administration.

Descriptive Results

Table 6 presents the descriptive statistics for the dimensions of both variables. Product innovation had the highest mean among the innovation types (M = 3.574), whereas process innovation had the lowest mean (M = 3.417) and the greatest dispersion (SD = 1.012). For process innovation, skewness was −.236 and kurtosis was −.827; the 1.5 interquartile range rule identified no outliers. To examine whether this dispersion might reflect territorial differences, means were also calculated by community (Table 7). These ranged from 3.036 to 3.905 and showed gradual variation across communities, with no clear-cut dichotomous pattern. Nevertheless, results for communities with very small sample sizes should be interpreted with caution. Among the organizational performance components, productivity had the highest mean (M = 3.671), whereas growth had the lowest (M = 3.426).

Table 6. Descriptive Statistics for the Dimensions

Dimension	Items	Mean (M)	Median (Md)	Standard Deviation (SD)	Skewness	Kurtosis	IQR Outliers
Product	7	3.574	3.571	0.658	−0.165	−0.462	1
Process	7	3.417	3.429	1.012	−0.236	−0.827	0
Marketing	7	3.482	3.429	0.722	−0.075	−0.492	1
Organizational	7	3.453	3.429	0.635	−0.166	−0.341	1
Productivity	3	3.671	3.667	0.652	−0.154	−0.046	12
Sales	5	3.549	3.600	0.647	−0.083	−0.146	5
Profitability	4	3.571	3.500	0.684	−0.280	0.061	7
Customers	4	3.578	3.500	0.710	−0.243	−0.179	8
Growth	4	3.426	3.500	0.665	−0.011	−0.212	0

Table 7. Process Innovation by Community

Community	n	M	SD	Md
San Bartolo Coyotepec	17	3.454	0.700	3.286
Santa María Atzompa	55	3.608	1.030	3.714
San Martín Tilcajete	22	3.396	0.915	3.357
San Antonio Arrazola	4	3.536	1.133	3.714

Santo Tomás Jalieza	18	3.730	1.186	4.071
San Antonino Castillo Velasco	3	3.905	0.733	3.714
Ocotlán de Morelos	4	3.036	0.732	2.929
Teotitlán del Valle	93	3.355	1.118	3.571
San Pablo Villa de Mitla	95	3.352	0.955	3.286
Santa Ana del Valle	26	3.236	0.976	3.214

Note. M = mean; SD = standard deviation; Md = median. Community means ranged from 3.036 to 3.905. The variation was gradual and, in itself, did not reveal a clear-cut dichotomous pattern. Results for groups with n = 3 or n = 4 should be interpreted with particular caution. Add an overall sample totalExplain the measurement scale

Correlation Analysis

Pearson's correlation coefficient was used to examine the direction and magnitude of the linear associations between the innovation and organizational performance dimensions. Interpretation considered the sign, magnitude, and statistical significance of the coefficients jointly, avoiding causal inferences from the observed associations (Schober et al., 2018).

Table 8 presents the correlations between the dimensions of both variables. Of the 20 associations examined, 19 were positive and statistically significant after applying the Bonferroni correction. The largest numerical association was between process innovation and customers ($r = .430$, $p < .001$). For the association between process innovation and profitability, the unrounded coefficient in the dataset was $r = .10679$, and its exact two-tailed p-value was $p = .05014$. Therefore, this association was not statistically significant, either before or after the correction. Correlations among the innovation dimensions themselves were moderate (Table 9), ranging from .249 to .499, which did not suggest extreme multicollinearity.

Table 8. Correlations Between Innovation and Organizational Performance Dimensions

Innovation Dimension	Productivity	Sales	Profitability	Customers	Growth
Product	0.241***	0.348***	0.187***	0.196***	0.203***
Process	0.197***	0.243***	0.107	0.430***	0.200***
Marketing	0.207***	0.212***	0.179***	0.350***	0.218***
Organizational	0.381***	0.387***	0.315***	0.188***	0.201***

Note. Pearson correlation coefficients. *** $p < .001$ indicates the unadjusted two-tailed p-value. The Bonferroni-adjusted significance threshold for the family of 20 innovation–performance comparisons is $p < .0025$. For process innovation–profitability, $r = .10679$ and $p = .05014$.

