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Lean Management and Entrepreneurial Competencies on Business Resilience of Micro and Small Enterprises

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ABSTRACT

This study investigates the influence of lean management practices and entrepreneurial competencies on the business resilience of micro and small enterprises (MSEs) in the third district of Bukidnon, Philippines. Recognizing MSEs as vital contributors to the local economy yet vulnerable to operational challenges and external disruptions, the research aims to understand how these firms adapt and sustain growth amid adversity. Employing a quantitative approach, data were collected from 400 MSE owners across eight municipalities through a structured questionnaire measuring business profile, lean management dimensions, entrepreneurial competencies, and resilience factors. Findings reveal that most MSEs are micro-sized, sole proprietorships engaged primarily in retail, with a majority operating for less than ten years. Lean management practices are highly adopted, particularly in process efficiency, standardization, and waste minimization. Similarly, entrepreneurial competencies are demonstrated at a considerable level among respondents. The study establishes a significant positive relationship between lean management, entrepreneurial competencies, and business resilience, highlighting the critical role of optimized operations and owner skills in enhancing adaptive capacity and vulnerability management. These insights underscore the importance of tailored support programs that foster lean practices and entrepreneurial development to improve the sustainability and resilience of MSEs in resource-constrained, rural settings. Recommendations include promoting continual improvement initiatives and capacity-building interventions targeting emerging enterprises to strengthen their survivability and growth prospects.

INTRODUCTION

Micro, small, and medium enterprises (MSEs) are the backbone of the Philippine economy, yet they often struggle to sustain beyond their first few years due to operational inefficiencies, limited entrepreneurial skills, and uncertain market, which is essential for business resilience. According to the Philippine Statistics Authority (2021), MSMEs comprised 99.5% of all registered business establishments in 2019, generating 63% of total employment and contributing 40% of gross value added to the national economy. Despite their importance, many MSEs struggled to sustain growth due to limited resources, weak access to financing, and constrained market reach (UNDP, 2020; Tabinas *et al.*, 2022).

In crisis situations such as natural disasters, financial downturns, and pandemics, the resilience of these firms to withstand and recover from disruptions, became critical. Resilience is not merely survival but the capacity to adapt and thrive amid adversity (Conz & Magnani, 2020; McManus *et al.*, 2008). This study aligns with the UN's 2030 Agenda, especially SDG 8 (Decent Work and Economic Growth), which promotes MSE formalization, job creation, and inclusive growth through resilient enterprises (United Nations, 2015), alongside SDG 9 (Industry, Innovation, and Infrastructure) and SDG 1 (No Poverty) for poverty alleviation in contexts like the Philippines (UNDP, 2020). Systematic reviews of entrepreneurship education confirm that targeted

competency development programs are among the most effective mechanisms for translating SDG commitments, particularly SDG 8 and SDG 9, into measurable enterprise-level outcomes in developing economies (Achuti & Nyaboga, 2025).

At the global level, micro and small enterprises (MSEs) face acute vulnerability to disruptions in the contemporary business environment. The COVID-19 pandemic led to the closure of over 41.6% of small and medium-sized enterprises worldwide, resulting in a spike in unemployment and a decline in productivity (Bartik *et al.*, 2020). Research shows crises hit hardest those reliant on external funding, due to limited resources and expertise (Erdiaw-Kwasie *et al.*, 2023; Koporcic *et al.*, 2025). A review of 82 studies pinpointed four interconnected challenges: lack of funding, training, education/awareness, and skills with funding as the root cause (Trupp *et al.*, 2025). These patterns highlight that MSE resilience is essential not just for advantage, but for survival.

Philippine MSMEs underpin the economy, comprising 99.5% of the 1,109,684 registered businesses in 2022 and contributing 40% of the GDP (DTI, 2024); yet, they face persistent structural vulnerabilities. Post-COVID recovery has been strained by inflation, peso fluctuations, supply chain disruptions, and rising raw material and lending costs (Bangko Sentral ng Pilipinas, 2023; Carandang, 2023). With 25% of Filipinos below the poverty line, MSE shock absorption is a social protection

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imperative linked to poverty reduction (Nursini, 2020).

At the regional level, Mindanao grapples with socioeconomic issues like high poverty, literacy gaps, stunting, and malnutrition, making rural MSEs vulnerable to shocks, disasters, inflation, and conflicts (Rebollido, 2024). This yields a harsher environment than urban areas with better infrastructure and credit. Resilient MSEs thus anchor household and community stability in rural Mindanao. Provincially, Bukidnon, an agriculture-driven hub with MSEs in wholesale, retail, and services, shows moderately conducive conditions but needs targeted interventions amid variations (Tabinas *et al.*, 2022). Vulnerabilities stem from economic constraints, gender inequality, weak transport/healthcare, and seismic/weather spillover effects (Pacific Disaster Center [PDC], 2021).

