SBIR
SMALL BUSINESS INTERNATIONAL REVIEW

JOURNAL: Small Business International Review
ISSN: 2531-0046
SECTION: Research Articles
VOLUME: 8; ISSUE: 1; ELOCATION-ID: e645
DOI: https://doi.org/10.26784/sbir.v8i1.645
SUBMITTED: 2024-04-01
ACCEPTED: 2024-06-18
PUBLISHED: 2024-06-26

Entrepreneurial bricolage: A key to innovation for SMEs in a developing economy

El bricolaje emprendedor: Una clave para la innovación de las PYMEs en una economía en desarrollo

John Paul C. Flaminiano[a,*]
a) Asian Institute of Management R.S.N. Policy Center for Competitiveness, Makati City (Philippines)
** Primary Contact: jpflaminiano.consultant@gmail.com (John Paul C. Flaminiano)*

Abstract
Entrepreneurship promotes economic growth, particularly in developing economies where small and medium-sized enterprises (SMEs) are a significant source of employment and economic activity. However, SMEs in developing countries often face various resource constraints and weak institutions, forcing them to engage in entrepreneurial bricolage behavior by creatively combining existing resources. This study explores the relationship between entrepreneurial bricolage and product, process, and marketing innovation among SMEs in the Philippines. Logistic regression estimates reveal that entrepreneurial bricolage has a significant and positive impact on product, process, and marketing innovation. As entrepreneurial bricolage behavior increases, so does the probability of innovation, highlighting the importance of creative problem-solving in settings with inadequate resources. The study also emphasizes the need for policies that support SMEs by providing enabling resources, such as robust infrastructure and reliable communication platforms, to encourage firm innovation that fosters positive spill-over effects on the broader economy.

Keywords: SMEs; bricolage; innovation; entrepreneurship
JEL Classification: L26; O30; O31

Resumen
El espíritu empresarial fomenta el crecimiento económico, sobre todo en las economías en desarrollo, donde las pequeñas y medianas empresas (PYMEs) son una fuente importante de empleo y actividad económica. Sin embargo, las PYMEs de los países en desarrollo se enfrentan a menudo a diversas limitaciones de recursos y a la debilidad de las instituciones, lo que les obliga a adoptar un comportamiento emprendedor mediante la combinación creativa de los recursos existentes. Este estudio explora la relación entre el las empresas de bricolaje y la innovación en productos, procesos y marketing en las PYMEs filipinas. Las estimaciones de regresión logística revelan que el bricolaje empresarial tiene un impacto significativo y positivo en la innovación de productos, procesos y marketing. A medida que aumenta el bricolaje empresarial, también lo hace la probabilidad de innovación, lo que pone de relieve la importancia de la resolución creativa de problemas en entornos con recursos insuficientes. El estudio también subraya la necesidad de políticas que apoyen a las PYMEs proporcionándoles recursos propicios, como infraestructuras sólidas y plataformas de comunicación fiables, para fomentar la innovación empresarial que promueva efectos indirectos positivos en la economía en general.

Palabras clave: PYMEs; bricolaje; innovación; emprendimiento
Clasificación JEL: L26; O30; O31

How to cite this article
Flaminiano, J. P. C. (2024). Entrepreneurial bricolage: A key to innovation for SMEs in a developing economy. *Small Business International Review*, *8*(1), e645. https://doi.org/10.26784/sbir.v8i1.645

1. Introduction

Entrepreneurship continues to be an important driver of economic growth, influencing the evolution of markets and industries in an era of dynamic innovation characterized by advancements in technology (Kim et al., 2022). In developing economies, small and medium enterprises (SMEs) have emerged as preferred economic entities, partly due to their adaptability and capacity to adjust and thrive in unfamiliar circumstances (Bauchet & Morduch, 2013; Manzoor et al., 2021; Savlovschi & Robu, 2011). However, small businesses in developing economies are often faced with conditions characterized by limited resources (Simba et al., 2021). The concept of entrepreneurial bricolage, where business owners improvise by employing combinations of available resources to address new challenges and opportunities (Baker & Nelson, 2005), has become an integral part of understanding the behavior and resource utilization strategies of entrepreneurs facing less-than-ideal environments. Resource constraints, along with a lack of institutional support, have forced resourceful SMEs in developing countries to make do with what is available (Zahoor et al., 2022).

The concept of bricolage has garnered considerable interest in the field of entrepreneurship as a creative method for fostering innovation. By demonstrating how opportunities can be maximized despite being in resource-constrained environments (Lassila et al., 2020), entrepreneurial bricolage represents a departure from conventional notions of innovation and instead emphasizes resourcefulness, adaptability, and creativity (Davidsson et al., 2017; Machado, 2020). Conventional paradigms of innovation commonly entail significant financial allocations and the availability of ample resources. These models often follow a straight and methodical progression, wherein scientific and technological developments give rise to research and development (R&D) activities, which are subsequently translated into marketable innovations by enterprises (Cirera et al., 2020). However, despite being considered an important engine of innovation, bureaucratic obstacles and other external costs hamper available resources and become roadblocks to entrepreneurship, especially in developing countries (Ciambotti et al., 2023; Doruk & Söylemezoğlu, 2014). Many entrepreneurs are faced with the challenge of navigating an environment characterized by high levels of uncertainty and ambiguity. This may be especially true for entrepreneurs in developing countries, where enterprises face higher degrees of uncertainty on average, and where employment, sales, and investment data are more erratic in comparison to developed countries (Avalos et al., 2023). Regardless of the limitations imposed by these constraints, entrepreneurial bricolage can allow entrepreneurs with limited resources to generate solutions by maximizing available resources and employing innovative and creative methods of putting these resources to use.

The research objective of this study was to examine empirically the impact of entrepreneurial bricolage behavior on innovation in small and medium enterprises (SMEs) operating in the Philippines, with a particular focus on product, process, and marketing innovations. This paper intends to address a specific gap identified in the literature. While several papers (Baker & Nelson, 2005; Senyard et al., 2014) have analyzed the relationship between entrepreneurial bricolage and innovation, there has been less research that focuses on different types of innovation, such as product, process, or marketing innovations (Demircioglu et al., 2019).

Using a logistic regression model, this study analyzed the impact of bricolage behavior on various dimensions of innovation, controlling for factors such as owner characteristics, business constraints, and industry-specific variables. Estimates from the regressions indicated that entrepreneurial bricolage behavior has a positive and statistically significant effect on product, process, and marketing innovation. This result suggests that as entrepreneurial bricolage behavior increases, the probability of undertaking these types of innovation also increases. The regressions controlled for owner characteristics such as educational attainment, previous entrepreneurial experience, and risk aversion, as well as various indicators of business constraints and challenges such as firm size, infrastructure, and competition, and fixed factors such as industry and location. To provide a more practical interpretation of the estimates, logit regressions using odds ratios were also presented.

The significance of this study lies in providing insights for policymakers and business leaders by illustrating how entrepreneurial bricolage can be leveraged to tackle resource limitations and foster innovation in developing economies. Understanding the role of bricolage in facilitating innovation holds particular significance in the context of SMEs in developing countries, where small businesses encounter many resource constraints. This research contributes to the existing literature on entrepreneurial bricolage by conducting an empirical analysis of its relationship with innovation. Policymakers may derive insights from the study's results in establishing policies that help small enterprises in developing countries overcome resource constraints.

2. Literature review

This study aims to fill a gap in the existing research on factors influencing entrepreneurship and innovation in a developing country setting. Several factors, including access to finance, infrastructure, and social norms, vary considerably between developed and developing countries and hence have distinct effects on factors influencing entrepreneurship. For instance, small businesses in developing countries may face different

financing constraints, but not all of these factors have been well-examined (Fowowe, 2017). Social variables can impact entrepreneurial behavior and innovation, and some may vary by country (Urbano et al., 2019). Therefore, it is important to consider the unique social environment specific to a country. For instance, research has shown that Filipino culture tends to gravitate towards resourcefulness and innovation, with the local phrase “madiskarte” ingrained in the language (Rose & Morales, 2017).