Table 9. Correlations Among the Innovation Dimensions

Dimension	Product	Process	Marketing	Organizational
Product	1.000	.249***	.356***	.379***
Process	.249***	1.000	.472***	.308***
Marketing	.356***	.472***	1.000	.499***
Organizational	.379***	.308***	.499***	1.000

Note. Two-tailed Pearson correlation coefficients. *** $p < .001$.

Multiple Linear Regression Analysis

To determine the joint contribution of the different types of innovation to organizational performance, five multiple linear regression models were estimated (Field, 2024). In each model, product, process, marketing, and organizational innovation were included as predictor variables, while productivity, sales, profitability, customers, and growth were alternately specified as dependent variables. Table 10 presents the overall fit of these models.

Table 10. Overall Model Fit with Community Fixed Effects and HC3 Inference

Dependent Variable	Overall R^2	ΔR^2 (Innovation)	HC3 F (4, 323)	p
Productivity	.177	.156	13.704	< .001
Sales	.228	.204	18.793	< .001
Profitability	.150	.104	8.060	< .001
Customers	.227	.216	24.885	< .001
Growth	.102	.079	6.077	< .001

The four innovation predictors were jointly statistically significant in all five models after controlling for average differences across communities through fixed effects (HC3 robust F-tests, $p < .001$). Overall R^2 was highest for sales (.228) and customers (.227). To isolate the contribution of innovation from territorial effects, the increase in R^2 associated with the four innovation dimensions was also calculated relative to a model including community fixed effects only: $\Delta R^2 = .216$ for customers, .204 for sales, .156 for productivity, .104 for profitability, and .079 for growth. These results indicate a stronger joint contribution to customers and sales, and a more limited contribution to growth.

The overall statistical significance of the models does not imply that all four types of innovation make statistically significant unique contributions in every case. Accordingly, Table 11 reports the estimated coefficients controlling for community fixed effects, their HC3 standard errors, and the Bonferroni-adjusted p-values for the family of 20 innovation–organizational performance coefficients.

Table 11. Regression Coefficients with Community Fixed Effects and HC3 Standard Errors

Dependent Variable	Predictor	B	HC3 SE	β	t	HC3 p	Bonferroni p	VIF	Decision
Productivity	Constant	2.044	.251	—	8.134	< .001	—	—	—
Productivity	Product	.102	.057	.103	1.791	.074	1.000	1.260	No
Productivity	Process	.056	.038	.086	1.447	.149	1.000	1.336	No
Productivity	Marketing	−.033	.054	−.037	−0.616	.538	1.000	1.653	No
Productivity	Organizational	.342	.058	.333	5.882	< .001	< .001	1.461	Yes
Sales	Constant	1.675	.235	—	7.130	< .001	—	—	—
Sales	Product	.211	.056	.215	3.793	< .001	.004	1.260	Yes
Sales	Process	.091	.035	.142	2.585	.010	.203	1.336	No
Sales	Marketing	−.066	.058	−.074	−1.145	.253	1.000	1.653	No
Sales	Organizational	.305	.066	.299	4.642	< .001	< .001	1.461	Yes
Profitability	Constant	2.278	.267	—	8.548	< .001	—	—	—
Profitability	Product	.070	.062	.068	1.142	.254	1.000	1.260	No
Profitability	Process	−.002	.041	−.002	−0.038	.970	1.000	1.336	No
Profitability	Marketing	.024	.060	.025	0.396	.692	1.000	1.653	No
Profitability	Organizational	.305	.070	.283	4.369	< .001	< .001	1.461	Yes
Customers	Constant	2.061	.242	—	8.501	< .001	—	—	—
Customers	Product	.051	.064	.047	0.804	.422	1.000	1.260	No
Customers	Process	.236	.045	.337	5.243	< .001	< .001	1.336	Yes
Customers	Marketing	.188	.060	.191	3.130	.002	.038	1.653	Yes
Customers	Organizational	−.018	.070	−.016	−0.251	.802	1.000	1.461	No
Growth	Constant	2.231	.272	—	8.215	< .001	—	—	—
Growth	Product	.110	.061	.109	1.803	.072	1.000	1.260	No
Growth	Process	.074	.039	.112	1.912	.057	1.000	1.336	No
Growth	Marketing	.065	.061	.071	1.069	.286	1.000	1.653	No
Growth	Organizational	.104	.066	.100	1.572	.117	1.000	1.461	No

