The Impact of Innovation on Formalization and Job Creation of Informal SMEs in Cameroon : Evidence from the World Bank Enterprise Survey

by

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Abstract

The impact of innovation on the formalization and job creation of informal SMEs in Cameroon is examined in this study using data from the World Bank Enterprise Survey 2016. The study found that while technological innovation increases the chances of formalizing a firm, product innovation reduces it. The jobs created are proportional to firm size and the nature of the firm's innovations. The results highlight the need to design the adoption of technological innovations by informal SMEs and encourage the registration of the intellectual property of new products created by them. The study contributes to the understanding of the role of innovation in enabling informal SMEs to generate income and employment, which is essential for sustainable development in African countries. The study also suggests that innovation can be a driver of firm growth, but not necessarily formalization. Overall, the study emphasizes the need for policies that support the adoption and diffusion of innovations by informal SMEs in Cameroon.

Keywords: Innovation, informal SMEs, Job creation, formalization, Cameroon.

JEL Classification: E26, O17, D92, and L25.

1. Introduction

The industrial revolution of the 2000s led to a boom in innovation, which took a considerable place in the production system by promoting the competitiveness and growth of firms (Terziovski 2010; Fu et al. 2018; Mendi and Mudida 2018). After financial factors, previous

studies show (Ayyagari, Demirgüç-Kunt, and Maksimovic 2011) that innovation is the grassroots of firm growth because it leads to economies of scale, improves productivity, and increases sales, which brings benefits (production of goods or services, distribution, marketing, etc.) to enterprises that can integrate it effectively. The introduction, adoption, and adaptation of these innovations vary according to the firm's size and the formal or informal nature of its activities (Lundvall et al. 2009; Kraemer-Mbula et Wunsch 2016).

From an economic point of view, they recognize innovation as being driven mainly by large and formal firms (Schumpeter 1934, 1942; Ayyagari, Demirgüç-Kunt, and Beck 2003; Oslo Manual 2005). However, in developing countries, the small size of most firms classifies them as Small- and Medium-sized Enterprises (SMEs) [1] (General Census of Enterprises 2013). Most of these enterprises operate partly or entirely informally, leading them to become informal enterprises (Demirgu-Kunt 2003; Gebreeyesus 2009; Nkouka et al.). According to these authors, the more a firm innovates, the better it increases its profits, but not necessarily its capacity for formalization.

Thus, the rapid adoption of innovations can not only promote their success by increasing their market share but also their growth. Most studies (De Beer et al., 2013) consider that there is a low rate of innovation in SMEs in Africa, and even less so in those that are reported to be informal. Much work (Bhatti 2012; Mashelkar 2012; Gupta 2013; Meagher and Lindell 2013; Knorringa et al. 2016; Tasker 2021) have been conducted on this issue in developing countries and Africa. They examined the role of innovation in SME productivity. SMEs in developing countries and informal enterprises are non-innovative and do not invest in R&D and knowledge diffusion (Nkouka et al. 2013; Fu et al. 2014). However, these companies contribute to the design of products and services or use low-cost, affordable, and functional (practical) processes and technologies aimed at helping poor or precarious populations (Leliveld and Knorringa 2018). This refers to "frugal" innovation or "inclusive", "jugaad" innovation depending on whether it is inclusive or sustainable (Mashelkar 2012; Bhatti 2012; Banerjee 2013; Gupta 2013; Meagher and Lindell 2013; Kumar and Bhaduri 2014; Knorringa et al. 2016; Mustapha et al. 2021).

According to the National Institute of Statistics (NIS), in 2009, SMEs account for over 95% of the existing businesses in the national territory. The Second Survey on Employment and the

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[1] The definition of SME retained here is that of Law No. 2015/010 of 16 July 2015, amending and supplementing certain provisions of Law No. 2010/001 of 13 April 2010 promoting Small and Medium Enterprises in Cameroon. This law provides in its articles 3 (new) 'a 6 that "the SME is considered as an enterprise, whatever its sector of activity, which employs not more than one hundred (100) people and whose annual turnover excluding taxes does not exceed three (03) billion CFA francs".

Informal Sector (EESI 2 2010) also showed that 86% of them were informal because they started their activities by not being registered or continued to carry out most activities outside of government regulation. There is a low rate of innovation in SMEs in Cameroon and informal SMEs. According to the Second General Census of Enterprises (GCE 2) carried out in 2009 by the National Institute of Statistics (NIS), less than 6% of SMEs made investments in research or technological innovation activities. Although 98% of enterprises use at least one computer and are connected to the Internet, only 6.5% report creating products or services that meet the national or international certification standards. However, innovative organizations are growing faster than non-innovative ones (Gebreeyesus, 2009). Thus, to enable firms to reach an optimal size that can lead to economic development and for policymakers to design adequate policies to reduce informal activities, it is necessary to understand whether innovations in the informal sector exist and how they contribute to the formalization and growth of these firms.

