Organizational Resilience in Emerging Markets: Insights from the Gamarra Commercial Hub, Peru

Hans Jhordan Silva Torralva
h.silvatorralva@up.edu.pe
Universidad del Pacífico (Lima, Perú)

Abstract
This study examines the relationship between organizational resilience and sociodemographic factors in textile and garment microenterprises located in the Gamarra commercial emporium (Lima, Peru) during the COVID-19 health crisis. Based on a sample of 147 business managers, the research employed factor analysis, ANOVA tests, and both linear and logistic regression models. Findings suggest that organizational resilience operates as a multidimensional construct, structured around eight empirical factors that exhibit adequate internal consistency and discriminant validity. Additionally, variables such as gender, age, and duration of commercial engagement emerged as significant predictors of resilience levels. Specifically, age contributed positively, whereas longer tenure in Gamarra reduced resilience likelihood. Prediction models achieved over 85% accuracy in distinguishing between high- and low-resilience enterprises. The study concludes that strengthening adaptive capabilities, promoting distributed leadership, and reinforcing strategic planning represent essential strategies for enhancing resilience in uncertain environments.

Keywords: Resilience, COVID-19, Microenterprises

Introduction

The rapid spread of COVID-19 prompted governments worldwide to implement a series of policy measures and structural reforms, ultimately leading to a 3.5% contraction in global economic activity (World Bank [WB], 2020). According to the Economic Commission for Latin America and the Caribbean (2021), hereafter ECLAC, approximately 25% of the GDP of Latin American economies experienced severe impacts due to the pandemic. Moreover, the organization projected the closure of around 2.7 million formal businesses across the region by the end of the crisis. ECLAC further indicated that micro and small enterprises suffered the greatest damage, given their strong presence in commerce, hospitality, food services, and other vulnerable sectors. It also reported that microenterprises represented 96% of these companies, primarily concentrated in wholesale and retail trade.

In the Peruvian context, the microenterprise sector recorded a sales decline of approximately 80 billion soles by the end of 2020 (Foreign Trade Society [COMEX], 2021). To mitigate the crisis's effects, the Peruvian government introduced two economic strategies: a plan for reactivating economic activities and a set of mechanisms designed to support the payment chain (Ministry of Economy and Finance [MEF], 2021). Nonetheless, these measures fell short of expectations, as the national GDP declined by 11% in 2020 (National Institute of Statistics and Informatics [INEI], 2021). According to MEF (2021), this contraction partly resulted from setbacks in manufacturing (-12.5%) and commerce (-16.0%), reflecting shifts in household consumption priorities during the pandemic.

Within the broader manufacturing and commerce sectors, the apparel and garment trade occupies a significant position. By the end of 2020, this activity accounted for 1% of national GDP and 7.6% of the manufacturing sector's output (Ministry of Production [PRODUCE], 2020). PRODUCE further stated that 96.8% of businesses in this sector comprised microenterprises, with 64.1% operating in Metropolitan Lima. INEI (2017) equated this sector directly with the Gamarra Commercial Emporium. According to INEI, Gamarra hosts 33,002 enterprises, 94.5% of which classify as microenterprises, and 88.7% focus specifically on garment manufacturing and sales.

Following the declaration of a state of emergency in March 2020, commercial establishments in Gamarra shut down, causing a 90% drop in customer flow and a 50% loss in annual sales by the end of the year (Lima Chamber of Commerce [CCL], 2021). In response, the Gamarra Business Coordinating Committee (2020) reported that several organizations launched initiatives to recover the commercial hub. However, the measures adopted and their outcomes varied significantly across firms.

The literature on firm behavior under uncertainty emphasizes that organizational resilience enables the analysis of how specific resilience dimensions relate to business performance during crises. This study seeks to examine the relationship between resilience and performance in garment microenterprises during the COVID-19 crisis in the Gamarra Commercial Emporium.

Theoretical Framework

Organizational Resilience

Xiao et al. (2017) developed a model of organizational resilience in which, despite prior efforts to define and measure the concept, they identified the absence of an integrative construct capable of facilitating interaction across response levels during crises. They conceptualized resilience as the organization's capacity to recover through the interplay of factors operating at individual, collective, and organizational levels. At the individual level, traits such as optimism, trust, and a sense of belonging foster positive behavioral responses to adversity. At the group level, psychological safety and shared responsibility enable cohesive efforts to face constraints. At the organizational level, elements such as structural design, financial capital, improvisation, and tolerance for failure reinforce systemic resilience.