Moreover, lean management practices helped businesses optimize resources and eliminate waste, which sought to maximize customer value through practices such as waste reduction, standardized work, and continuous improvement. Empirical studies showed that lean implementation in SMEs leads to improved quality, lower costs, shorter lead times, and enhanced competitiveness, thereby supporting stronger operational performance (Shah & Ward, 2007; Alkhoraiif *et al.*, 2019; Panigrahi *et al.*, 2023). For instance, recent evidence from SME settings indicated that lean bundles were positively associated with both operational and business performance (Minh & Kien, 2021; Tortorella *et al.*, 2025).

Meanwhile, entrepreneurial competencies equipped owners with skills to innovate, calculate risk, and seize opportunities such as resource leveraging, value creation, opportunity recognition, creative problem-solving, and leadership represent the behavioral, cognitive, and relational skills that drive entrepreneurial success (Kyndt & Baert, 2015). These competencies enabled entrepreneurs to identify new opportunities, innovate under pressure, manage uncertainties, make effective decisions, and build supportive networks (Baggen *et al.*, 2018; Sakib *et al.*, 2022). Developing these competencies is therefore essential for entrepreneurs aiming to build resilient and adaptable businesses capable of sustaining growth in dynamic environments.

A research gap persists on how lean management and entrepreneurial competencies shape MSE resilience in the Philippine context, especially rural Bukidnon, where studies often examine them separately rather than linking to resilience (Hadjielias *et al.*, 2022). Amid family-owned, micro, retail-focused firms, exploring internal capabilities for anticipating disruptions, mitigating vulnerabilities, and adapting is crucial. This study operationalizes resilience via McManus *et al.* (2008) dimensions: situational awareness, keystone vulnerability management, and adaptive capacity, grounded in Cohen and Levinthal (1990) Absorptive Capacity Theory. It investigates lean practices and entrepreneurial competencies' contributions to Bukidnon MSE resilience.

LITERATURE REVIEW

Theoretical Framework

This study is anchored on the Model of Relative Overall Resilience developed by McManus *et al.* (2008), the Absorptive Capacity Framework (Cohen & Levinthal, 1990), Lean Management Theory, the 13 Entrepreneurial Competencies Model (Morris *et al.*, 2013), the Great Eight Model (Bartram, 2005), and Dynamic Capabilities Theory (Teece *et al.*, 1997; Teece, 2007). Together, these frameworks explain how lean management practices and entrepreneurial capabilities contribute to the business resilience of micro and small enterprises (MSEs) in Bukidnon.

The McManus *et al.* (2008) model serves as the primary theoretical foundation of this research, as it defines organizational resilience as the ability of a business to survive, adapt, and grow in the face of disruptions. According to this model, resilience is characterized by three interrelated dimensions: situational awareness, keystone vulnerabilities, and adaptive capacity. These three dimensions provide the structural basis for assessing the resilience of MSEs, particularly in a rural and dynamic business environment such as Bukidnon. Complementing this, Absorptive Capacity Theory (Cohen & Levinthal, 1990) defines a firm's ability to acquire, assimilate, and apply external information and resources to support operations and performance, operationalized in this study as the absorption capacity dimension of resilience.

To explain the first independent variable, Lean Management serves as the theoretical foundation for this study because it conceptualizes how organizations can systematically enhance performance by maximizing customer value and minimizing waste through process-focused improvement. Lean thinking, originating from the Toyota Production System and articulated by Womack and Jones (1996), rests on principles such as specifying value from the customer's perspective, identifying the value stream, creating uninterrupted flow, allowing customer demand to pull production or services, and pursuing continuous improvement, which together form a coherent management philosophy rather than a set of isolated tools (Shah & Ward, 2007). Empirical studies in small and medium-sized enterprises (SMEs) show that lean practices such as waste reduction, standardization of work, value stream mapping, and continuous improvement routines are associated with better operational and sometimes business performance, even in resource-constrained settings (Pakdil & Leonard, 2015; Bhamu & Sangwan, 2014; Moraga *et al.*, 2024). Reviews covering both manufacturing and service contexts further indicate that lean principles are transferable beyond large factories, supporting their application to diverse organizations, including micro and small firms, where simplified lean practices can improve efficiency, responsiveness to customer needs, and organizational adaptability (Stone, 2012; Jasti & Kodali, 2015). Thus, Lean Management offers a robust, empirically supported

framework for explaining how structured attention to value, processes, waste, and continuous improvement within micro and small enterprises can contribute to stronger and more resilient business operations.