2.1 Entrepreneurial bricolage and innovation

The term “bricolage” has its origins in anthropology (Levi-Strauss, 1966), where it originally described the process of creating something using an assortment of readily available materials and tools. Since then, the term has been used in a variety of contexts and domains, including research on entrepreneurship (Fisher, 2012). Entrepreneurial bricolage (EB) is a concept described in the literature as the practice of utilizing available resources in innovative ways to address novel challenges and capitalize on emerging opportunities (Baker & Nelson, 2005). It heavily involves improvisation, adaptation, and putting available resources to their best use to overcome challenges and maximize opportunities. In constraint theories (Casson, 1982), the scarcity of resources is considered a barrier because resources were previously assumed to be predetermined, objective, problem-free, and independent of any one organization (Baker & Nelson, 2005; Lassila et al., 2020). On the other hand, the bricolage perspective posits that scarcity can also serve as a catalyst for the creation of opportunities (Lassila et al., 2020; Salunke et al., 2013).

This perspective suggests that entrepreneurial bricolage has the potential to promote innovation by encouraging a more flexible attitude that is open to exploring, which may result in the development of new ideas and processes. Bricolage can also be viewed as a resource-management strategy used by entrepreneurs to devise creative techniques to circumvent resource constraints or maximize the use of underutilized assets, which might not have arisen in more resource-abundant settings (Baaken et al., 2022; Malmström, 2014; Varughese & Metilda, 2017). When faced with limited resources, entrepreneurial bricolage enables entrepreneurs to repurpose and maximize the use of existing assets such as technologies (Baker & Nelson, 2005; Yu & Wang, 2021). Innovation is the process of generating or implementing new or improved ideas, processes, goods, or services that result in improvements, breakthroughs, or unique solutions (OECD, 2005). At the firm level, innovation refers to changes in an organization where labor, capital, information, and other resources are transformed into products and services of higher value (Christensen et al., 2019). This includes product, process, and marketing innovation. Through bricolage, entrepreneurs may utilize pre-existing technologies in creative ways to effectively meet market demands or challenges. The adaptable approach of entrepreneurial bricolage can result in unique applications and uses of existing technologies, as well as encourage the adoption of new technologies.

2.2 Attributes and other factors affecting entrepreneurial bricolage and innovation

Bricolage often arises in situations characterized by a scarcity of resources, where entrepreneurs encounter limitations in their ability to obtain resources. The scarcity of resources may serve as a catalyst for entrepreneurs to employ bricolage as a strategic approach to attain innovation (Xiaobao et al., 2022). There are various entrepreneurial attributes and external and environmental factors that have the potential to facilitate innovation among business owners who engage in bricolage. These include adaptability and flexibility, experience, attitude toward risk, professional networks and relationships, cultural and social factors, and access to new technologies. Entrepreneurs who are adaptable and flexible in their strategies are in an advantageous position to engage in bricolage. These entrepreneurs display the ability to swiftly adapt to changing circumstances and make unconventional uses of resources that promote innovation (Yu et al., 2020).

Experience is also valuable in supporting innovation among entrepreneurs engaged in bricolage. Experienced entrepreneurs may have a heightened understanding of limitations in resources and exhibit adeptness in devising innovative solutions to challenges (Li et al., 2022). This experience has the potential to improve their ability to engage in bricolage and use it as a means of encouraging innovation. Substantial entrepreneurial experience is also associated with an improved capacity to identify opportunities, enabling seasoned business owners to comprehend and seize industry trends, discern potential market demands, and undertake targeted initiatives to effectively adapt to the market environment (Li et al., 2022). Risk tolerance is another important factor that facilitates the ability of bricolage entrepreneurs to engage in innovative activities. The willingness to take risks has been identified as a critical component of innovation culture (Claver et al., 1998; Ekvall, 1996; Giaccone & Magnusson, 2022). Since innovation heavily relies on discovering and implementing novel ideas (Baer, 2012; MacGregor, 2006), entrepreneurial risk appetite can be considered a driver of innovation as it encourages the emergence of new and uncertain ideas, fostering creative combinations of various resources (Giaccone & Magnusson, 2022; Ling et al., 2008; Wu et al., 2005). Entrepreneurs who possess a higher tolerance for risk are more inclined to explore non-traditional resource combinations (Hvide & Panos, 2014). Thus, entrepreneurial risk tolerance has the potential to positively influence the process of bricolage-led innovation.

Apart from entrepreneurial characteristics, various external and environmental factors may influence the innovation of bricolage entrepreneurs. For example, entrepreneurial networks and relationships can facilitate access to a vast array of resources and knowledge (Hamdani & Salah, 2019). Additionally, entrepreneurs with diverse networks are more likely to locate resources for bricolage-driven innovative solutions (Dodd & Keles, 2014; Sullivan & Ford, 2014). Many bricolage entrepreneurs rely on the resources provided by various stakeholders to facilitate the growth and development of their own operations (Zott & Huy, 2007). Moreover, emerging enterprises often create their competitive advantages by establishing strategic alliances and collaborations with other organizations (Soh, 2010). An entrepreneur's cognitive framework and strategic attitude toward innovation can be shaped by cultural and social influences (Estrada-Cruz et al., 2019). In certain cultural settings such as developing countries, the practice of bricolage may be more extensively adopted and even perceived as a strategy for overcoming obstacles (Busch & Barkema, 2021; Simba et al., 2021). Several studies (Busch & Barkema, 2021; Simba et al., 2021) that analyzed resource-constrained small businesses in Sub-Saharan Africa found that the “make-do improvisation” approach to decision-making associated with entrepreneurial bricolage is more than a business strategy or a means to temporarily get by; instead, it has become ingrained as common practice in environments with scarce resources.

3. Theory and hypothesis

3.1 Theoretical framework: resource-based view (RBV) and entrepreneurial bricolage

The Resource-Based View (RBV) is a valuable theoretical framework for analyzing the impact of entrepreneurial bricolage behavior on innovation, especially in environments with limited resources such as developing countries (Barney, 1991). According to the Resource-Based View (RBV), not all resources hold the same level of value, and firms can achieve a competitive edge by leveraging their valuable internal resources, which competitors may find difficult to replicate or replace (Barney, 1991). While RBV highlights the importance of effectively managing available resources to maximize an organization's capabilities, entrepreneurial bricolage behavior involves creatively utilizing a firm’s available assets to encourage innovation when faced with resource constraints (Baker & Nelson, 2005). The concept of entrepreneurial bricolage aligns with the Resource-Based View (RBV) in providing a framework for how entrepreneurs can strategically use internally available resources to gain a competitive edge and enhance their firm's performance. This approach can be especially effective in developing country settings, where small business owners must constantly navigate and overcome the various challenges and limitations presented by their environment.

3.2 Research hypotheses

The innovative combination of resources, which is an essential component of bricolage, allows small and medium-sized enterprises (SMEs) to develop new products or make considerable improvements to existing ones. Particularly, SMEs engaged in entrepreneurial bricolage behavior are more inclined to innovate their products. This inclination arises from a need to maximize the use of limited resources and address constraints, which frequently leads to innovative problem-solving and thinking outside conventional boundaries. SMEs may then develop unique product innovations that meet, and could even create, new market demands through persistent reinvention. This strategy not only allows SME bricoleurs to differentiate themselves but also ensures they stay one step ahead of competitors by addressing market needs in new and interesting ways.

H1: *Entrepreneurial bricolage behavior is significantly associated with a higher probability of product innovation among SMEs.*

In a similar manner, SMEs engaged in entrepreneurial bricolage behavior are also more inclined to innovate in their production and service delivery processes since they are able to optimize and improve efficiency despite facing resource constraints. This is likely because entrepreneurial bricolage encourages a creative approach to problem-solving and adaptability, enabling SMEs to uncover fresh strategies to improve their operations. As a result, this flexible approach not only improves their operational capabilities but also allows them to stay competitive in constantly evolving market environments.