Note. The models include community fixed effects, whose coefficients are omitted for parsimony. HC3 SE = HC3 heteroskedasticity-consistent standard error. Bonferroni p = HC3

p-value adjusted for 20 comparisons. A "Yes" decision indicates HC3 $p < .0025$ (equivalent to Bonferroni $p < .05$).

The coefficient analysis revealed a selective pattern. After controlling for community fixed effects and applying HC3 standard errors with the Bonferroni correction, organizational innovation retained positive associations with productivity ($\beta = .333$, $p < .001$), sales ($\beta = .299$, $p < .001$), and profitability ($\beta = .283$, $p < .001$). Product innovation showed an independent association with sales ($\beta = .215$, $p = .00018$; Bonferroni-adjusted $p = .0035$). Process innovation exhibited a robust association with customers ($\beta = .337$, $p < .001$), whereas its association with sales no longer met the adjusted significance threshold ($p = .010$). Finally, marketing innovation was associated with customers ($\beta = .191$, $p = .00191$; Bonferroni-adjusted $p = .038$). None of the innovation types showed a statistically significant unique contribution to growth.

Accordingly, individual inferences are based on models incorporating community fixed effects and HC3 standard errors. Applying the same Bonferroni criterion to both correlation and regression analyses ensures that statistical significance does not depend on different decision rules across the two analyses. It also eliminates the apparent significance of the process innovation–sales association observed with some conventional cluster-robust standard errors.

Furthermore, the variance inflation factors for the four innovation dimensions in the fixed-effects models were low (VIF = 1.260–1.653), indicating no relevant multicollinearity concerns. The main diagnostics concerning model specification, heteroscedasticity, residual distribution, and influential observations are presented in Table 12.

Table 12. Diagnostics for Models with Community Fixed Effects

Dependent Variable	RESET F	p	Breusch–Pagan F	p	Jarque–Bera χ^2	p	Maximum Cook's D
Productivity	2.973	.086	1.333	.192	1.746	.418	.172
Sales	2.705	.101	.937	.514	5.721	.057	.106
Profitability	.630	.428	1.078	.378	2.134	.344	.130
Customers	2.756	.098	.735	.728	7.757	.021	.041
Growth	.043	.837	.857	.599	1.218	.544	.148

Note. Diagnostics correspond to models with community fixed effects. Neither the RESET nor the Breusch–Pagan test was statistically significant in any of the five models. Maximum Cook's D represents the highest observed value.

The diagnostic tests revealed no evidence of functional misspecification or heteroscedasticity: the RESET and Breusch–Pagan tests yielded p-values greater than .05 across all five models. The Jarque–Bera test was not statistically significant for productivity, sales, profitability, or growth; however, it indicated a departure from normality for customers ($\chi^2 = 7.757$, $p = .021$). Given that the primary inference relied on HC3 standard errors and a sample of 337 observations, this deviation was not treated as a mechanical prerequisite for coefficient validity. Maximum Cook's distances ranged from .041 to .172. None approached the conventional threshold of 1, although individual observation influence was considered when interpreting the results.

Sensitivity Analysis

To assess the stability of the results obtained from the main models, a sensitivity analysis was conducted by adding MSME age to the models incorporating community fixed effects and HC3 standard errors. Firm size was not included as an additional control because the sample was heavily concentrated in microenterprises and its operational classification derived directly from the number of employees. Moreover, artisanal activity exhibited a strong correspondence with the communities under study.

Table 13 presents the coefficients for the four innovation dimensions and firm age. The p-values are based on HC3 standard errors. The Bonferroni threshold of .0025 remains the reference criterion for the four innovation dimensions, whereas firm age is included as a control variable and does not form part of the family of 20 comparisons.