Theoretically, the question of innovation in the informal sector arises first about its real existence in this sector before the question of its implications for performance. Second, studies on innovation show that innovation takes place much more often in developed countries than in developing ones. This is why they are more suited to formal than informal firms (Fu et al., 2018). Fu et al. (2018) find a positive relationship between innovation and firm productivity in developing countries; however, the effect of innovation on growth is more significant for firms in the formal sector than in the informal sector (Sheikh and Bhaduri 2020). This line of research is consistent with Mashelkar (2012), who shows that studies on innovation are carried out much more in developed countries than in developing ones and are adapted to formal rather than informal firms.

Mendi and Mudida (2018) confirm these findings by showing that access to innovation depends highly on the sector in which the firm operates. The authors also argue that, in early informal firms, the entrepreneur's characteristics strongly influence innovation capacity. However, several other studies (De Mel et al. 2009; Daniels 2010; Nancy and Mbaye 2014; De Beer, Fu, and Wunsch-Vincent 2016; Charmes, Gault, and Wunsch-Vincent 2016; Mendi and Mudida 2018; Fu et al. 2014) have challenged this view by explaining that improving the use of intellectual property and innovation in national innovation policies, can foster the growth of informal activities. This reflects that informal enterprises can innovate as formal enterprises. However, there is no consensus on the capacity of innovations to foster their formalization processes and growth.

Despite the level of technological development exported from developed communities to developing countries, SMEs in these countries still cannot: (i) develop, adopt, or adapt innovative technologies in their activities, and (ii) improve their productivity. This problem is even more acute for the SMEs in Cameroon. This is partly because the high cost of technologies such as the Internet is still rising, and their use for SMEs' current activities is low compared with other African countries. For example, the cost of the internet is 460 against 7 Mbp/month/US dollars, which represents the price of international capacity for Egypt and Tunisia. This is also one of the biggest obstacles faced by SMEs and limits their growth. However, because innovation is the engine of enterprise growth, it can also influence the capacity of SMEs to contribute to the economic development process in developing countries. Therefore, what factors can improve the performance of informal enterprises? In other words, how can innovation contribute to improving informal enterprises' performance?

While innovation positively affects firm growth and economic development (Daka and Toivanen, 2014), little is known about how innovation affects the formalization process of SMEs and their growth in developing countries. Consequently, this study examines the impact of the adoption of innovations in improving the process of formalization and job creation of informal enterprises in Cameroon. Specifically, the study examines whether SME innovation (both technological, process, product, research, and development) leads entrepreneurs to formalize their firms on the one hand and whether access to these innovations improves their growth. This study contributes to answering the fundamental question of the determinants of innovation by analyzing the effects of innovation on the formalization and growth of informal firms using the specific case of Cameroon, which has never been realized before.

Informal economics is a vast field of analysis that has been widely explored by many authors for over four decades. Therefore, it is not a new concept in that it has been analyzed under several axes of discipline to determine the causes and consequences of informal activities, their characteristics, their components, and their functioning. Thus, it is no longer a question to study the policies to be applied there, nor to know whether they contribute to economic growth. Therefore, our work focused on identifying the conditions for sustainable development induced by informal activities.

The aim of this study is to go beyond the theoretical questions mentioned above to focus on the factors that can improve the functioning of these activities and enable them to achieve the status of formal activity generating income and employment, which are the conditions for them to contribute to economic development. We then studied the factors of plausible growth and better performance, intending to lead them to promote inclusive growth and sustainable

development. To this end, we retain the innovation factor as being able to promote performance. We assume that access to innovation (technology, processes, products, research, and development) increases the formalization and growth of informal enterprises.

The rest of this paper is organized into five sections, second section reviews the literature on innovation, firm growth, and formalization. The third section examines the characteristics of SMEs in Cameroon in terms of innovation, and the fourth section presents the study's method and data. The fifth and final sections present the results and recommendations, respectively.

2. Literature Review: Exploring the Dynamic Interplay between Innovation, Formalization, and Firm Growth

2.1 Conceptual Framework of Innovation

At the outset, it is crucial to crystallize our understanding of 'innovation,' a concept that morphs across different firm sizes. Despite its recognized role as a driver of economic development, the theoretical underpinnings of innovation remain fragmented.