H2: *Entrepreneurial bricolage behavior is significantly associated with an increased probability of process innovation among SMEs.*

Entrepreneurial bricolage behavior can help SMEs in resource-challenged settings develop innovative marketing strategies and practices to expand market reach and engage customers. Entrepreneurial bricolage fosters creativity, encouraging SMEs to think outside the box and find unique ways to connect with customers through novel marketing and advertising campaigns. By utilizing novel approaches, SMEs are able to differentiate themselves from competitors and establish stronger connections with their customers. This

flexibility not only enhances their visibility but also enables them to cultivate stronger customer relationships through creative marketing strategies.

H3: *Entrepreneurial bricolage behavior is significantly associated with a higher probability of marketing innovation among SMEs.*

4. Methodology

This section presents an overview of the sample and the methods employed in this study to examine the influence of entrepreneurial bricolage on innovation among SMEs in the Philippines, with a specific focus on product, process, and marketing innovation. The Philippine context presents various characteristics that make it important for researching entrepreneurial bricolage and innovation among SMEs. First, the Philippines has a large informal sector with a high level of informal economic activity occurring concurrently with formal economic activity. Understanding entrepreneurial bricolage tendencies and innovation in this context helps comprehensively explain how entrepreneurs creatively use limited resources in various settings to overcome limitations. Additionally, with unique cultural values such as placing a premium on resourcefulness ("madiskarte") and being community-oriented (Rose & Morales, 2017), uncovering context-specific dynamics can offer practical implications to enable SMEs in the Philippines to become more innovative in the face of limited resources.

4.1 Data and sample

This study used data from the 2023 Asian Institute of Management Rizalino S. Navarro Policy Center for Competitiveness (AIM-RSN-PCC) Survey on Small and Medium-Sized Enterprise Resources. The survey, conducted from September to October 2023, included a total of 500 respondents from Small and Medium-Sized Enterprises (SMEs) as defined by The Department of Trade and Industry (DTI) across the different regions in the Philippines, with representation from NCR, the rest of Luzon, Visayas, and Mindanao. The distribution of samples was computed based on the 2021 Philippine MSME statistics (Department of Trade and Industry, 2022). Table 1 shows how samples were drawn from the target population of Philippine SMEs.

Table 1. Distribution of SMEs in the sample

	Number of Establishments, SMEs*	% Share	Computed Sample	Adjusted Sample (±5% MOE)
National Capital Region	28,506	29%	145.93	145
Balance Luzon	35,848	37%	183.52	185
Visayas	16,667	17%	85.33	85
Mindanao	16,646	17%	85.22	85
Total	**97,667**	**100%**	**500**	**500**

Source: 2021 Philippine MSME statistics
https://www.dti.gov.ph/resources/msme-statistics
https://dtiwebfiles.s3.ap-southeast-1.amazonaws.com/BSMED/MSME+2021+Statistics/2021+Philippine+MSME+Statistics+in+Brief.pdf

This study was conducted through an online survey using a nationally representative panel database. Artificial Intelligence (AI) software was used to randomly select participants across various regions and provinces in the Philippines. Panel members who satisfied the minimum age (18 years old) and location requirements were selected at random and invited to participate in the survey. Further screening was conducted to determine whether the potential respondents met the other selection requirements, such as being SME owners, senior managers, decision-makers, or other key influencers for the company, and if they had been in their current position for at least two years. Random sampling was conducted until the desired target quota was achieved, ensuring that the distribution of Micro, Small, and Medium-Sized Enterprises (MSMEs) corresponded with the official government statistics in the Philippines. To guarantee adherence to quality standards, data quality checks and validation procedures were implemented. The sample sizes utilized in this study were determined by taking into consideration the study's objectives, coverage, and the qualifications of the respondents.

The selection of SMEs included in the sample was based on a specified set of inclusion criteria. All firms in the sample were designated as small and medium-sized enterprises (SMEs) according to the definition of the Philippine government (Aldaba, 2012). This classification was determined based on the total asset size (excluding land) and the employment size of the firms. Additionally, these organizations had been operating for at least two years and had valid business permits registered for the year 2023. Similarly, there were inclusion criteria for the respondents from the sampled firms. These criteria included being the owner or manager of the business, actively participating in the strategy and management of firm operations, and holding their current role or position in the organization for at least two years.

4.2 Variables

To evaluate the firm's inclination for product innovation, questions were asked about whether the business had introduced new products or services to the market in the last two years or improved its existing products or services. Between these two questions measuring product innovation, the question about whether the company had improved its current products and services was better suited for assessing product innovation as it pertained to enhancing the firm's existing products or services. In contrast, the question of whether the company introduced new products or services to the market could encompass both entirely new products and services and those already available elsewhere but not in the market the business currently serves. Additionally, the study asked whether the firm had improved its production or service delivery processes over the last two years to measure process innovation, which assessed the firm's inclination to improve production or service delivery efficiency. Finally, to measure marketing innovation, the study asked whether the firm had improved its marketing operations in the last two years. This question assessed the firm's tendency to implement marketing strategies designed to increase its exposure. Table 2 below provides a summary of the dependent variables tested, while the overview of entrepreneurial bricolage variables and their corresponding factor loadings are shown in Table 3.

Table 2. Dependent variables

Variable	Survey Question	Unit
Product innovation	Improved current products and services (in the last two years)	1 = Yes 0 = No
Process innovation	Improved process of production or service delivery (in the last two years)	
Marketing innovation	Improved marketing (in the last two years)	

The study employed three sets of control variable groups to account for a variety of variables that influenced the tendency to implement innovation, as presented in Table 4. The first group of controls relates to owner characteristics, which include variables such as educational attainment, prior experience, and propensity for risk-taking. Educational attainment was anticipated to have a favorable impact, as individuals with higher levels of education typically demonstrate a stronger understanding of innovative ideas and corporate procedures (Fuentelsaz et al., 2018; Koellinger, 2008). Previous experience can have varying effects, either positive or negative, as it has the potential to influence risk-taking tendencies and shape biases rooted in past successes or failures. On the other hand, risk-taking behavior was expected to have a positive impact since entrepreneurs with a higher appetite for risk were more likely to embrace innovative ideas (Tsai & Luan, 2016).

The second set of controls focused on business constraints and challenges, including infrastructure quality, internet connectivity, competition, and asset size. Some of these variables were based on how the surveyed firms perceived these challenges. A five-point Likert scale, ranging from strongly disagree to strongly agree, was used to evaluate responses to questions regarding internet access and infrastructure. Poor infrastructure and internet connectivity were expected to have a negative impact on innovation, as they impede its implementation (Chen & Wang, 2023; Ebua, 2023). Despite the long-standing view that competition drives innovation, there is no theoretical consensus on the precise relationship between these two variables in a market economy (OECD, 2023). Moreover, empirical evidence suggests competition can have two opposing impacts on firm innovation; while competition can encourage firms to innovate in order to remain competitive, it can also reduce a firm's market share, sales, and profit, making it more challenging to implement costly innovations (Canare & Francisco, 2021). Additionally, asset size was likely to have a favorable impact because larger companies often have more resources for innovation (Abeysekera, 2023; Moen, 1999).

The last set of control variables considered fixed characteristics such as location and industry. These controls account for natural constraints arising from the firms' location and industry. Given that the variables in the previous set of controls were based on perceptions, this set addressed physical constraints, capturing certain aspects of infrastructure quality that may not be fully represented in the prior group. However, the effects of these variables were expected to vary by region and industry.