The second independent variable, Entrepreneurial Competencies, is grounded in the 13 Entrepreneurial Competencies Model (Morris *et al.*, 2013) and the Great Eight Model (Bartram, 2005). Morris *et al.* (2013) conceptualize competencies as the dynamic outcomes of interactions between the individual entrepreneur and their environment, identifying thirteen core competencies, including opportunity recognition, creative problem-solving, resource leveraging, value creation, and resilience, that collectively underpin effective entrepreneurial action and sustained business performance. Martínez-Martínez *et al.* (2020) further validate the competency-based approach in higher education entrepreneurship contexts, confirming that an integrated competency portfolio enables entrepreneurs to navigate uncertainty and persist through adversity.

Dynamic Capabilities Theory (Teece *et al.*, 1997; Teece, 2007) provides a unifying micro-foundational lens, explaining how firms deliberately sense changes, seize opportunities, and reconfigure resources to maintain performance in turbulent environments. In this study, lean management represents a process-based dynamic capability, while entrepreneurial competencies function as individual-level dynamic capabilities. Together, they enable MSEs to continuously reconfigure and reuse resources through lean routines and entrepreneurial skills, allowing enterprises to withstand shocks and adapt to new conditions. Integrating these frameworks establishes that MSEs effectively applying lean management practices and cultivating entrepreneurial competencies are more likely to withstand challenges, recover from disruptions, and sustain long-term growth.

Integrating these theories provided a comprehensive explanation of how internal management practices and individual competencies interact to influence business resilience. The Lean Management framework emphasizes the systematic reduction of waste and the alignment of all organizational activities with customer-defined value through process improvement and continuous learning, while the Entrepreneurial Competencies Model and Great Eight Model focus on the personal and behavioral traits that drive innovation and adaptability. The McManus *et al.* (2008) model and Absorption Capacity Theory, based on Cohen and Levinthal (1990) framework, serve as the unifying framework, linking these variables to the key outcome business resilience, characterized by situational awareness, control of vulnerabilities, absorption capacity, and adaptive capacity. Together, these theories established that MSEs that effectively apply lean management practices and cultivate entrepreneurial competencies are more likely to withstand challenges, recover from disruptions, and sustain long-term growth.

Lean Management

Lean management is a systematic operational philosophy

aimed at maximizing customer value while minimizing waste through the continuous improvement of processes, people, and organizational practices. Originating from the Toyota Production System and articulated by Womack and Jones (1996), lean thinking rests on principles of value identification, waste elimination, process flow optimization, and continuous improvement, forming a coherent management philosophy applicable beyond large manufacturing contexts to small and resource-constrained enterprises (Shah & Ward, 2007). For micro and small enterprises operating with limited capital and narrow operational margins, lean management serves not merely as an efficiency tool but as a strategic capability that builds adaptability, operational resilience, and long-term competitiveness.

Empirical evidence consistently establishes a strong positive relationship between lean practices and SME performance across diverse geographical and sectoral contexts. Alkhoraif *et al.* (2019), in a foundational systematic review of lean implementation across SMEs, confirmed that waste reduction, pull systems, continuous improvement, and employee involvement are positively associated with lower costs, shorter lead times, improved quality, and enhanced competitiveness, while noting that implementation success depends critically on leadership commitment and organizational culture. Panigrahi *et al.* (2023), using PLS-SEM analysis on 248 Indian manufacturing firms, further demonstrated that lean bundles, particularly pull systems, total productive maintenance, and quality-at-source practices, generate synergistic effects across multiple performance dimensions, including reduced defects, minimized inventory costs, shortened cycle times, and improved customer satisfaction. Extending these findings to a developing economy SME context closely analogous to the Philippine setting, Minh and Kien (2021) reported that structured lean adoption across six Vietnamese SMEs produced inventory reductions of up to 90% and defect probability eliminations of up to 96%, demonstrating that lean implementation contributes to stronger operational resilience even where resources and technical capacity are constrained.

The specific lean dimensions most relevant to MSE resilience, waste minimization, process efficiency and standardization, frontline resourcefulness, visual management, and continual improvement each carry distinct and complementary performance implications. Waste minimization through muda elimination consistently reduces operational costs and shortens response times, directly strengthening an enterprise's capacity to absorb disruptions (Alkhoraif *et al.*, 2019; Minh & Kien, 2021). The performance gains from process standardization can be substantial even in small enterprises. Realyvásquez-Vargas *et al.* (2019), studying a publishing SME, quantified these gains at an 18.44% reduction in unit cycle time alongside a 63.2% increase in production output, outcomes achieved without capital investment, through workflow redesign and line balancing alone. This underscores that standardization is not merely a quality control tool but a

competitiveness lever accessible to resource-constrained MSEs. Frontline resourcefulness, the active engagement and empowerment of employees in problem-solving and process improvement, is equally critical, as Machingura *et al.* (2024) confirmed that empowering frontline workers to make autonomous decisions is a key success factor for lean implementation, enabling organizations to respond rapidly to operational challenges without dependence on centralized decision-making. Visual management practices, including 5S workplace organization and visual controls, further support operational efficiency by enabling real-time monitoring and quick corrective actions; Rojasara and Qureshi (2013) documented production system efficiency improvements from 67% to 88.8% following 5S implementation in a small-scale enterprise.