Tracing its lineage back to classical and neoclassical theories, innovation has been perceived as an external catalyst for growth (Hodgson 2007). Pioneers such as Adam Smith and David Ricardo laid the groundwork with their focus on market self-regulation and industrial production. However, the 1930s Depression unveiled the limitations of these theories, paving the way for Keynes' revolutionary ideas on employment and equilibrium.

Empirical studies have reinforced the notion that innovation is pivotal in boosting production. They highlight how externalities from National Innovation Systems (NIS) can be harnessed to create vibrant industries and elevate societal well-being (Kramer-Mbula et al., 2014). This shift led to the development of the NIS tailored to the economic nuances of different nations.

According to the Oslo Manual (2005, 2011, p.33), innovation encompasses significant improvements in products or processes, including the gamut of developmental, investment, and commercial endeavors. This comprehensive definition encompasses both large and small firms, and categorizes innovation into four types: product and business process innovations.

Acknowledging the importance of integrating knowledge and technology, the National Innovation System (NIS) is a vital framework. Kraemer-Mbula and Wamae (2010) define NIS as a matrix of activities and outputs dependent on institutional contexts, underscoring the extensive reach of innovation.

- **Innovation in Different Economic Sectors**

Lundvall and Freeman (1988) linked innovation to firm performance and identified formal institutions as key sources. These institutions span diverse entities, such as enterprises,

educational systems, and government agencies, and play a pivotal role in research and development (De Beer et al., 2013).

In the informal sector, innovation is characterized by its potential to make goods and services more accessible, particularly to poorer populations. Termed as 'Inclusive,' 'frugal,' or 'social' innovations, these developments not only enhance performance in the informal sector but also democratize market access (Bhatti 2012; Mashelkar 2012; Gupta 2013; et al.).

Echoing Charmes, Gault, and Wunsch-Vincent (2018), social innovation is closely tied to an understanding of innovation within an informal economy. The importance of the economic and social roles of the informal sector is increasingly recognized, with knowledge dissemination often occurring through hands-on experience or prior education.

This review assesses the relationship between innovation and SME formalization through the lens of two divergent schools of thought, setting the stage for a nuanced understanding of this complex interplay.

2.2 Empirical Review: Innovation, Firm Formalization, and Growth in Developing Countries

- **Innovation in Informal vs. Formal Sectors**

There is a dichotomy in the literature regarding the existence of innovation in informal sectors. Some argue that informal sectors primarily focus on imitations or adaptations rather than on true innovations (De Beer et al., 2013). However, others such as Mahemba and Bruijn (2003) have found evidence of genuine innovation in the informal sector, often driven by the need to stay competitive. This finding is supported by Avenyo and Kraemer-Mbula (2021), who suggest that product innovation significantly impacts employment creation in informal enterprises.

Research by Fu et al. (2018) and Mustapha et al. (2021) emphasizes the need for context-specific measures of innovation, especially in the informal sectors prevalent in developing economies. Their findings align with those of Ayinaddis (2022), who identified firm-specific barriers to innovation in Ethiopian MSEs, underscoring the need for a tailored approach to understand and foster innovation in these contexts.

- **Informal innovation challenges: Definitions, the Entrepreneur and Firm Characteristics**

One of the persistent challenges in this research domain is the measurement and definition of innovation, particularly in the informal sector. Mustapha et al. (2021) argue for the need for localized approaches to measuring innovation in developing economies, where informal activities dominate. This view is supported by the findings of Ayinaddis (2022), who

demonstrate the specific barriers to innovation in Ethiopian MSEs, highlighting the need for context-specific understanding and measures of innovation.

The definition of SMEs, which varies by country and typically considers factors such as the number of employees and turnover, can significantly impact the research findings. This is crucial when interpreting studies from different countries and contexts, as noted by Ayyagari et al. (2011). Saura et al. (2023) could offer perspectives on how innovation in entrepreneurship can improve informal enterprises' performance by addressing new challenges. Their work may delve into innovative business models and strategies tailored to informal sector contexts.

De Mel et al. (2009) and Nkouka et al. (2013). These studies emphasize the importance of managerial skills, competitive intensity, and the use of information and communication technologies (ICT) in fostering innovation. However, they also point out obstacles, such as the high cost of financing innovations and the lack of innovative financing mechanisms. Mendi and Mudida (2018) expanded on this by showing that a firm's age and legal status can significantly impact its capacity for innovation. This perspective is valuable when considering the findings of Kassa and Getnet Mirete (2022) on the importance of entrepreneurial attitudes towards innovation in Ethiopian MSEs, suggesting that both individual and firm characteristics play a crucial role in the innovation process.