4.3 Confirmatory factor analysis

To measure entrepreneurial bricolage behavior, this study uses a summated index derived from nine bricolage-related questions from the 2023 Asian Institute of Management Rizalino S. Navarro Policy Center for Competitiveness (AIM-RSN-PCC) Survey on Small and Medium-Sized Enterprise Resources. The survey questions pertaining to entrepreneurial bricolage were developed based on the bricolage scale established by Senyard et al. (2014). Subsequently, these questions were subjected to validation and refinement by Davidsson et al. (2017), drawing upon the theoretical underpinnings laid out in the influential research conducted by Baker and Nelson (2005) on the process of resource construction through entrepreneurial bricolage (Kleine-Stegemann et al., 2024). The primary objective of our study is to assess the broader implications of

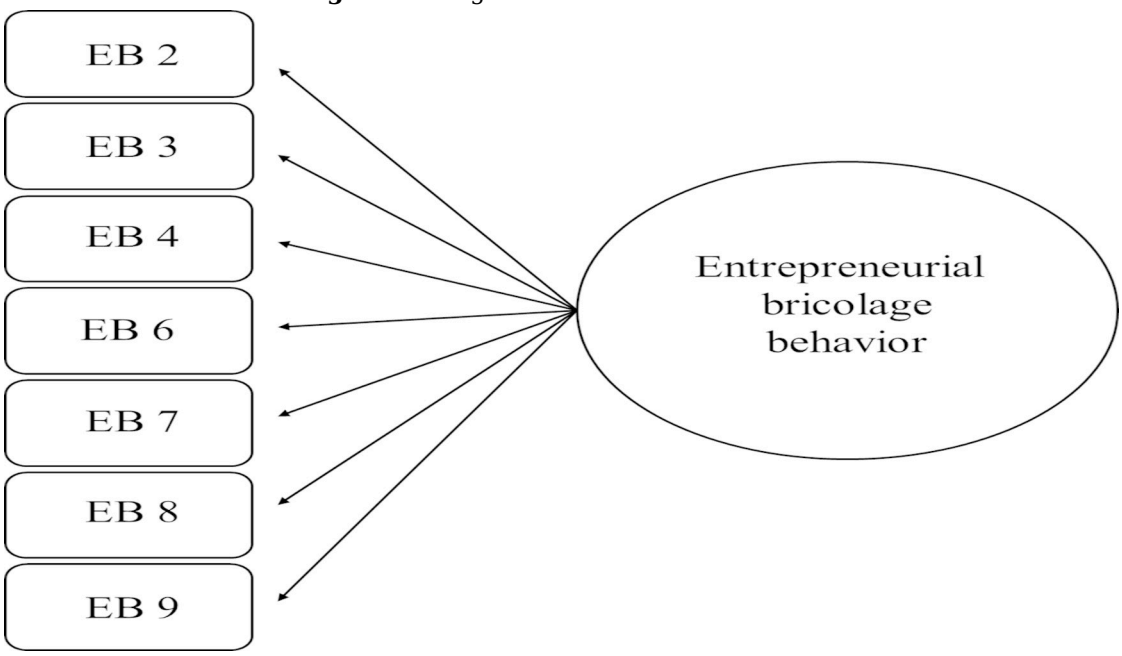
entrepreneurial bricolage on firm innovation, and the summated index of entrepreneurial bricolage behavior was derived through confirmatory factor analysis (CFA).

Latent factors, also known as underlying constructs or unobservable variables, are modeled and explained in Confirmatory Factor Analysis (CFA) (Brown & Moore, 2012). Latent factors are the underlying constructs that the analysis seeks to identify and understand. These factors are deduced from a collection of observable variables (indicators) that are presumed to be linked to them (Brown & Moore, 2012). The one-factor model is a fundamental model used in CFA, and it states that the covariance or correlation between observable variables may be assigned to a single latent component (UCLA: Statistical Consulting Group, 2021). In this study, Entrepreneurial Bricolage behavior (EB) is the underlying factor that accounts for the shared variation among the nine items (17.1 to 17.9) described in Table 2. The factor loadings are also presented, which function similarly to weights in multiple regression analysis (Kline, 2014) by indicating the strength and direction of the relationship between each observed variable and the latent factor (Yong & Pearce, 2013). Variables with high factor loadings are considered reliable predictors of the underlying factor, whereas variables with low factor loadings indicate that they are not valuable in measuring the underlying concept (Yong & Pearce, 2013). MacCallum et al. (2001) suggest that factor loadings in a model should be at least 0.6, which is consistent with the recommendations of Guadagnoli and Velicer (1988) and Field (2005). The variables EB 1 and EB 5 were omitted from the single-factor measurement model based on this criterion for evaluating factor loadings for inclusion in the model (Figure 1). The entrepreneurial bricolage indicator is the summated index derived from factor scores.

Table 3. Entrepreneurial bricolage variables

Variable	Survey Question	Unit	Factor loadings
EB1	Q17.1: We are confident in our ability to find workable solutions to new challenges by using our existing resources.	1 = Never 2 = Rarely 3 = Sometimes 4 = Often 5 = Always	0.579
EB2	Q17.2: We gladly take on a broader range of challenges than others with our resources would be able to.		0.734
EB3	Q17.3: We use any existing resource that seems useful for responding to a new problem or opportunity		0.618
EB4	Q17.4: We deal with new challenges by applying a combination of our existing resources and other resources inexpensively available to us		0.643
EB5	Q17.5: When dealing with new problems or opportunities, we take action by assuming that we will find a workable solution		0.585
EB6	Q17.6: By combining our existing resources, we take on a surprising variety of new challenges		0.709
EB7	Q17.7: When we face new challenges, we put together workable solutions from our existing resources		0.612
EB8	Q17.8: We combine resources to accomplish new challenges that the resources were not originally intended to accomplish		0.665
EB9	Q17.9: To deal with new challenges, we acquire resources at low or no cost and combine them with what we already have		0.634

Figure 1. Single-factor measurement model



4.4 Estimation model

To effectively address the research objectives and account for the characteristics of the data, particularly the dependent variables, the proposed methodology involves the use of a binomial (logistic) regression model. This study assumes that the probability of implementing innovation is a function of bricolage behavior, owner characteristics, business constraints, and other fixed factors. Specifically, this paper uses the following model specified in equation (1).

$$I_i = \alpha + \beta\ Bricolage_i + \gamma\ O + \delta\ C + \theta\ F + \varepsilon_i\ (1)$$

In this equation, is one of the three innovation measures being tested; is the bricolage summated index of the nine bricolage-related questions; is a vector of ownership characteristic variables; is a vector of business constraint variables; is a vector of fixed factors; and is the error term. Since the primary objective of equation (1) is to estimate the probability of implementing innovation given the dichotomous nature of the dependent variables, the preferred method for developing a probability function was the logit model. The logit model has been extensively used in various studies from estimating technology adoption (Foltz, 2003; Nonvide, 2021) to analyzing different factors affecting entrepreneurship (Lafuente & Vaillant, 2013; Noguera et al., 2013). Estimates showing the odds ratios were also presented to provide a more practical interpretation of the results.

5. Results

This section presents the results of statistical analyses. The descriptive results (Summary Statistics) are presented in section 5.1, while the explicative results (logistic outputs) are presented in section 5.2.

5.1 Summary statistics

Table 4 displays the summary statistics of the key variables utilized in the analysis. In this study, the dependent variables are binary. Each of the dependent variables assesses firm innovation from three different viewpoints: product innovation, process innovation, and marketing innovation. This is achieved by inquiring if the organization has introduced innovations within these three dimensions over the past two years. The indicator variable for entrepreneurial bricolage is represented by a summated index, which is derived through confirmatory factor analysis (CFA) that incorporates the factor scores. Control variables, such as the characteristics of the owner and the organization, including both internal and external environmental aspects, as well as other fixed controls, are also utilized.