Gallopín (2006), in his model of organizational vulnerability components, proposed an interconnection among vulnerability, resilience, and adaptive capacity. He argued that resilience stems from an organization's response capability, which in turn forms part of its vulnerability. From a broader perspective, vulnerability depends on three factors: exposure to disturbances that reshape the organizational context, sensitivity to such disturbances—defined by the degree of impact—and the organization's response capacity. Resilience, therefore, reflects the ability to regain equilibrium after disruptions rooted in uncertainty and risk.

Fiksel (2003) expanded upon Gallopín's work by identifying four core elements that enhance resilience: (i) diversity, or the presence of varied forms and behaviors; (ii) efficiency, understood as performance achieved with moderate resource consumption; (iii) adaptability, or the ability to shift in response to new pressures; and (iv) cohesion, referring to the quality of connections and relationships between the firm and its external environment.

Dimensions of Organizational Resilience

Lee et al. (2013), McManus (2008), and Seville (2008) posited that organizational resilience comprises four dimensions: (i) resilient ethics, (ii) situational awareness, (iii) key vulnerability management, and (iv) adaptive capacity. Resilient ethics entails embedding a culture of resilience across hierarchical levels and disciplinary boundaries (Lee et al., 2013). In this regard, Seville (2008) described the organization as a networked system in which resilience issues form critical decision-making inputs. Stephenson et al. (2010) added that resilient ethics reflect an organizational culture where top leadership balances flexible decision-making with pressure to generate profits.

Seville (2008) measured this dimension through two indicators: (i) commitment to resilience—defined as the belief in the organization's capacity to recover from adversity and manage momentary disruptions; and (ii) network perspective—the collective orientation adopted by the firm to recognize and actively manage interdependencies with peer organizations.

Situational Awareness

Lee et al. (2013) described this dimension as the organization's ability to interpret and internalize specific contexts in which decision-making becomes necessary. In crisis scenarios, situational awareness allows organizations to grasp the implications of specific events. McManus (2008) and

Seville (2008) assessed this dimension through several indicators: awareness of roles and responsibilities, understanding of hazards and consequences, recognition of interconnections, recovery priorities, monitoring of internal and external environments, and informed decision-making.

Key Vulnerability Management

McManus (2008) defined key vulnerabilities as organizational components with the potential to inflict significant negative impact. Seville (2008) characterized this dimension as the organization's capacity to identify threats and areas for improvement in order to mitigate or leverage them, respectively. Lee et al. (2013) identified examples such as insufficient personnel, financial deficits, lack of leadership skills, infrastructure damage, and supply shortages.

Adaptive Capacity

Seville (2008) described adaptive capacity as the ability of organizations to evolve in response to changing demands in their external environment. McManus (2008) emphasized that adaptive behavior involves leveraging organizational culture to support decision-making under crisis conditions. Increasingly, scholars and practitioners adopt this perspective in business contexts, where cultural assets and employee capabilities serve as catalysts for adaptation.

According to Lee et al. (2013), this dimension reflects the firm's ability to craft effective responses to emerging challenges. Seville (2008) assessed this dimension through indicators such as collective mindset, internal and external communication, strategic vision, access to knowledge, governance structures, innovation, creativity, and distributed, responsive decision-making.

Organizational Performance

Fareed et al. (2016) outlined two theoretical approaches to performance: (i) performance as a consequence of external conditions and (ii) performance as the result of leveraging internal resources.

The first approach highlights how environmental conditions shape business strategy and, consequently, organizational performance. This perspective attributes performance outcomes to factors beyond managerial control and underscores the need for timely strategies that mitigate risks and harness external opportunities. Teece et al. (1997) noted that such changes produce dynamic capabilities, which integrate, build, and reconfigure internal and external competencies in response to fluctuating environments.

Organizational Performance Perspectives

Following the views of Avolio et al. (2008), Lee et al. (2013), and Alva (2019), performance evaluation must consider multiple dimensions: (i) human capital, (ii) digital infrastructure and physical presence, (iii) finance, and (iv) strategic planning.