The cumulative effect of these lean dimensions is reflected most powerfully in the relationship between lean management and organizational resilience. Tortorella *et al.* (2025) found that firms with higher levels of lean implementation demonstrated greater adaptive capacity and faster recovery from operational shocks, with continuous improvement practices and employee involvement identified as particularly important mechanisms for building resilience capabilities. Biadacz (2024) further demonstrated that Kaizen Costing, the application of continuous improvement to cost reduction and resource optimization across the value chain, produces compounding benefits, including increased productivity, elevated inventory turnover, and systematic cost reductions that strengthen enterprise sustainability over time. Collectively, these findings establish lean management as both an operational efficiency framework and a foundational resilience-building strategy for micro and small enterprises navigating resource constraints, market volatility, and environmental disruptions.

Entrepreneurial Competencies

Entrepreneurial competencies are the integrated knowledge, skills, and attitudes that enable entrepreneurs to effectively create, sustain, and grow businesses in dynamic and resource constrained environments. Theorized as dynamic capabilities at the individual and firm level, these competencies encompass a broad portfolio of behavioral, cognitive, and relational abilities, including resource leveraging, value creation, opportunity recognition, creative problem-solving, and leading and deciding, that collectively drive entrepreneurial action and organizational performance (Morris *et al.*, 2013). Rather than isolated traits, entrepreneurial competencies function as an interdependent set that entrepreneurs actively deploy when navigating uncertainty, managing disruptions, and pursuing growth opportunities. Research published in JEBS has highlighted organizational performance evaluation as a multidimensional process that integrates both objective and subjective indicators, including leadership, culture, and adaptability, all of which align closely with the entrepreneurial competency

dimensions examined in the present study (Ayogoi, 2026). Empirical evidence consistently demonstrates that entrepreneurial competencies are positively associated with venture performance and resilience. Botha *et al.* (2019), in a study of 154 existing entrepreneurs, found a significant positive relationship between the entrepreneurial competency set and recurring entrepreneurial behavior (Spearman's $\rho = 0.257$, $p < 0.001$), identifying creative problem-solving, opportunity recognition, value creation, and resource leveraging as the competencies most actively relied upon during repeated business initiation and growth. These competencies constitute what the authors describe as the "action knowledge" that transforms entrepreneurial intention into sustained business behavior. In the Philippine context, Maravilla and Flores (2025) examined 385 SME owners in Tacloban City and found through Structural Equation Modeling that entrepreneurs who effectively leveraged resources, exercised strategic decision-making, and demonstrated financial literacy achieved significantly higher resilience and sustainable performance following natural disasters and economic disruptions. Similarly, Sakib *et al.* (2022) established that entrepreneurial competencies, particularly creative problem-solving and decision-making, empower entrepreneurs to manage uncertainties and sustain business continuity in developing economy contexts.

The capacity to recognize and act on opportunities further distinguishes resilient enterprises from those that merely survive disruptions. Opportunity recognition enables entrepreneurs to reorient their offerings when market conditions shift, facilitating strategic pivots and timely adaptation (Morris *et al.*, 2013). Complementing this, creative problem-solving allows entrepreneurs to generate innovative solutions under resource constraints, a competency particularly critical for micro and small enterprises that operate with limited buffers. Flaminiano *et al.* (2024), examining Filipino SMEs, found that bricolage behavior, a practical expression of creative problem-solving, significantly increased the probability of innovation and business success by enabling entrepreneurs to recombine existing resources in novel ways and adapt rapidly to market changes. Ndlela and Barnes (2024) further confirmed through structural equation modeling that creative problem-solving indirectly enhanced SME longevity by strengthening critical thinking, innovation capability, and performance optimization across 204 enterprises.

At the strategic level, leading and deciding competencies represent a primary determinant of organizational resilience. Musyoka and Ouma (2024) demonstrated that crisis leadership explained 56.2% of enterprise performance variance during the COVID-19 pandemic, with strategic leadership independently accounting for 18.5% of performance variance among Nairobi SMEs. Malik and Terzidis (2025) further established that strategic decision-making, characterized by resource reconfiguration, strategic foresight, and adaptive

planning, functioned as a central resilience determinant in turbulent market environments. Taken together, these findings affirm that entrepreneurial competencies are not merely correlates of business performance but active enablers of resilience, equipping owners to sense environmental changes, exploit opportunities, marshal constrained resources, and lead their enterprises through adversity toward sustained growth.