Table 13. Sensitivity Analysis with Community Fixed Effects, HC3 Standard Errors, and Firm Age

Dependent Variable	R^2	Product B (p)	Process B (p)	Marketing B (p)	Organizational B (p)	Firm Age B (p)
Productivity	.177	.103 (.074)	.057 (.142)	−.035 (.519)	.342 (< .001)	.003 (.656)
Sales	.230	.210 (< .001)	.089 (.012)	−.064 (.274)	.305 (< .001)	−.005 (.456)
Profitability	.155	.072 (.243)	.002 (.969)	.018 (.761)	.305 (< .001)	.010 (.190)
Customers	.228	.051 (.422)	.237 (< .001)	.187 (.002)	−.017 (.803)	.001 (.874)
Growth	.104	.110 (.070)	.076 (.052)	.062 (.317)	.105 (.117)	.007 (.373)

The sensitivity analysis reproduced the main pattern: organizational innovation remained associated with productivity, sales, and profitability; product innovation with sales; process innovation with customers; and marketing innovation with customers. Firm age did not reach statistical significance in any of the five models using HC3 standard errors. Therefore, including this covariate did not substantially alter the direction or pattern of the main associations.

These findings indicate that the main associations cannot be explained solely by average differences across communities or by firm age. Nevertheless, the territorial structure remains a relevant characteristic of the sample, and the fixed effects control only for observable average differences at the community level. Accordingly, the interpretation should continue to account for the territorial heterogeneity of artisanal MSMEs.

Hypothesis Testing

Since hypotheses H1a–H1d were formulated as relational hypotheses, they were tested using bivariate correlations adjusted for multiple comparisons through the Bonferroni correction, in accordance with the criterion established in the statistical analysis strategy (Table 14). Multiple regression models and the sensitivity analysis are interpreted as complementary analyses of unique contributions and result stability, respectively, but they do not retrospectively alter the hypothesis-testing criterion.

Table 14. Hypothesis Testing

Hypothesis	Result	Interpretation
H1a. Product innovation	Supported	All five product innovation–performance associations were positive and exceeded the Bonferroni-adjusted significance threshold.
H1b. Process innovation	Partially supported	Four of the five associations exceeded the Bonferroni-adjusted significance threshold; the process innovation–profitability association did not.
H1c. Marketing innovation	Supported	All five marketing innovation–performance associations were positive and exceeded the Bonferroni-adjusted significance threshold.
H1d. Organizational innovation	Supported	All five organizational innovation–performance associations were positive and exceeded the Bonferroni-adjusted significance threshold.

Note. "Supported" indicates that all five hypothesized associations exceeded the Bonferroni-adjusted significance threshold; "partially supported" indicates that at least one hypothesized association did not meet this threshold.

Overall, the hypothesis testing results indicate that H1a, H1c, and H1d were supported by the Bonferroni-adjusted correlations, whereas H1b received partial support due to the process innovation–profitability association. The multiple regression models provide complementary insights by showing that the unique contributions of the different types of innovation are more selective than their bivariate associations.

Discussion

The findings indicate that the relationship between innovation and organizational performance is positive, although heterogeneous. The bivariate evidence identifies associations across virtually all combinations of dimensions, whereas the multiple regression models reveal that several of these associations share variance with other types of innovation. This supports the value of examining innovation as a multidimensional phenomenon rather than as a single index (Bogetoft et al., 2024; Vahter & Vadi, 2024; Zhang, 2022).

From the Resource-Based View, this pattern suggests that outcomes depend not merely on the accumulation of innovative practices but also on how resources are organized and combined (Barney, 1991; Li et al., 2023). Organizational innovation retained unique associations with productivity, sales, and profitability, even after simultaneously accounting for product, process, and marketing innovation. This finding aligns with dynamic capabilities theory, which posits that resource coordination and reconfiguration can facilitate the conversion of other capabilities into organizational outcomes (Teece et al., 1997; Saeedikiya et al., 2024).

Product innovation showed a particularly consistent association with sales. In artisanal enterprises, changes in design, materials, functionality, or presentation can enhance the value proposition without necessarily displacing traditional techniques. These findings are consistent

with studies linking high-quality product innovations to improved market outcomes (Nathan & Rosso, 2022; Rubio-Andrés et al., 2024).