Human Capital

Hallak et al. (2018) defined the human capital perspective as the accumulation of knowledge and skills through organizational investment in employee training and experiential learning. The authors argued that firms prioritizing the development of such competencies outperform others in resilience and adaptability. Indicators include need for external support, employee engagement, staff turnover, and job satisfaction.

Digital Infrastructure and Physical Presence
This perspective captures the firm's capacity to safeguard information and ensure geographic coverage for business continuity, including relocation when necessary. Hallak et al. (2018) evaluated it through indicators such as data protection, location, and relocation capacity.

Finance
Forsyth (2004), Vernimmen (2005), Franco (2015), Alva (2019), and Chong et al. (2019) emphasized the need to examine four financial dimensions when assessing performance: liquidity, solvency, efficiency, and profitability. De la Garza et al. (2017) added that the time horizon also plays a crucial role, as it frames the analysis of financial operations. Accordingly, the financial perspective includes liquidity, solvency, management efficiency, and profitability indicators.

Strategic Planning
David (2013) defined strategic planning as the firm's ability to formulate, implement, and assess decisions. Fernández (2012) viewed strategic direction as a process involving action plans, information systems, and control mechanisms. D'Alessio (2013) described strategic planning as a systematic and quantitative effort to define goals, policies, and strategies tailored to market demands. Bontis (2002) and Pérez et al. (2009) advocated for integrating both objective financial metrics and perceptual indicators of managerial effectiveness. Specifically, Bontis et al. (2002) recommended evaluating strategic planning through mission and vision alignment, goal attainment, and business strategy execution.

Background

Fatoki (2018) aimed to evaluate the relationship between business resilience and organizational performance in small and medium-sized enterprises. His findings revealed a strong correlation between the two variables (0.78, $p = 0.01$), concluding that resilience may act as a catalyst for organizational performance by facilitating the management of both internal and external shocks, thereby promoting operational success.

Santoro et al. (2018) also identified a significant correlation between business resilience and organizational performance (0.58, $p < 0.01$). They concluded that business resilience positively associates with perceived performance, a connection potentially driven by how business leaders influence risk awareness and adversity management through their personal beliefs and skills.

Oparanma et al. (2019) found that 61.1% of respondents agreed organizational learning influences corporate performance in banks, while 50.0% believed that adaptability affects it as well. They concluded that a firm's adaptive capacity constitutes a key competitive advantage in managing unpredictable changes, as it allows the proactive development of strategies that sustain operations.

Prayag et al. (2018) reported that organizational resilience accounted for 13.2% of the total variance in the financial performance of tourism agencies. Their main conclusion highlighted that resilience within the tourism sector facilitated effective planning efforts to address emerging

challenges, enabled by network-building, collaboration, innovation, and cultural integration—all of which enhanced financial outcomes.

Fisher et al. (2016) observed a weaker yet significant correlation (0.12, $p < 0.01$), suggesting a low direct association. They concluded that while resilience constitutes a critical capability during uncertain times, managers must demonstrate high adaptability and confidence to navigate disruptive challenges that may affect performance.

Emueje et al. (2020) reported that organizational resilience explained 70.5% of the total variance in performance, through dimensions such as creativity, strategic diversity, and proactivity. They concluded that resilient entrepreneurs tend to guide their firms toward efficient performance by sustaining a clear vision and adopting adaptive behavior in the face of adversity.

Suryaningtyas (2019) concluded that resilient leadership enables organizations to better navigate adverse situations. Such capacity fosters optimism, commitment, tolerance for ambiguity, and adaptability among employees. Hallak et al. (2018) found that resilience accounted for 19.7% of the variation in organizational performance. Their main conclusion emphasized how managerial resilience influences employees, encouraging them to experience positive emotions that foster personal growth and success.

In the Peruvian context, Garmendia et al. (2015) observed that business leaders exhibited signs of resilience, including a high initiative for immediate action, though they showed limited openness to change unless exceptional conditions arose. However, the small sample size (48 garment business owners) weakened the generalizability of their conclusions.

Carrasco (2018) found that the performance level of micro and small enterprises (MSEs) remained moderate, mainly due to inadequate financial planning and process management that hindered optimal productivity. He concluded that key performance determinants included the owner's idiosyncrasies, business experience, access to external financing, and sector dynamics.