Table 4. Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Dependent Variables					
Product innovation	500	0.752	0.432	0	1
Process innovation	500	0.718	0.450	0	1
Marketing innovation	500	0.742	0.438	0	1
Independent Variable					
Entrepreneurial bricolage: summated index (EB)	500	-1.28e-09	0.559	-2.517	0.681
Control Variables					
Owner’s education	500	2.426	0.581	1	3
Owner’s previous entrepreneurial experience	500	0.866	0.341	0	1
Owner’s risk appetite	500	2.468	0.739	1	3
Firm size (if medium based on total assets)	500	0.400	0.490	0	1
Poor quality of the firm’s work infrastructure	500	0.272	0.445	0	1
Weak internet and firm communication facilities	500	0.260	0.439	0	1
Competition from rival firms	500	2.712	0.496	1	3
Fixed factors					
Industry (if in services)	500	0.726	0.446	0	1
Location (if in the metro area)	500	0.516	0.500	0	1

5.2 Logistic outputs

The following section presents the results of the regression analysis performed based on the model specified in equation (1). The results of the baseline logistic (logit) regression using the summated entrepreneurial bricolage index derived from the factor scores are shown in Table 5, while the results of the logit regression model with the odds ratios are presented in Table 6, which provides a more practical interpretation of the coefficient estimates.

Table 5. Baseline logit regression

Logit regression	(1) Product innovation	(2) Process innovation	(3) Marketing innovation
EB	0.349*	0.565***	0.486**
	(0.198)	(0.189)	(0.197)
College diploma	1.106**	-0.632	0.629
	(0.477)	(0.529)	(0.493)
Some postgraduate	1.600***	-0.447	0.495
	(0.493)	(0.540)	(0.500)
Previous experience	-0.0582	0.431	0.247
	(0.331)	(0.292)	(0.314)
Risk neutral	-0.606	-0.566	-0.301
	(0.371)	(0.353)	(0.358)
Risk taker	-0.393	-0.509	-0.0689
	(0.338)	(0.323)	(0.323)
Medium-sized firm	-0.0664	0.445**	-0.457**
	(0.231)	(0.223)	(0.223)
Poor infrastructure	-0.733**	-0.543*	-0.551*
	(0.290)	(0.281)	(0.290)
Poor communication	-0.434	-0.305	-0.661**
	(0.288)	(0.280)	(0.286)
Competition: medium	-0.00124	-0.122	-1.247
	(0.757)	(0.754)	(1.085)
Competition: high	0.116	0.201	-0.963
	(0.744)	(0.743)	(1.077)
Services sector	0.333	0.00401	0.155
	(0.239)	(0.233)	(0.238)
Metropolitan area	0.215	0.137	0.0501
	(0.226)	(0.214)	(0.224)
Constant	0.268	1.459	1.892
	(0.903)	(0.941)	(1.196)
Observations	500	500	500

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 presents the results of the baseline logistic regression analysis involving three different models (columns labeled (1), (2), and (3)) that explore the relationship between entrepreneurial bricolage behavior and various control variables, and three different types of innovation (product, process, and marketing innovation). In column 1, the dependent variable is product innovation, which refers to whether the firm has improved its current products and services in the past two (2) years. Entrepreneurial bricolage has a statistically significant coefficient estimate that indicates a positive relationship with product innovation. This finding implies that there is a positive relationship between a higher inclination for entrepreneurial bricolage behavior and an increased probability of engaging in firm product innovation, which entails improving current products or services. Furthermore, there is a statistically significant and positive correlation between a higher education level of the business owner and the probability of innovating the firm's products or services, suggesting that, relative to high school graduates (baseline category), having a college diploma and attaining postgraduate education have a positive and statistically significant effect on product innovation. Conversely, poor-quality work infrastructure negatively impacts product innovation.

Column 2 shows the results of the baseline logit regression with process innovation (whether the firm has improved its production or service delivery processes over the last two years) as the dependent variable. The coefficient estimate of entrepreneurial bricolage is statistically significant at the 1 percent level, indicating a strong positive relationship with process innovation, and suggesting that a higher tendency for entrepreneurial bricolage behavior is associated with an increased probability of improving a firm's production or service delivery processes. This result is consistent with product innovation in column 1. However, the coefficient estimates suggest that the firm owner's education has no statistically significant impact on the probability of engaging in process innovation. Medium-sized firms are also more likely to improve their production or service delivery processes relative to small firms, but poor infrastructure quality also negatively impacts process innovation.

The dependent variable in column 3 is marketing innovation, or whether the firm's marketing has improved over the last two years. Column 3 shows a positive and statistically significant coefficient estimate for entrepreneurial bricolage, which is consistent with the results in columns 1 and 2. The coefficient estimate for entrepreneurial bricolage is significant at the 1 percent level, indicating a strong positive relationship between entrepreneurial bricolage tendencies and marketing innovation. This provides suggestive evidence that firm owners who exhibit entrepreneurial bricolage behavior are more likely to enhance their marketing efforts. In contrast to the findings presented in column 2, which indicate a higher propensity for process innovation among medium-sized enterprises, the results in column 3 indicate a greater probability of marketing

innovation among small firms. The findings across all three models consistently demonstrate that there is a strong and negative correlation between poor-quality infrastructure and innovation. Similarly, having weak internet and communication facilities is associated with a reduced probability of engaging in marketing innovation.

To provide a more practical interpretation of the magnitude of coefficient estimates, the results of a logistic regression that show the odds ratios are presented in Table 6. The odds ratios quantify the impact of a one-unit change in each independent variable on the odds of engaging in product, process, or marketing innovation.

Table 6. Logit regressions with odds ratios

	(1) Product innovation	(2) Process innovation	(3) Marketing innovation
EB	1.418*	1.760***	1.626**
	(0.281)	(0.333)	(0.320)
College diploma	3.023**	0.532	1.875
	(1.442)	(0.281)	(0.924)
Some postgraduate	4.954***	0.639	1.641
	(2.442)	(0.345)	(0.820)
Previous experience	0.943	1.539	1.280
	(0.312)	(0.450)	(0.402)
Risk neutral	0.545	0.568	0.740
	(0.202)	(0.200)	(0.265)
Risk taker	0.675	0.601	0.933
	(0.228)	(0.194)	(0.302)
Medium-sized firm	0.936	1.560**	0.633**
	(0.216)	(0.347)	(0.141)
Poor infrastructure	0.480**	0.581*	0.576*
	(0.139)	(0.163)	(0.167)
Poor communication	0.648	0.737	0.516**
	(0.187)	(0.207)	(0.148)
Competition: medium	0.999	0.885	0.287
	(0.756)	(0.667)	(0.312)
Competition: high	1.123	1.222	0.382
	(0.835)	(0.909)	(0.411)
Services sector	1.395	1.004	1.168
	(0.333)	(0.234)	(0.278)
Metropolitan area	1.239	1.146	1.051
	(0.280)	(0.245)	(0.235)
Constant	1.308	4.301	6.634
	(1.181)	(4.047)	(7.937)
Observations	500	500	500

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The odds ratio represents the degree to which the odds of pursuing product, process, or marketing innovation varies with each incremental change in the entrepreneurial bricolage index. However, accurately quantifying a unit increase in entrepreneurial bricolage behavior poses challenges due to the nature of the variable. While the estimates indicate that a one-unit increase in entrepreneurial bricolage behavior is associated with 41.8 percent higher odds of undertaking product innovation, 76 percent higher odds of engaging in process innovation, and 62.6 percent higher odds of carrying out marketing innovation, it is difficult to precisely measure what a unit increase in entrepreneurial bricolage behavior entails in practice based on the EB index. Nonetheless, it is important to recognize that there is a significant and positive relationship between the innovation of products, processes, and marketing and entrepreneurial bricolage behavior. This suggests that higher levels of entrepreneurial bricolage tendencies are associated with a greater chance of participating in innovative activities such as product development, process improvement, and marketing strategies.