Business Resilience

Organizational resilience is broadly defined as the ability to anticipate, respond to, and recover from disruptions while maintaining core business functions. McManus *et al.* (2008) conceptualize resilience as a multi-dimensional organizational capability. These dimensions capture a firm's capacity for real-time environmental monitoring, proactive management of critical weaknesses, and flexible adjustment under changing conditions. Collectively, they reflect a dynamic rather than static conception of resilience, one in which firms do not merely survive disruptions but continuously reconfigure their capabilities to sustain performance and growth amid adversity (Conz & Magnani, 2020).

Empirical applications of this framework to small and medium enterprises confirm its explanatory power across diverse disruption contexts. Duchek (2020), in a capability-based conceptualization of organizational resilience, demonstrated that SMEs excelling across all dimensions, particularly those with advanced situational awareness and adaptive capacity, achieved superior resilience outcomes during the COVID-19 pandemic. Firms that systematically gathered market intelligence, monitored competitor behavior, and maintained real-time awareness of environmental signals were better positioned to act on threats before they escalated into operational crises. This finding underscores that situational awareness is not merely reactive intelligence gathering but a foundational resilience capability that enables timely strategic response. Complementing situational awareness, the proactive identification and management of keystone vulnerabilities, critical organizational weak points such as single-source supplier dependencies, financing gaps, or operational bottlenecks, is consistently linked to stronger crisis endurance in the SME literature. Resilient firms distinguish themselves by conducting regular risk audits, diversifying resource bases, and maintaining contingency buffers that prevent single points of failure from cascading into systemic disruption (Duchek, 2020). For micro and small enterprises operating in resource-constrained environments, this proactive vulnerability management is particularly consequential, as limited slack resources amplify the impact of unaddressed weaknesses during external shocks.

Absorption capacity, defined as an organization's ability to acquire, assimilate, and apply external knowledge and information into existing operational structures, functions as a critical translation mechanism linking environmental learning to resilience outcomes. Warren (2025),

synthesizing over 40 peer-reviewed studies, established that absorptive capacity operates cumulatively: each disruption event contributes to an expanding repository of organizational knowledge and adaptive strategies that strengthens future resilience through path-dependent learning. Asare-Kyire *et al.* (2023) further demonstrated that absorptive capacity fully mediates the relationship between entrepreneurial orientation and organizational resilience, indicating that leadership capabilities translate into resilience outcomes only insofar as they enhance an enterprise's external learning capacity. For MSEs, absorption capacity thus bridges the gap between awareness of environmental change and the operational adjustments needed to manage it effectively.

Adaptive capacity, the ability to reconfigure strategies, operations, and business models in response to disruptions, represents the culminating resilience dimension through which awareness and learning are converted into sustained performance. Mashingaidze (2025) found that SMEs achieving stronger competitive advantage during periods of disruption did so through active business model innovation and internal resource reconfiguration, demonstrating that adaptability is an executable strategic competency rather than a passive organizational trait. Duchek (2020) similarly highlights that adaptive capacity in resilient SMEs is characterized by information sharing, delegated decision-making, and rapid operational pivoting that enables firms to seize emerging opportunities even under crisis conditions. Taken together, the literature establishes business resilience as an integrated, multi-dimensional capability in which situational awareness, vulnerability management, absorption capacity, and adaptive capacity operate synergistically, enabling micro and small enterprises to not only endure disruptions but emerge from them with stronger operational and strategic foundations.

MATERIALS AND METHODS

This study utilized a quantitative descriptive-correlational research design to examine the effects of lean management and entrepreneurial competencies on the business resilience of micro and small enterprises (MSEs) in the third district of Bukidnon. The study involved 400 MSE owners from eight municipalities, namely Danggagan, Damulog, Don Carlos, Kadingilan, Kibawe, Kitaotao, Quezon, and Maramag, selected through stratified sampling to ensure population representation.

Data were gathered using a standardized questionnaire divided into sections measuring lean management (waste minimization, process efficiency & standardization, frontline resourcefulness, visual management, and continual improvement), entrepreneurial competencies (resource leveraging, value creation, opportunity recognition, creative problem-solving, and leading & deciding), and business resilience (situational awareness, keystone vulnerabilities, absorption capacity, adaptive capacity) via five-point Likert scales.

Content validation and pilot testing ensured instrument

reliability. Ethical protocols included securing permissions from authorities, informed consent from participants, anonymity, and confidentiality. Descriptive statistics summarized demographic data and variable levels, while inferential statistics, specifically, Pearson correlation, identified relationships of business resilience. This comprehensive methodology enabled the study to objectively quantify and analyze how specific lean practices and entrepreneurial competencies significantly influence MSE resilience within a rural Philippine context.

RESULTS AND DISCUSSION

This section presents the data findings, along with their

analysis and interpretation. Further explanations and inferences from the collected information were drawn to verify whether the results align with the study's theoretical framework. Key findings on the business resilience of micro and small enterprises in the third district of Bukidnon are illustrated through tables, organized by the study's problem components. The respondents consisted of 400 participating enterprises from this district.