Vargas et al. (2015) demonstrated that organizations displayed a low level of resilience, with a marked delay in response and action during complex scenarios. Contributing factors included poor reaction time, limited visibility, and a lack of flexibility in organizational culture. They ultimately concluded that small and medium-sized enterprises in Peru tend to exhibit low resilience levels.

Espinoza et al. (2020) indicated that 44% of surveyed firms considered administrative factors crucial for business growth, while 20% emphasized commercial strategies, 19% highlighted operational actions, and 17% pointed to macroenvironmental elements. The study concluded that administrative factors—such as managerial, financial, and human resource activities—exert a strong impact on the growth of footwear-related MSEs.

Methodology

The primary objective of this study involves examining the relationship between resilience and performance among microenterprises engaged in the manufacture and sale of garments during the COVID-19 period in the Gamarra Commercial Emporium. The survey method served as the main data collection technique, using tailored questionnaires for each variable. Data collection occurred both in person and online. For the face-to-face approach, the researcher established trust with respondents and employed colloquial language to maintain the attention of the target audience.

Drawing from his own business experience, the researcher approached commercial centers in Gamarra to administer surveys to the target population. The fieldwork took place between February and March 2022, yielding 93 completed surveys. For the online phase, a digital form was distributed among entrepreneurs in the targeted segment. This step relied on referrals from a subgroup of business owners who facilitated the dissemination of the instrument through social media platforms. This second channel yielded 54 responses, bringing the total sample to 147 microentrepreneurs.

During the initial phase, the researcher conducted a literal translation of the tools developed by Forsyth (2004), Vernimmen (2005), McManus (2008), Seville (2008), Pérez et al. (2009), Gallopín (2006), Lee et al. (2013), Franco (2015), Xiao et al. (2017), Alva (2019), and Quevedo (2019). The wording of each item was adapted to reflect the Peruvian pandemic context while preserving the intent and structure of the original instruments. This stage also included a pilot survey and interviews with selected microentrepreneurs.

In the second phase, the researcher revised the instrument based on insights from the pilot survey and interviews. The updated questionnaire used clear, accessible language while maintaining formal structure and the intended meaning of each statement.

For the final stage, a second pilot survey was conducted with 16 microentrepreneurs to assess the instrument's reliability and internal consistency. Cronbach's alpha was calculated for each dimension and perspective, and all values exceeded the 0.7 threshold (see Annex 6). This final version of the questionnaire was then administered to the full sample of 147 microenterprise managers.

The final questionnaire contained 72 items divided into two sections. To assess organizational resilience, the instrument included 58 items distributed across four dimensions: resilient ethics (6 items), situational awareness (17 items), key vulnerability management (19 items), and adaptive capacity (16 items). For organizational performance, 14 items were included and categorized into four perspectives: human capital (4 items), IT and physical presence (3 items), finance (4 items), and strategic planning (3 items). Respondents rated each statement using a four-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree.

The population consisted of all managers or owners of microenterprises dedicated to garment manufacturing and sales in Gamarra during the COVID-19 period. As Ñaupas et al. (2018) explained, the population comprises all research units—individuals, objects, or phenomena—sharing specific characteristics required for data analysis and investigation.

The sample, defined as a subset of the population (Bernal, 2016), included 147 managers or owners of microenterprises in the garment sector within Gamarra. Table 1 below presents the demographic characteristics of the respondents.

Table 1. Demographic Characteristics of the Respondents

Demographic Variables	Number	Percentage
Sex		
Male	91	38.0%
Female	56	62.0%
Age		
Between 20 and 30 years	18	12.0%
Between 31 and 40 years	19	13.0%
Between 41 and 50 years	35	24.0%
Over 50 years	75	51.0%
Educational Level		
Primary	44	30.0%
Secondary	76	52.0%
Higher Education	26	18.0%
Marital Status		
Single	37	25.0%
Married	84	57.0%
Widowed	9	6.0%
Divorced	18	12.0%
Time in Gamarra		
Less than 1 year	7	5.0%
Between 1 and 3 years	29	20.0%
Between 4 and 6 years	28	19.0%
More than 6 years	82	56.0%

Sampling involves a technique that enables researchers to select individuals of interest using either probabilistic or non-probabilistic methods (Juárez, 2014). For this study, a non-probabilistic sampling approach was applied, since randomization and probability calculations were not used during the selection of each basic unit (Gallardo, 2017). Additionally, the specific type of sampling followed a convenience-based method, meaning that the selection of each respondent depended on the researcher's judgment and the constraints encountered throughout the data collection process (Sánchez et al., 2015).