The relationship between higher education levels and firm innovation is only statistically significant in the context of product innovation; no statistically significant relationship is found in relation to process or marketing innovation. The impact of firm size on innovation remains ambiguous. Medium-sized firms have 56 percent higher odds of engaging in process innovation compared to small firms but are less likely to pursue marketing innovation (36.7 percent lower odds). The presence of substandard business infrastructure quality is also associated with reduced odds of undertaking product innovation by 52 percent, process innovation by 41.9 percent, and marketing innovation by 42.4 percent, relative to having good-quality firm infrastructure. Similarly, the presence of weak internet and communication systems in a firm is correlated with a 48.4 percent decrease in the odds of engaging in marketing innovation, compared to having reliable internet and communication resources.

In summary, entrepreneurial bricolage behavior has a positive and statistically significant effect on all three types of innovation: product, process, and marketing. The results support the research hypotheses, demonstrating that entrepreneurial bricolage behavior is significantly linked to a higher probability of innovation in products (H1), processes (H2), and marketing (H3). This suggests that as entrepreneurial bricolage behavior increases, the odds of undertaking these types of innovation also increase. While the effect of firm size on the probability of undertaking innovation is ambiguous, poor firm infrastructure, internet, and communication facilities are associated with reduced odds of engaging in innovative activities.

6. Discussion and conclusions

6.1 Main findings

This study explored the relationship between entrepreneurial bricolage behavior and product, process, and marketing innovation within the context of small and medium-sized enterprises (SMEs) in the Philippines. Using logistic (logit) regression models, we found suggestive evidence that entrepreneurial bricolage behavior has a significant and positive impact on all three types of innovation. As entrepreneurial bricolage behavior increases, so does the probability of engaging in product innovation, which involves improving current products and services, emphasizing the importance of improvisation and resource optimization in fostering product innovation. Similarly, a strong positive relationship between entrepreneurial bricolage behavior and process innovation was found, reinforcing the notion that adaptability and creative resource utilization play a vital role in improving a firm’s production or service delivery process. Notably, the impact of firm size on process innovation was ambiguous, while poor infrastructure quality was found to negatively affect process innovation. The estimates indicate a significant and positive relationship between marketing innovation and entrepreneurial bricolage activity, suggesting that business owners with a stronger inclination for entrepreneurial bricolage are more likely to boost their marketing efforts. However, in contrast to the results for process innovation, small firms were more likely to engage in marketing innovation, indicating their capacity to react quickly and creatively to shifting marketing environments. Poor infrastructure quality, as well as inadequate internet and communication capabilities, were also shown to be negatively related to marketing innovation, emphasizing the need for appropriate resources to support innovation.

6.2 Discussion

The results highlight the positive relationship between entrepreneurial bricolage and product, process, and marketing innovation among SMEs in the Philippines. The study also emphasizes the need for policies that support enabling resources for SMEs in developing countries, such as robust infrastructure, including reliable internet and communication platforms. The results of this study support similar findings in the literature (Baker & Nelson, 2005; Senyard et al., 2014) by demonstrating that entrepreneurial bricolage behavior significantly increases the predisposition of SMEs to innovate in terms of products, processes, and marketing. This confirms the research hypotheses, showing that entrepreneurial bricolage behavior is significantly associated with a higher probability of product (H1), process (H2), and marketing (H3) innovation. This also offers valuable insights into how entrepreneurial bricolage and product, process, and marketing innovation are linked in small and medium-sized enterprises (SMEs) in the context of a developing economy such as the Philippines. The significant and positive relationship between bricolage behavior and various types of innovation provides suggestive evidence that SMEs who engage in bricolage may not simply be improvising because they lack resources. Instead, they are skillfully utilizing the resources they possess to introduce significant innovations in different aspects of their operations. The findings highlight the important role that resource constraints play in shaping entrepreneurial innovation. Even with limited resources, SMEs that embrace bricolage are geared toward finding innovative and unconventional solutions. These firms are inclined to turn limitations into competitive advantages. However, evidence from this study further reinforces the notion in the literature that poor infrastructure and weak communication networks impede all types of innovation (Foster et al., 2023). This aspect highlights the importance of supportive external environments to improve the effectiveness of entrepreneurial bricolage in innovation. Nevertheless, the main findings highlight the significance of bricolage in driving product, process, and marketing innovations, in line with the idea of Baker and Nelson (2005) that constraints may stimulate creative problem-solving. Moreover, the findings of Salunke et al. (2013) that firms utilize bricolage as a means to overcome resource scarcity and promote service innovation align with this study's findings on process and marketing innovations.

6.3 Academic and practical contributions

This study generally supports and adds to the current literature by offering detailed insights into the complex relationship between entrepreneurial bricolage and innovation in the context of a developing country. Encouraging entrepreneurial bricolage behavior in SMEs in developing economies is crucial for fostering sustainable growth and innovation in environments with limited resources. This empowers small businesses to strategically leverage their assets, fostering economic resilience and maximizing available resources. By focusing on SMEs in the Philippines, this study adds to our understanding of how entrepreneurial bricolage

behavior is demonstrated in environments with limited resources and institutional gaps.

Given the significance of these findings, we propose the following policy recommendations. Strategic resource allocation plays a crucial role in promoting innovation, particularly in contexts where resources are limited. While certain resources may be scarcer than others, policymakers should focus on providing alternative types of support to SMEs in developing countries like the Philippines, such as initiatives that go beyond financial assistance. Policy initiatives, such as improving access to technology and training programs, can help entrepreneurs and their employees enhance their problem-solving abilities and creativity. Policymakers should also invest in capacity-building initiatives to help small business owners improve their business acumen. This may involve training to maximize or strategically allocate available resources, adaptive problem-solving, and creative thinking to assist SMEs in overcoming resource constraints. Infrastructure and institutional support are also crucial components in enabling organizations to innovate in environments with limited resources. Improving infrastructure quality, especially reliable internet connections and communication capabilities, is vital for facilitating innovation among SMEs. Policymakers must consider the importance of infrastructure development in supporting efficient and productive business operations. Given the significance of external factors in enabling SMEs to innovate, policies that aim to strengthen institutions and promote entrepreneurial activity, such as business incubators, mentorship programs, and regulatory frameworks that encourage innovation, must be prioritized. This can contribute to the creation of an enabling environment for SMEs to thrive. Finally, encouraging collaboration and knowledge sharing among SMEs can stimulate innovation and create industry-wide positive spill-over effects. Supporting networking events, industry clusters, and platforms that enable SMEs to share best practices and exchange ideas can encourage collective learning, leading to innovation.

6.4 Limitations and lines for future research

This study has several limitations that can be addressed in future research. First, although this study uses cross-sectional data, conducting longitudinal studies that track small businesses over time through varying economic cycles, including severe economic downturns and crises, is an important consideration for future research. This can provide insights into how attitudinal inclinations toward innovation vary with economic conditions and whether these conditions influence entrepreneurial bricolage behavior. Additionally, this study only includes small and medium-sized enterprises (SMEs). By including micro-enterprises in the sample (MSMEs), additional complexities and nuances that are not accounted for when looking only at SMEs may arise. This can also improve the generalizability of future studies, especially in developing country contexts, where the majority of small businesses are classified as micro-enterprises.

There are also some unexpected results, or nuances not typically widely documented, that may need further analysis in future studies. First, the relationship between higher education and innovation is ambiguous in this context. While higher education has been found to have a positive and statistically significant impact on product innovation, it is not significant in terms of process or marketing innovations, which may suggest that the nature of innovation can impact the way educational advantages are leveraged. This is in contrast to the prevailing opinion in the literature (Portuguez Castro et al., 2019; Wang et al., 2021), which suggests that higher education has a wide-ranging impact on enhancing innovative capacities in various domains. Additionally, the relationship between firm size and innovation is also unclear. The notion that medium-sized firms would consistently outperform smaller firms in terms of innovation was not fully supported by the results. Instead, the findings suggest that smaller firms may adjust their marketing strategies more quickly, possibly because they are not weighed down by bureaucratic red tape.

Finally, it is also important to consider cultural factors in future research when discussing attitudes towards entrepreneurship, bricolage behavior, and innovation. Influences ingrained in social norms and culture, such as being “madiskarte”, which represents the spirit of adaptability in the Philippines (Rose & Morales, 2017), can affect entrepreneurs’ overall predisposition towards bricolage behavior.