Business Profile of Micro and Small Enterprises

The data shows the business profile of micro and small enterprises (MSEs) in the third district of Bukidnon. The data demonstrates that most enterprises are micro in size,

Table 1: Business Profile Analysis of Survey Respondents (N=400)

Business Profile		Frequency (N)	Percentage (%)
Business Type	Micro	284	71.0 %
	Small	116	29.0 %
Total		400	100.0 %
Business Ownership Structure	Sole Proprietorship	256	64.0 %
	Partnership	119	29.8 %
	Corporation	25	6.2 %
Total		400	100.0 %
Nature of Business	Retail Enterprises	189	47.2 %
	Wholesale Enterprises	92	23.0 %
	Service Enterprises	119	29.8 %
Total		400	100.0 %
Years of Operation	1-10 years	356	89.0 %
	11-20 years	26	6.5 %
	21-30 years	13	3.3 %
	31-40 years	5	1.2 %
Total		400	100.0 %
Number of Employees	1-9 Employees	284	71.0 %
	10-99	116	29.0 %
Total		400	100.0 %

Table 2: Lean Management Practices

INDICATORS	Mean	Descriptive Rating	Qualitative Interpretation
Waste Minimization	4.36	Agree	Highly Practiced
Process Efficiency & Standardization	4.38	Agree	Highly Practiced
Frontline Resourcefulness	4.26	Agree	Highly Practiced
Visual Management	4.33	Agree	Highly Practiced
Continual Improvement	4.27	Agree	Highly Practiced
Overall Mean	4.32	Agree	Highly Practiced

accounting for 71.0%, while small enterprises constitute 29.0%. Regarding business ownership structure, sole proprietorship dominates with 64.0%, in contrast to partnerships with 29.8% and corporations, which represent only 6.2%. A sole proprietorship is defined

as a business owned and managed by a single individual who bears full responsibility and control over operations (Musyoka & Ouma, 2024). The predominance of micro-sized firms and sole proprietorships underscores the typical structure of MSEs in rural settings, where

resources and capital are constrained (United Nations Development Programme, 2020).

Concerning the nature of business, retail enterprises comprise the largest share at 47.2%, followed by service enterprises at 29.8%, and wholesale enterprises at 23.0%. Most MSEs are relatively young, with a vast majority are 89.0% operating for 1 to 10 years, while only 1.2% have been in operation for over 30 years. Lastly, the majority of businesses employ between 1 to 9 employees at 71.0%, whereas 29.0% have 10 to 99 employees. The substantial presence of retail enterprises aligns with the local economic landscape, where direct consumer sales form a major part of business activity. The predominance of enterprises operating less than a decade suggests that many businesses are in their formative stages, facing the common challenge of achieving long-term economic sustainability and resilience (Moraga *et al.*, 2024).

These profiles resonate with previous studies highlighting that MSEs in developing rural contexts predominantly consist of micro firms relying heavily on individual entrepreneurship and retail trade as the foundation of economic activity (Alkhorraif *et al.*, 2019; Sakib *et al.*, 2022). Such profiles necessitate targeted interventions in lean management practices and entrepreneurial skill development, as these can enhance operational efficiency and resilience, particularly for nascent enterprises constrained by resources (Minh & Kien, 2021; Maravilla & Flores, 2025). Understanding the business profile is essential for tailoring support programs that strengthen business resilience through both internal capabilities and strategic positioning.

Lean Management Practices of the Business Owner

The data depicts the summary of lean management practices of business owners among micro and small enterprises in terms of waste minimization, process efficiency & standardization, frontline resourcefulness, visual management, and continual improvement. The study reveals an overall mean of 4.32, rated as Agree, indicating that lean management practices are highly practiced by the business owners. The highest-rated indicators are “Process Efficiency & Standardization” with a mean of 4.38 and “Waste Minimization” with a mean of 4.36, both interpreted as Highly Practiced. On the other hand, the lowest-rated indicators are “Frontline Resourcefulness,” which scored a mean of 4.26, and “Continual Improvement,” with a mean of 4.27, both interpreted as Highly Practiced.

The result reflects that micro and small enterprises exhibit strong engagement with lean management dimensions critical to operational effectiveness. The emphasis on process standardization and waste elimination aligns with improving business resilience by reducing vulnerabilities and enhancing adaptability, crucial for micro and small enterprises often challenged by limited resources. The slightly lower engagement in continual improvement may imply a need for structured programs encouraging regular reflection, feedback integration, and innovation, which

are vital for sustaining in dynamic market conditions.