Results

The following section outlines the findings obtained after administering the questionnaires to a sample of 147 microentrepreneurs. Table 2 displays the results of the exploratory factor analysis (EFA), including the matrix of factor loadings grouped by variable (dimension-indicator). This matrix reflects the degree to which each variable contributes to each of the nine extracted factors. Loadings above ±0.4 usually indicate statistical significance. When a variable loads strongly on a single factor, it tends to serve as a strong representative of that factor. In contrast, when a variable loads highly on multiple factors, such behavior may signal conceptual ambiguity or theoretical overlap.

Each row in the EFA output (organized by dimension-indicator) was linked to the corresponding set of items, allowing the researcher to accurately recover the original theoretical dimension and indicator.

Table 2. Factor Analysis Results

Variable (Dimension – Indicator)	Empirical Factor
Key Vulnerability Management – Attitude and Capacity for External Resources	Factor 5
Adaptive Capacity – Leadership, Management, and Governance Structures	Factor 5
Adaptive Capacity – Communication and Relationships	Factor 5
Situational Awareness – Monitoring of Internal and External Situations	Factor 5
Adaptive Capacity – Accountability in Decision-Making	Factor 5
Adaptive Capacity – Strategic Vision and Expected Outcomes	Factor 1
Strategic Planning – Mission and Vision	Factor 1
Strategic Planning – Goal Fulfillment	Factor 1
Finance – Profitability	Factor 1
Finance – Liquidity	Factor 1
Situational Awareness – Recovery Priorities	Factor 1
Human Capital – Staff Satisfaction	Factor 1
IT and On-Site Presence – Business Location	Factor 1
IT and On-Site Presence – IT Backup and Security	Factor 1
Situational Awareness – Informed Decision-Making	Factor 8
Resilient Ethics – Network Perspective	Factor 8
Human Capital – Need for External Support	Factor 7

No discrepancies emerged between the theoretical and empirical structures regarding the grouping of indicators. This outcome suggests that the items belonging to the same theoretical indicator aligned consistently within the same empirical factor during the EFA, demonstrating empirical structural consistency at least at the indicator grouping level. Table 3 presents the reliability analysis results for the scales using Cronbach's alpha. The findings reveal that Adaptive Capacity, Finance, and Situational Awareness exhibit excellent internal consistency ($\alpha \geq 0.85$), while Key Vulnerability Management maintains good reliability ($\alpha = 0.80$), and Human Capital

shows moderate internal consistency (α = 0.65). No strong cross-loadings were detected, supporting the discriminant validity of the model.

Table 3. Cronbach's Alpha by Dimension

Dimension	Cronbach's Alpha
Adaptive Capacity	0.89
Human Capital	0.65
Situational Awareness	0.85
Finance	0.89
Key Vulnerability Management	0.80
IT and On-Site Presence	0.82
Strategic Planning	0.94
Resilient Ethics	0.56

Table 4 presents the correlation matrix of the factors extracted through the exploratory factor analysis (EFA). The results indicate correlations close to zero, suggesting statistical independence among the factors and supporting discriminant validity across constructs.

Table 4. Correlation Matrix of Extracted Factors (p-values by Demographic Variable)

Dimension / Subdimension	p-value (Gender)	p-value (Age)	p-value (Education Level)	p-value (Marital Status)	p-value (Time in Gamarra)
Key Vulnerability Management – Participation in Exercises	0.0000	0.0000	0.5572	0.0000	0.0000
Key Vulnerability Management – Organizational Connectivity	0.0034	0.0000	0.3673	0.0001	0.8875
Key Vulnerability Management – External Resource Capacity	0.0000	0.0000	0.7062	0.0000	0.0000
Key Vulnerability Management – Planning Strategies	0.2108	0.0000	0.3576	0.0000	0.0077
Adaptive Capacity – Leadership, Management, Governance	0.4289	0.0000	0.9261	0.0003	0.0000
Adaptive Capacity – Collective Work Mindset	0.0440	0.0000	0.2783	0.0001	0.0000
Adaptive Capacity – Information and Knowledge	0.8453	0.0000	0.8769	0.0002	0.1253
Strategic Planning – Mission and Vision	0.0000	0.0001	0.3627	0.0222	0.0000
Strategic Planning – Goal Achievement	0.0006	0.0036	0.2789	0.3460	0.0000
Finance – Profitability	0.8599	0.1054	0.6178	0.0000	0.0000
Finance – Liquidity	0.0901	0.0168	0.3907	0.0004	0.0399