Process innovation yielded the most distinctive finding: its association with customers was the strongest among the 20 correlations examined, whereas its association with profitability did not meet the significance threshold after adjustment for multiple comparisons. In the multiple regression model, process innovation retained a marked association with customers. One plausible interpretation is that production improvements first become apparent through attributes that customers can perceive, such as consistency, quality, fulfillment, and responsiveness, before translating into financial outcomes. However, the EFAs for innovation and organizational performance were estimated separately; therefore, their cross-loadings cannot directly assess potential overlap between process-related and customer-related indicators. HTMT provides the relevant evidence for distinguishing the dimensions, with all values remaining below .85. Nevertheless, some degree of semantic overlap between quality control and customer satisfaction cannot be entirely ruled out.

This finding partially diverges from the expectation developed in the literature review, where process innovation was primarily associated with improvements in efficiency and productivity. Although the bivariate association between process innovation and productivity was positive, its unique contribution did not remain statistically significant in the model with community fixed effects and HC3 standard errors ($\beta = .086$; $p = .149$), whereas its association with customers remained robust ($\beta = .337$; $p < .001$). In the artisanal context, this suggests that process improvements may first be reflected in market-perceived attributes—quality, consistency, fulfillment, and responsiveness—rather than in independent productivity gains once the other types of innovation are taken into account. This divergence qualifies the theoretical expectation and reinforces the need to examine multidimensional outcomes (Bogetoft et al., 2024; Wadho & Chaudhry, 2024).

Marketing innovation maintained bivariate associations with all five performance components, but its independent contribution in the multiple regression models was more evident for customers. This finding aligns with the role of marketing as a mechanism for connecting with the market and communicating cultural attributes such as provenance, authenticity, and territorial identity (Dwivedi & Pawsey, 2023; Nguyen & Phan, 2025; Roy & Mohapatra, 2023).

Growth was the performance component with the lowest proportion of variance explained by the four types of innovation. This finding suggests that business expansion likely depends on additional factors, including access to financing, human capital, networks, demand, and the characteristics of artisanal activities. Therefore, higher levels of innovation should not be assumed to automatically generate business growth.

Overall, the evidence supports a perspective in which tradition and innovation can coexist. Traditional knowledge, techniques, and territorial reputation constitute strategic resources that can be selectively reconfigured alongside modern technologies, marketing channels, and organizational practices, without requiring the indiscriminate replacement of artisanal processes (Harsanto et al., 2026; Krismajayanti et al., 2026).

Conclusions

The findings of this study indicate that the relationship between innovation and organizational performance among artisanal MSMEs in the Central Valleys of Oaxaca is positive, although it varies across innovation types and organizational performance components. The multidimensional analysis identified 19 positive and statistically significant associations out of the 20 bivariate associations examined after applying the Bonferroni correction. The strongest association emerged between process innovation and the customer dimension ($r = .430$), whereas the relationship between process innovation and profitability was the only one that did not reach statistical significance. These findings suggest that the innovation–organizational performance relationship should be understood as a set of specific associations between innovative capabilities and organizational outcomes, rather than as a uniform relationship between two aggregate variables.

Multiple regression models with community fixed effects and HC3 standard errors showed that unique contributions were more selective than bivariate associations. Organizational innovation exhibited the most consistent pattern, with positive associations with productivity, sales, and profitability. Product innovation was associated with sales; process innovation stood out for its relationship with customers; and marketing innovation showed a specific contribution to customers. The process innovation–sales association did not meet the Bonferroni-adjusted significance threshold under HC3 inference. By contrast, none of the innovation types made a statistically significant unique contribution to growth, suggesting that MSME expansion also depends on resources and conditions beyond the innovative practices examined.

From a theoretical perspective, the findings align with the Resource-Based View and the dynamic capabilities approach. In artisanal enterprises, the value of innovation depends not only on introducing new products, processes, or marketing channels but also on the organization's ability to coordinate, combine, and reconfigure resources. Thus, organizational innovation may function as an enabling capability that facilitates the transformation of knowledge, traditional practices, business relationships, and productive resources into business outcomes.