Acknowledgements

This research was supported by the Konrad-Adenauer-Stiftung (Funder Identifier: http://dx.doi.org/10.13039/501100004079) Grant number: IB-AIM-23-001.

References

Abeysekera, I. (2023). Innovation and business performance in Australia: Role of entrepreneurship and intrapreneurship in a crisis. *Frontiers in Psychology, 14*. https://doi.org/10.3389/fpsyg.2023.1126313

Aldaba, R. (2012). *Small and medium enterprises' (SMEs) access to finance: Philippines. (2012–05; PIDS Discussion Paper)*

Avalos, E., Barrero, J. M., Davies, E., Iacovone, L., & Torres, J. (2023). Business expectations and uncertainty in developing and emerging economies. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4327860

Baaken, T., Liu, L., & Lapornik, L. (2022). Bricolage and growth hacking: two smart concepts of creating a business lacking resources. In *Next Generation Entrepreneurship*. IntechOpen. https://doi.org/10.5772/intechopen.99391

Baer, M. (2012). Putting creativity to work: The implementation of creative ideas in organizations. *Academy of Management Journal, 55*(5), 1102–1119. https://doi.org/10.5465/amj.2009.0470

Baker, T., & Nelson, R. E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. *Administrative Science Quarterly, 50*(3), 329–366. https://doi.org/10.2189/asqu.2005.50.3.329

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Bauchet, J., & Morduch, J. (2013). Is micro too small? Microcredit vs. SME finance. *World Development, 43*, 288–297. https://doi.org/10.1016/j.worlddev.2012.10.008

Brown, T. A., & Moore, M. T. (2012). Confirmatory factor analysis. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 361–379). The Guilford Press

Busch, C., & Barkema, H. (2021). From necessity to opportunity: Scaling bricolage across resource-constrained environments. *Strategic Management Journal, 42*(4), 741–773. https://doi.org/10.1002/smj.3237

Canare, T., & Francisco, J. P. (2021). Does competition enhance or hinder innovation? Evidence from philippine small and medium-sized enterprises. *Southeast Asian Economies, 38*(1), 24–50. https://doi.org/10.1355/ae38-1b

Casson, M. (1982). *The entrepreneur: An economic theory*. Rowman & Littlefield

Chen, J., & Wang, J. (2023). The impact of broadband speed on innovation: City-level evidence from China. *Heliyon, 9*(1), e12692. https://doi.org/10.1016/j.heliyon.2022.e12692

Christensen, C. M., Ojomo, E., & Dillon, K. (2019). *The prosperity paradox: how innovation can lift nations out of poverty. HarperBusiness, an Imprint of HarperCollins Publishers*

Ciambotti, G., Zaccone, M. C., & Pedrini, M. (2023). Enabling bricolage in resource-constrained contexts: the role of sense of community and passion in African social entrepreneurs. *Journal of Small Business and Enterprise Development, 30*(1), 167–185. https://doi.org/10.1108/JSBED-02-2022-0049

Cirera, X., Frias, J., Hill, J., & Li, Y. (2020). *A practitioner's guide to innovation policy: Instruments to build firm capabilities and accelerate technological catch-up in developing countries. In The World Bank Group. The World Bank Group*

Claver, E., Llopis, J., Garcia, D., & Molina, H. (1998). Organizational culture for innovation and new technological behavior. *The Journal of High Technology Management Research, 9*(1), 55–68. https://doi.org/10.1016/1047-8310(88)90005-3

Davidsson, P., Baker, T., & Senyard, J. M. (2017). A measure of entrepreneurial bricolage behavior. *International Journal of Entrepreneurial Behavior & Research, 23*(1), 114–135. https://doi.org/10.1108/IJEBR-11-2015-0256

Demircioglu, M. A., Audretsch, D. B., & Slaper, T. F. (2019). Sources of innovation and innovation type: firm-level evidence from the United States. *Industrial and Corporate Change, 28*(6), 1365–1379. https://doi.org/10.1093/icc/dtz010

Department of Trade and Industry (2022). *2022 Philippine MSME Statistics*

Dodd, S. D., & Keles, J. (2014). *Expanding the networks of disadvantaged entrepreneurs. OECD (Organisation for Economic Co-Operation and Development)*

Doruk, Ö. T., & Söylemezoğlu, E. (2014). The constraints of innovation in developing countries: Too many barriers to start ups? *Procedia - Social and Behavioral Sciences, 150*, 944–949. https://doi.org/10.1016/j.sbspro.2014.09.106

Ebua, E. J. (2023). Investigating the potential of technology to promote development and the ethical and social implications of technological innovation in the context of development. *OALib, 10*(04), 1–23. https://doi.org/10.4236/oalib.1109936

Ekvall, G. (1996). Organizational climate for creativity and innovation. *European Journal of Work and Organizational Psychology, 5*(1), 105–123. https://doi.org/10.1080/13594329608414845

Estrada-Cruz, M., Verdú Jover, A. J., & Gómez Gras, J. M. (2019). The influence of culture on the relationship between the entrepreneur's social identity and decision-making: Effectual and causal logic. *BRQ Business Research Quarterly, 22*(4), 226–244. https://doi.org/10.1016/j.brq.2018.10.002

Field, A. (2005). *Discovering statistics using SPSS. In SAGE (Vol. 2nd, Issue Third Edition)*

Fisher, G. (2012). Effectuation, causation, and bricolage: A behavioral comparison of emerging theories in entrepreneurship research. *Entrepreneurship Theory and Practice, 36*(5), 1019–1051. https://doi.org/10.1111/j.1540-6520.2012.00537.x

Foltz, J. D. (2003). The economics of water-conserving technology adoption in Tunisia: An empirical estimation of farmer technology choice. *Economic Development and Cultural Change, 51*(2), 359–373. https://doi.org/10.1086/367627

Foster, V., Gorgulu, N., Straub, S., & Vagliasindi, M. (2023). *The impact of infrastructure on development outcomes. Policy research working paper 10343. World Bank*. The World Bank. https://doi.org/10.1596/1813-9450-10343

Fowowe, B. (2017). Access to finance and firm performance: Evidence from African countries. *Review of Development Finance, 7*(1), 6–17. https://doi.org/10.1016/j.rdf.2017.01.006

Fuentelsaz, L., Maicas, J. P., & Montero, J. (2018). Entrepreneurs and innovation: The contingent role of institutional factors. *International Small Business Journal: Researching Entrepreneurship, 36*(6), 686–711. https://doi.org/10.1177/0266242618766235

Giaccone, S. C., & Magnusson, M. (2022). Unveiling the role of risk-taking in innovation: antecedents and effects. *R&D Management, 52*(1), 93–107. https://doi.org/10.1111/radm.12477

Guadagnoli, E., & Velicer, W. F. (1988). Relation of sample size to the stability of component patterns. *Psychological Bulletin, 103*(2), 265–275. https://doi.org/10.1037/0033-2909.103.2.265

Hamdani, K., & Salah, K. (2019). Knowledge based entrepreneurship: the role of networks. Paper presented at *Advances in Business Management: A contemporary perspectives*

Hvide, H. K., & Panos, G. A. (2014). Risk tolerance and entrepreneurship. *Journal of Financial Economics, 111*(1), 200–223. https://doi.org/10.1016/j.jfineco.2013.06.001

Kim, J., Petalcorin, C. C., Park, D., Jinjarak, Y., Quising, P., & Tian, S. (2022). Entrepreneurship and Economic Growth: A Cross-Section Empirical Analysis. *Asian development outlook 2022*

Kleine-Stegemann, L., Hensellek, S., Senyard, J., Jung, P. B., & Kollmann, T. (2024). Are bricoleurs more satisfied? How bricolage affects entrepreneur job satisfaction among experienced versus novice entrepreneurs. *Journal of Small Business Management, 62*(3), 1347–1384. https://doi.org/10.1080/00472778.2022.2140159