Dimension / Subdimension	p-value (Gender)	p-value (Age)	p-value (Education Level)	p-value (Marital Status)	p-value (Time in Gamarra)
Situational Awareness – Awareness of Interconnectedness	0.0000	0.0000	0.1094	0.0003	0.0000
Situational Awareness – Recovery Priorities	0.1123	0.0000	0.8418	0.0465	0.0037
Situational Awareness – Informed Decision-Making	0.6386	0.0000	0.0118	0.0007	0.0000
Human Capital – Employee Turnover	0.0823	0.0000	0.9227	0.0133	0.0000
Human Capital – Employee Occupancy	0.0137	0.0433	0.8865	0.0001	0.0000
Resilient Ethics – Netw					

Subsequently, an ANOVA by group was conducted for each dimension-indicator based on the following demographic variables: Gender, Age, Educational Level, Marital Status, and Length of Time in Gamarra. A p-value < 0.05 indicates statistically significant differences among groups.

With respect to gender, statistically significant differences ($p < 0.05$) were found across all analyzed dimensions. All dimensions also exhibited significant differences according to age group ($p < 0.01$). No statistically significant differences ($p > 0.05$) were found for any of the indicators when segmented by educational level. All indicators showed statistically significant differences ($p < 0.01$) based on marital status. Regarding time in Gamarra, several dimensions exhibited significant differences ($p < 0.05$), particularly Participation in Exercises and Attitude and Capacity for Internal and External Resources; however, not all indicators displayed differences—for example, Organizational Connectivity yielded a p-value of 0.8875.

Subsequently, a linear regression analysis was performed to identify the predictors of resilience. Table 5 presents the results of the linear regression, where the dependent variable is the average score across all resilience dimensions (Total_Resilience), and the independent variables include Gender, Age, Educational Level, Marital Status, and Time in Gamarra. Linear regression enables the exploration of the quantitative influence of each predictor.

This method predicts a continuous outcome (i.e., Total_Resilience average), which makes it possible to estimate the magnitude of change in resilience per unit variation in the predictor variables. Therefore, it provides insight into how each factor (gender, age, etc.) contributes to the level of resilience.

Table 5. Linear Regression Results for Total Organizational Resilience

const	3.5248	0.1197	29.4368	0	3.2881	3.7615
Gender	-0.204	0.0427	-4.7786	0	-0.2884	-0.1196
Age	0.1041	0.0218	4.784	0	0.0611	0.1472
Educational Level	-0.0066	0.0303	-0.2182	0.8276	-0.0664	0.0532

Marital Status	0.0229	0.0248	0.9235	0.3573	-0.0262	0.072
Time in Gamarra	-0.1713	0.0235	-7.2788	0	-0.2179	-0.1248

The results from the linear regression model reveal statistically significant effects for the variables Gender, Age, and Time in Gamarra. In addition, a logistic regression analysis was conducted to predict high resilience, as presented in Table 6. This model estimates the probability of belonging to a specific category (i.e., High vs. Low Resilience) through a logistic function, allowing for classification based on sociodemographic predictors.

Table 6. Logistic Regression – High Resilience

Clase	Precision	Recall	F1-Score	Soporte
0	0.88	0.88	0.88	25.0
1	0.85	0.85	0.85	20.0
Accuracy			0.867	0.867
Macro Avg	0.865	0.865	0.865	45.0
Weighted Avg	0.867	0.867	0.867	45.0

The model's performance metrics indicate a global accuracy of 86.7% and a macro-averaged F1 score of 86.5%, reflecting a high degree of precision in distinguishing between participants with high and low resilience levels. The model demonstrates a balanced performance across both categories, suggesting that the included sociodemographic variables—gender, age, educational level, marital status, and length of time in Gamarra—serve as reliable predictors of resilience levels (Table 7).