- **Innovations and Formalization**

The role of innovation in enterprise formalization is complex and multifaceted. Studies suggest that although informal enterprises often rely on adaptive and imitative strategies, there is an emerging understanding that genuine innovation does occur in these settings and can contribute to their formalization. Daniels (2010) and Mendi & Mudida (2018) highlight that informal enterprises, though constrained in terms of investment in formal R&D, are still capable of producing innovations that are accessible and beneficial, particularly to lower-income populations.

Empirical evidence from developing countries, including Ayinaddis (2023) and Kassa and Getnet Mirete (2022), underscores this complexity. They reveal that while innovation in MSEs may not always align with traditional forms of R&D, it significantly influences firm performance and growth, potentially supporting the transition towards formalization. This is particularly pertinent in contexts where MSEs plays a critical role in the economy.

De Beer, Fu, and Wunsch-Vincent (2016) present case studies exploring the role of innovation and intellectual property in the informal economy of countries like Ghana, Kenya, and South Africa. These studies could shed light on how intellectual property rights intersect with innovation in the informal sector.

- **Informal Innovation and Firm Growth**

Recent studies provide nuanced insights into the relationship between innovation and firm growth, especially in the context of micro and small enterprises (MSEs). Ayinaddis's 2023 work on innovation orientation in Ethiopian micro and small manufacturing firms underscores the significant positive relationship between various forms of innovation (product, process, marketing, and organizational) and firm performance, with product innovation being especially impactful. This supports the notion that innovation is a crucial driver of firm growth, even in smaller and informal sectors.

Similarly, Ayinaddis' 2022 study on deterrents to innovation in MSEs in Ethiopia highlights the critical role of research and development as a barrier, indicating the nuanced challenges faced by these enterprises in embracing innovation. Moreover, Kassa and Getnet Mirete (2022) focused on the role of entrepreneurial attitudes towards innovation in MSEs, emphasizing the importance of mindset in fostering an innovative culture. These findings align with the broader literature that underscores the importance of innovation for firm-level growth and job creation, even in developing countries (Gebreeyesus, 2009; Mahemba and Bruijn, 2003; Lundvall et al., 2020).

Recent research by Su et al. (2023) discuss how technological innovation capability strengthens the influence of the institutional environment on intra-industry transformation, improving the performance of informal enterprises. This study provides insights into the role of technology in enhancing the competitiveness of informal sector firms. Fagerberg et al. (2010) have demonstrated that countries investing more in innovation are the most productive, underscoring the link between national innovation strategies and economic output.

- **Innovation and Job Creation in Informal Sectors**

In developing countries, the relationship between innovation and job creation in the informal sector has been a subject of increasing interest. Studies by Kleinknecht and Mohnen (2001), Ayyagari, Demirgüç-Kunt, and Beck (2003), and Terziovski (2010) support the idea that innovation positively impacts national and firm-level growth. For instance, Gebreeyesus (2009) observed that larger firms in Ethiopia's industrial sector, which are more likely to adopt innovative processes, have faster job creation rates. This aligns with the findings of Ayinaddis (2023) for Ethiopian micro and small manufacturing firms, where various innovation types positively impact firm performance, indirectly suggesting potential job growth.

La Porta and Shleifer (2014) discuss how informality hinders economic growth, positing that innovation could play a crucial role in reversing this trend. This is further evidenced in studies such as that of Olufikayo and Oluseye (2020), who find a positive relationship between the

implementation of innovation programs and firm growth in developing countries. This perspective is echoed in Ayinaddis' (2022) work regarding deterrents to innovation in MSEs, suggesting that overcoming these barriers could be key to job creation and economic growth.

- **Policy Implications and Future Research Directions**

The studies reviewed here indicate a clear link between innovation, firm growth, and the formalization process. However, they also suggest the need for targeted policy interventions that recognize unique challenges and opportunities within the informal sector. For instance, fostering an environment that encourages and supports innovation in MSEs, as seen in Ayinaddis (2023) and Kassa and Getnet Mirete (2022), could be pivotal in enhancing firm growth and facilitating the transition to formalization.

Moreover, future research should continue to explore the nuanced relationship between innovation and formalization, particularly in developing economies. This should include a focus on developing and applying measurement tools that accurately capture innovative activities within the informal sector, thereby providing a more comprehensive understanding of their impact on firm growth and formalization, an aspect on which this study is based.

This literature review reveals a dynamic and complex interplay between innovation, formalization, and firm growth, particularly in the informal sectors of developing economies. This underscores the need for context-specific strategies to foster innovation and suggests potential pathways for MSE formalization and growth.