The result conforms to the study of Alkhorraif *et al.* (2019), which emphasized that waste reduction and continuous improvement strongly enhance operational performance in SMEs, but leadership commitment and culture are key for success. Similarly, Panigrahi *et al.* (2023) found lean practices like pull systems and quality management positively impact operational and business outcomes in small firms, supporting the importance of process efficiency found in this study. Furthermore, Islam and Ahmed (2024) demonstrated that work standardization in SMEs leads to significant productivity and lead-time improvements, consistent with the high rating for process standardization.

Entrepreneurial Competencies of Business Owner

The data presents the summary of entrepreneurial competencies of business owners in terms of resource leveraging, value creation, opportunity recognition, creative problem solving, and leading and deciding. The study shows an overall mean of 4.15, rated as high extent, indicating that owners are considerably competent in their entrepreneurial skills. The highest-rated indicators are “Leading and Deciding”, with a mean of 4.19, and “Value Creation” with a mean of 4.21, both interpreted as considerably competent. Conversely, the lowest-rated indicators are “Opportunity Recognition” with a mean of 4.04 and “Resource Leveraging” with a mean of 4.09, which are also interpreted as considerably competent but comparatively lower.

Competence in leading and deciding shows owners possess decisiveness and strategic prioritization, essential for navigating uncertainties and sustaining operations. Similarly, strong value creation indicates the ability to meet customer needs and differentiate offerings, contributing to competitive advantage. The relatively lower scores in opportunity recognition and resource leveraging imply that owners may benefit from capacity-building initiatives to enhance market scanning abilities and optimize resource use in constrained environments. Overall, the competencies assessed contribute positively to equipping business owners with skills to respond adaptively to challenges and maintain sustainability.

The findings of this study are in harmony with the work of Baggen *et al.* (2018) emphasize that entrepreneurial skills, including opportunity recognition and value creation, are pivotal for SMEs to innovate and adapt to change. Similarly, Kusa *et al.* (2021) found that competencies such as leading effectively and resource leveraging enable resilience by facilitating quick decision-making and efficient resource use. Maravilla and Flores (2025) also reinforce that creative problem-solving and decisive leadership are essential for SMEs’ sustainability in volatile markets. Consequently, the integration of targeted training in opportunity scanning and resource management could further strengthen owners’ capacities and ensure robust business continuity.

The statistics demonstrate the summary of business

resilience among micro and small enterprises (MSEs) in terms of situational awareness, keystone vulnerabilities, absorption capacity, and adaptive capacity. The study shows an overall mean of 4.20, rated as Agree, indicating strong resilience among the participating enterprises. The highest-rated indicators are “Keystone Vulnerabilities” with a mean of 4.23 and “Adaptive Capacity” with a mean of 4.22, both interpreted as Strong Resilience. On the other hand, the lowest-rated indicators are “Situational Awareness” with a mean of 4.16 and “Absorption Capacity” with a mean of 4.18, also both interpreted as Strong Resilience.

Strong resilience across all dimensions suggests that the participating MSEs possess a robust capacity to survive, adapt, and recover from operational disruptions. However, the slightly lower scores in Situational Awareness and Absorption Capacity imply a need for focused professional development to strengthen early detection of risks and to build adequate emergency resources. Enhancing these areas may improve the enterprises’ preparedness and responsiveness, thus supporting their sustainability and growth amid changing market conditions. The narrow range among the indicators indicates balanced competencies, yet reflects a

slight need for improvement in proactive risk monitoring and financial or inventory buffers.

The present findings find support in the study of McManus *et al.* (2008) assert that situational awareness is critical for organizational resilience as it allows timely detection of threats and opportunities. Lengnick-Hall *et al.* (2011) also emphasize absorption capacity, such as emergency funds and inventory surplus, as essential buffers against shocks. Furthermore, Alkhoraif *et al.* (2019) highlight that adaptive capacity, including learning from past experiences and reconfiguring resources, greatly contributes to business continuity in SMEs. Similarly, Tabinas *et al.* (2022) emphasize entrepreneurial competencies, particularly in leading and decision-making, which complement resilience capabilities. These factors enhance the overall business resilience among micro and small enterprises, enabling them to better withstand and thrive through disruptions.

As shown in the correlation results indicated that lean management $r = 0.704$, ($p < 0.001$) and its sub-components, particularly waste minimization $r = 0.561$, ($p < 0.001$), process efficiency & standardization $r = 0.568$, ($p < 0.001$), frontline resourcefulness $r = 0.626$, ($p < 0.001$), visual management $r = 0.526$, ($p < 0.001$), and

Table 3: Entrepreneurial Competencies

INDICATORS	Mean	Descriptive Rating	Qualitative Interpretation
Resource Leveraging	4.09	High Extent	Considerably Competent
Value Creation	4.21	High Extent	Considerably Competent
Opportunity Recognition	4.04	High Extent	Considerably Competent
Creative Problem Solving	4.18	High Extent	Considerably Competent
Leading and Deciding	4.19	High Extent	Considerably Competent
Overall Mean	4.15	High Extent	Considerably Competent