Table 7. Metric clase 0-1

Metric	**Clase 0 (Baja resiliencia)**	**Clase 1 (Alta resiliencia)**
Precisión	0.880	0.850
Recall	0.880	0.850
F1-score	0.880	0.850
Soporte	25	20

Precision refers to the proportion of instances the model correctly identified as belonging to a given class out of all instances it predicted for that class; in this case, 85%. Recall (Sensitivity) measures how many of the actual instances in that class were correctly identified by the model, also 85%. The F1-score, which is the harmonic mean of precision and recall, offers a balanced evaluation of the model's performance. A score of 0.850 for Class 1 indicates a solid balance between correctly identifying true positives and minimizing false positives. Support indicates the number of actual observations in each class.

Overall, the model demonstrates good performance across both classes, with very similar metrics. It performs slightly better in predicting low resilience (Class 0) than high resilience. Nevertheless, both precision and recall exceed 85%, which indicates a robust and balanced model for this binary classification task.

The model is well-balanced and performs effectively in both classes, suggesting that the sociodemographic variables (gender, age, educational level, marital status, and time in Gamarra) are useful predictors of resilience levels (Table 8).

Table 8. Logistic Regression Coefficients – High Resilience (Class 1)

Variable	Coefficient (B)	Odds Ratio
Gender	-1.6834	0.1857
Age	2.3474	10.4579
Education Level	0.2635	1.3015
Marital Status	0.4247	1.5291
Time in Gamarra	-3.0065	0.0495

Conclusions

The findings of this study suggest that organizational resilience in times of crisis constitutes a multidimensional phenomenon, composed of clearly distinguishable factors that interact significantly depending on the leader's characteristics and the business environment.

First, the exploratory factor analysis identified eight key dimensions of resilience: adaptive capacity, human capital, situational awareness, financial health, critical vulnerability management, digital and physical infrastructure, and strategic planning. These dimensions exhibited a robust structure and acceptable internal consistency, thereby empirically validating the complexity of the resilience construct in business management contexts.

Second, ANOVA tests revealed statistically significant differences based on gender, age, marital status, and time in the Gamarra commercial district. These results imply that business resilience does not manifest uniformly but instead reflects the entrepreneur's social capital, experience, and background. Specifically:

-Men and women displayed notable differences in their engagement with vulnerability management, possibly reflecting varying levels of responsibility or involvement.

-Age significantly affected perceptions of risk identification and strategic planning skills, indicating that resilience tends to evolve with life experience.

-Education level showed no substantial association with the measured constructs, possibly because practical experience outweighs formal education in this business setting.

-Marital status likely shapes the level of commitment, availability, and responsibility, influencing how entrepreneurs handle risks and planning.

-Years in Gamarra predicted greater capacities in areas such as crisis leadership and strategic foresight, although not necessarily in organizational connectivity, suggesting a learning curve grounded in environmental familiarity.

These patterns confirm that the proposed model sensitively captures demographic differences, especially in personal attributes such as gender, age, and marital status. The absence of significant differences linked to education level highlights the importance of promoting practical training over academic credentials. Additionally, time in Gamarra emerged as a relevant predictor across several resilience dimensions.

The linear regression model revealed that identifying as male correlated with a lower average resilience score, showing a decrease of 0.204 units compared to females. Age positively predicted resilience, with a 0.1041-point increase in the dependent variable per additional year. Changes in education level and marital status did not significantly impact resilience. However, for each additional year in Gamarra, the resilience score dropped by 0.1713 units, indicating a significant negative effect.

The logistic regression model reinforced these findings. Being male significantly reduced the probability of high resilience. Higher age multiplied the likelihood of high resilience by a factor of 10.46. While higher education slightly increased the odds, marital status raised the probability by 53%. Conversely, longer tenure in Gamarra drastically decreased the probability of high resilience. Among these, age emerged as the most positive and robust predictor, while time in Gamarra had the strongest negative effect. This suggests that extended exposure to challenging market conditions might deteriorate resilience-related attributes over time.

In conclusion, these results underscore the importance of promoting strategic planning, inter-firm collaboration, distributed leadership, and continuous learning as critical pillars for strengthening resilience among small and medium-sized enterprises facing uncertain environments.

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