Finally, the sensitivity analysis indicated that adding firm age to the models with community fixed effects and HC3 standard errors did not substantially alter the overall pattern of associations. Firm age was not statistically significant in any of the five models. However, given the cross-sectional design, non-probability sampling, and perceptual nature of the measurements, the findings should be interpreted as statistical associations rather than causal relationships. The study's main contribution lies in showing that the performance of artisanal MSMEs relates differently to distinct innovation capabilities and that its analysis requires the simultaneous consideration of productive, commercial, economic, and organizational dimensions.

Implications, Limitations, and Future Research

The findings have both theoretical and managerial implications. From a theoretical perspective, the results support the value of examining innovation as a multidimensional phenomenon. The evidence shows that product, process, marketing, and organizational innovations do not relate in the same way to productivity, sales, profitability, customers, and growth. In particular, organizational innovation supports the view that certain internal capabilities facilitate the development and effective use of other forms of innovation. Therefore, relying exclusively on aggregate innovation and performance indices may obscure key mechanisms underlying how MSMEs transform their resources and knowledge into organizational outcomes.

From a managerial perspective, the findings suggest replacing the general recommendation to "innovate more" with an innovation strategy aligned with specific objectives. If the goal is to increase sales, product innovations and certain organizational improvements appear particularly relevant. To improve customer acquisition, satisfaction, or relationships, process and marketing innovations show clearer associations. When the objective involves simultaneously strengthening productive, commercial, and economic outcomes, organizational capabilities become essential. Nevertheless, the limited explanatory power of growth suggests that innovation alone does not guarantee business expansion and must be complemented by other capabilities and resources.

In artisanal enterprises, these implications require consideration of the cultural dimension of production. The adoption of digital tools, new marketing channels, or operational improvements should proceed selectively, ensuring that new capabilities complement rather than replace traditional knowledge, artisanal techniques, territorial reputation, and attributes of authenticity. Accordingly, support strategies for artisanal MSMEs could benefit from combining organizational training, business development, digitalization, and process improvements with mechanisms that protect and enhance their productive and cultural heritage.

The findings should be interpreted in light of several limitations. First, the cross-sectional design precludes establishing temporal precedence and, consequently, does not allow causal inferences. Second, non-probability quota sampling limits the statistical generalizability of the findings to all artisanal MSMEs in the Central Valleys of Oaxaca. Third, both innovation and organizational performance were assessed primarily through the perceptions of owners or managers, which may introduce common method bias, social desirability bias, or recall errors associated with the three-year reference period. Fourth, although the instrument's internal structure yielded favorable exploratory results, its evaluation relied on EFA conducted using a single sample; therefore, the factor structure requires independent confirmation. The EFAs for innovation and organizational performance were estimated separately, meaning that the resulting cross-loadings cannot directly assess potential overlap between items from the two blocks. HTMT values provided favorable evidence of discriminant validity among the dimensions, but they do not entirely rule out semantic overlap between certain indicators. Finally, because the ten communities constitute a small number of unbalanced clusters, conventional cluster-robust inference was not used as the primary criterion. Instead, community fixed effects and HC3 standard errors were employed. This approach controls for average differences across

communities but does not eliminate all possible forms of territorial dependence; therefore, community-level heterogeneity should be interpreted with caution.

In light of these limitations, future research should employ longitudinal designs to examine the temporal sequence between innovation adoption and changes in organizational performance. Researchers should also complement perceptual assessments with objective indicators of sales, profitability, productivity, employment, and growth, while incorporating multiple informants per firm. The measurement structure should be evaluated through confirmatory factor analysis using an independent sample, and measurement invariance should be examined across communities, types of artisanal activity, and firm sizes.

Furthermore, a particularly relevant research avenue involves assessing whether organizational innovation acts as a mediating variable or an enabling capability linking product, process, and marketing innovations to different dimensions of performance. Future studies could employ structural equation models and multilevel designs to simultaneously examine firm-level and territorial effects. It would also be relevant to incorporate variables such as digitalization, human capital, business cooperation, access to financing, entrepreneurial orientation, business networks, and the characteristics of each artisanal activity. Finally, longitudinal research could determine whether certain innovations generate sequential outcomes—for example, initial improvements in quality, customer outcomes, or productivity that subsequently translate into greater profitability and growth.

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