Table 4: Business Resilience among Micro and Small Enterprises (MSEs)

INDICATORS	Mean	Descriptive Rating	Qualitative Interpretation
Situational Awareness	4.16	Agree	Strong Resilience
Keystone Vulnerabilities	4.23	Agree	Strong Resilience
Absorption Capacity	4.18	Agree	Strong Resilience
Adaptive Capacity	4.22	Agree	Strong Resilience
Overall Mean	4.20	Agree	Strong Resilience

continual improvement $r = 0.603$, ($p < 0.001$) showed statistical significance relative to the business resilience of micro and small enterprises (MSEs). This is to say that an increase in business owners’ lean management practices in terms of waste minimization, process efficiency & standardization, frontline resourcefulness, visual management, and continual improvement leads to an increase in business resilience of micro and small enterprises (MSEs), which means that the more they practice lean management in their operations, the more the enterprises become resilient.

Alkhoraif *et al.* (2019) support this view, finding that lean practices such as waste reduction and continuous improvement in SMEs improve operational performance

and competitiveness, which underpins resilience. Similarly, Panigrahi *et al.* (2023) empirically established that lean manufacturing practices including process standardization and employee involvement have a significant positive influence on firm performance, reinforcing the link between lean approaches and adaptive capacity. Additionally, Biadacz (2024) demonstrated that methodologies like Kaizen Costing extend continuous improvement benefits across various functions, yielding productivity gains and systematic cost reductions that bolster resilience during adversities.

Moreover, correlation results between entrepreneurial competencies and business resilience also showed significance $r = 0.786$, ($p < 0.001$), and its sub-components,

namely resource leveraging $r = 0.563$, ($p < 0.001$), Value Creation $r = 0.660$, ($p < 0.001$), opportunity recognition $r = 0.601$, ($p < 0.001$), creative problem solving $r = 0.653$, ($p < 0.001$), and leading and deciding $r = 0.663$, ($p < 0.001$) were also significantly associated with business resilience of micro and small enterprises (MSEs). All showed statistically significant positive correlations, which means that if the business owners' entrepreneurial competencies increase, their business resilience will also increase. This means that enhancing the entrepreneurial competencies of the business owners could improve the resilience of the enterprise.

This result is supported by Ngo and Vu (2025), who emphasize that entrepreneurial competence, as a core individual resource, enables entrepreneurs to proactively adapt to environmental shifts and navigate risks, ultimately enhancing the sustainability performance

and resilience of their firms. Sakib *et al.* (2022) further assert that creative problem solving and decision-making capabilities empower entrepreneurs to effectively manage uncertainties and crises, vital for business continuity. Similarly, Kusa *et al.* (2021) found that high levels of competencies related to leading and deciding correlate with greater flexibility and recovery capacity in SMEs facing disruptions.

CONCLUSIONS

This study demonstrates that lean management practices and entrepreneurial competencies are significant positive predictors of business resilience among micro and small enterprises in the third district of Bukidnon, Philippines. Correlation results revealed strong associations for both lean management ($r = 0.704$, $p < .001$) and entrepreneurial competencies ($r = 0.786$, $p < .001$), with entrepreneurial

Table 5: Correlation analysis of lean management, entrepreneurial competencies, and business resilience of micro and small enterprises (MSEs)

Independent Variables Correlated with Business Resilience	Correlation Coefficient (r)	p-value
Lean Management	0.704**	0.001
Waste Minimization	0.561**	0.001
Process Efficiency & Standardization	0.568**	0.001
Frontline Resourcefulness	0.626**	0.001
Visual Management	0.526**	0.001
Continual Improvement	0.603**	0.001
Entrepreneurial Competencies	0.786**	0.001
Resource Leveraging	0.563**	0.001
Value Creation	0.660**	0.001
Opportunity Recognition	0.601**	0.001
Creative Problem Solving	0.653**	0.001
Leading and Deciding	0.663**	0.001

competencies exhibiting a larger effect size, underscoring the primacy of owner skills and decision-making in driving enterprise resilience.

These findings contribute to the McManus *et al.* (2008) resilience framework and Absorptive Capacity Framework (Cohen & Levinthal, 1990) by operationalizing it in a developing economy, rural Philippine context, and corroborate Dynamic Capabilities Theory (Teece *et al.*, 1997) by confirming that process-based and individual-level capabilities jointly enable MSEs to withstand disruptions. Practically, the results call for targeted support programs integrating lean management training, particularly in continual improvement and frontline resourcefulness, with entrepreneurial competency development focused on opportunity recognition and resource leveraging.

Future research should explore additional factors and regional variations in MSE resilience, plus synergies between lean practices and entrepreneurial competencies for optimized outcomes. Strengthening these via

collaborative efforts among firms, government, and academia will empower MSEs to thrive long-term.

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