Kline, P. (2014). *An easy guide to factor analysis*. Routledge. https://doi.org/10.4324/9781315788135

Koellinger, P. (2008). Why are some entrepreneurs more innovative than others? *Small Business Economics, 31*(1), 21–37. https://doi.org/10.1007/s11187-008-9107-0

Lafuente, E. M., & Vaillant, Y. (2013). Age driven influence of role-models on entrepreneurship in a transition economy. *Journal of Small Business and Enterprise Development, 20*(1), 181–203. https://doi.org/10.1108/14626001311298475

Lassila, S., Rieple, A., & Ennis, C. (2020). *Bricolage – a mindset of resourcefulness: Stories as a vehicle for mediating means into resources. HHBIC 2020*

Levi-Strauss, C. (1966). *The savage mind*. University of Chicago Press

Li, Y., Li, B., & Lu, T. (2022). Founders' creativity, business model innovation, and business growth. *Frontiers in Psychology, 13*. https://doi.org/10.3389/fpsyg.2022.892716

Ling, Y., Simsek, Z., Lubatkin, M. H., & Veiga, J. F. (2008). Transformational leadership's role in promoting corporate entrepreneurship: Examining the CEO-TMT interface. *Academy of Management Journal, 51*(3), 557–576. https://doi.org/10.5465/amj.2008.32626023

MacCallum, R. C., Widaman, K. F., Preacher, K. J., & Hong, S. (2001). Sample size in factor analysis: The role of model error. *Multivariate Behavioral Research, 36*(4), 611–637. https://doi.org/10.1207/S15327906MBR3604_06

MacGregor, S. P. (2006). Strategic management of technological innovation. *Journal of Product Innovation Management, 23*(1), 102–104. https://doi.org/10.1111/j.1540-5885.2005.00184_4.x

Machado, H. P. V. (2020). Bricolagem na criação e trajetória de um circo contemporâneo. *Organizações & Sociedade, 27*(93), 314–332. https://doi.org/10.1590/1984-9270938

Malmström, M. (2014). Typologies of bootstrap financing behavior in small ventures. *Venture Capital, 16*(1), 27–50. https://doi.org/10.1080/13691066.2013.863064

Manzoor, F., Wei, L., & Siraj, M. (2021). Small and medium-sized enterprises and economic growth in Pakistan: An ARDL bounds cointegration approach. *Heliyon, 7*(2), e06340. https://doi.org/10.1016/j.heliyon.2021.e06340

Moen, Ø. (1999). The relationship between firm size, competitive advantages and export performance revisited. *International Small Business Journal: Researching Entrepreneurship, 18*(1), 53–72. https://doi.org/10.1177/0266242699181003

Noguera, M., Alvarez, C., & Urbano, D. (2013). Socio-cultural factors and female entrepreneurship. *International Entrepreneurship and Management Journal, 9*(2), 183–197. https://doi.org/10.1007/s11365-013-0251-x

Nonvide, G. M. A. (2021). Adoption of agricultural technologies among rice farmers in Benin. *Review of Development Economics, 25*(4), 2372–2390. https://doi.org/10.1111/rode.12802

OECD (2005). *Oslo manual: Guidelines for collecting and interpreting innovation data. In Communities (Vol. 46). OECD/Eurostat*

OECD (2023). *Competition and innovation: A theoretical perspective*

Portuguez Castro, M., Ross Scheede, C., & Gómez Zermeño, M. G. (2019). The impact of higher education on entrepreneurship and the innovation ecosystem: A case study in Mexico. *Sustainability, 11*(20), 5597. https://doi.org/10.3390/su11205597

Rose, M., & Morales, H. (2017). Defining diskarte: Exploring cognitive processes, personality traits, and social constraints in creative problem-solving. *Philippine Journal of Psychology, 50*(2)

Salunke, S., Weerawardena, J., & McColl-Kennedy, J. R. (2013). Competing through service innovation: The role of bricolage and entrepreneurship in project-oriented firms. *Journal of Business Research, 66*(8), 1085–1097. https://doi.org/10.1016/j.jbusres.2012.03.005

Savlovschi, L. I., & Robu, N. R. (2011). The role of SMEs in modern economy. *Economia, Seria Management, 14*(1)

Senyard, J., Baker, T., Steffens, P., & Davidsson, P. (2014). Bricolage as a path to innovativeness for resource-constrained new firms. *Journal of Product Innovation Management, 31*(2), 211–230. https://doi.org/10.1111/jpim.12091

Simba, A., Ojong, N., & Kuk, G. (2021). Bricolage and MSEs in emerging economies. *The International Journal of Entrepreneurship and Innovation, 22*(2), 112–123. https://doi.org/10.1177/1465750320969621

Soh, P. (2010). Network patterns and competitive advantage before the emergence of a dominant design. *Strategic Management Journal, 31*(4), 438–461. https://doi.org/10.1002/smj.819

Sullivan, D. M., & Ford, C. M. (2014). How entrepreneurs use networks to address changing resource requirements during early venture development. *Entrepreneurship Theory and Practice, 38*(3), 551–574. https://doi.org/10.1111/etap.12009

Tsai, H., & Luan, C. (2016). What makes firms embrace risks? A risk-taking capability perspective. *BRQ Business Research Quarterly, 19*(3), 219–231. https://doi.org/10.1016/j.brq.2016.01.002

UCLA: Statistical Consulting Group (2021). *A practical introduction to factor analysis: Confirmatory factor analysis*

Urbano, D., Aparicio, S., & Audretsch, D. (2019). Twenty-five years of research on institutions, entrepreneurship, and economic growth: what has been learned? *Small Business Economics, 53*(1), 21–49. https://doi.org/10.1007/s11187-018-0038-0

Varughese, A., & Metilda, R. M. (2017). Resource bootstrapping and bricolage: A reflex to scarcity and uncertainty: A case of Indian informal grocery retailers. *Middle-East Journal of Scientific Research, 25*(3), 666–671

Wang, Q., Sun, Z., & Wu, C. (2021). The impact of university innovation and entrepreneurship education on entrepreneurial intention from the perspective of educational psychology. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.745976

Wu, S., Levitas, E., & Priem, R. L. (2005). CEO tenure and company invention under differing levels of technological dynamism. *Academy of Management Journal, 48*(5), 859–873. https://doi.org/10.5465/amj.2005.18803927

Xiaobao, P., Rui, G., Jiewei, Z., & Xiaofan, S. (2022). The impact of resource bricolage on entrepreneurial orientation in start-ups: The moderating roles of TMT heterogeneity and TMT behavioral integration. *Frontiers in Psychology, 13*. https://doi.org/10.3389/fpsyg.2022.900177

Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology, 9*(2), 79–94. https://doi.org/10.20982/tqmp.09.2.p079

Yu, X., Li, Y., Su, Z., Tao, Y., Nguyen, B., & Xia, F. (2020). Entrepreneurial bricolage and its effects on new venture growth and adaptiveness in an emerging economy. *Asia Pacific Journal of Management, 37*(4), 1141–1163. https://doi.org/10.1007/s10490-019-09657-1

Yu, X., & Wang, X. (2021). The effects of entrepreneurial bricolage and alternative resources on new venture capabilities: Evidence from China. *Journal of Business Research, 137*, 527–537. https://doi.org/10.1016/j.jbusres.2021.08.063

Zahoor, N., Khan, H., Khan, Z., & Akhtar, P. (2022). Responsible innovation in emerging markets' SMEs: The role of alliance learning and absorptive capacity. *Asia Pacific Journal of Management*. https://doi.org/10.1007/s10490-022-09843-8

Zott, C., & Huy, Q. N. (2007). How entrepreneurs use symbolic management to acquire resources. *Administrative Science Quarterly, 52*(1), 70–105. https://doi.org/10.2189/asqu.52.1.70