2. Method

3.1 Models specification and estimation procedure.

According to previous theoretical analyses in the literature review, access to innovation depends on the innovative capacity of informal firms. The adoption of innovation influences the choice of an activity (formal or informal). Therefore, a model of innovation adoption based on the empirical work of Mendi and Mudida (2017) was built to better capture this reality. Either an entrepreneur, at the time of setting up his/her business, has the choice of registering the business with the authorities and carrying out activities legally or not registering it and carrying out activities informally. Consider U_{ji} the utility that the entrepreneur i draws by choosing option j. j can assume a value of 0 or 1.

U_{ji} comprises two aspects. The deterministic aspects depend on the entrepreneur's characteristics X_i, U_{ji}., was random and environmentally dependent.

$$U_{ji} = X_i'\beta^j + u_{ji} \quad (1)$$

The rational entrepreneur chooses one of the two options if its utility is greater than the utility provided otherwise. If y is the binary variable representing the chosen option (for example, $y_i = 0$ if the entrepreneur chooses option 0 and $y_i = 1$ otherwise (if he/she chooses option 1). the rational entrepreneur chooses status 1 if $U_{1i} - U_{0i} = y^* > 0$. If not ($U_{1i} - U_{0i} = y_i^* < 0$)) he/she chooses status zero.

posing $y_i^* = X_i'\beta + \varepsilon_i$ (2)

with $\beta = \beta^1 - \beta^0$

and $\varepsilon_i = u_{1i} - u_{0i}$

$$y_i = \begin{cases} 1 \ si y_i^* > 0 \\ 0 \ si y_i^* < 0 \end{cases} \quad (3)$$

Y* is an unobservable quantity referred to as a latent variable.

- *Empirical specification*

In this study, we are interested in the role played by innovation in the process of SME formalization in Cameroon. We ask whether the fact that an SME is innovating (technological, process, product, or R&D) encourages entrepreneurs to formalize their enterprises. Assuming that individual observations (y_i, x_i) are identically and independently distributed, the explanatory variables are exogenous, and the probability that the individual i chooses $y_i = 1$ can be derived from the latent variable

$P(y_i = 1 | x_i) = P(y_i^* > 0)$ (4)

$\quad = P(-\varepsilon_i < X_i'\beta)$ (5)

$P(y_i = 1 | x_i) = F(X_i'\beta)$

With $F(.)$ is the distribution function of the law of $-\varepsilon_i$.

If u_1 and u_0 follow an "extreme value type I" law (Gumbel's law), $F(.)$ then becomes a logistical law, and $P(y_i = 1 | x_i)$ is estimated using a logit model. They liken this model to a discrete choice economic model, in which the dependent variable is binary.

The estimated model is finally

$P(y_i = 1 | x_i) = F(X_i'\beta)$ (5)

$$= \frac{1}{1 + e^{-(x_i\beta + Z_i'\delta)}}$$

With Z_i the vector of the characteristics of individual i, and β and δ being the vectors of the parameters to be estimated, y_i the binary variable indicates the formal or informal status of the

company. x_i is a polytomic variable of interest that distinguishes firms that use innovation (technology, processes, products, or R&D) from those that do not.

β coefficient captures the effect of innovation on the probability of business formalization. A positive and significant coefficient β indicates the use of innovation to favor the formalization of new businesses, whereas a β negative and significant coefficient indicates the opposite. To avoid the problem of omitted variables that would bias the coefficient, we introduce our estimation of the control variables Z_i. This set of characteristics of the firm and the head of the firm can affect the probability of formalizing a business. These variables include the experience of the owner of the enterprise, age of the enterprise, level of education of the manager, and turnover of the enterprise.

- *Innovation and business growth (employment growth)*

$$y_i = \alpha + x_i\beta + Z_i'\delta + \varepsilon_i \quad (6)$$

where y_i is the growth in the number of employees in the company, and Z_i is the vector of characteristics of individual i, β and δ are the vectors of the parameters to be estimated, x_i the variable of polytomic interest that distinguishes firms that use innovation (technology, processes, products or R&D innovations) from those that do not.

- *Estimation method*

We estimate the parameters of interest in the logit model using the maximum likelihood method. Under the standard assumptions of nonlinear models, the maximum likelihood estimator (MLE) is consistent, asymptotically normal, and efficient (Amimia 1985)[2].

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[2] $y_i = \begin{cases} 1 \text{ with the probability } p_i \\ 0 \text{ with probability } 1 - p_i \end{cases}$

For a sample of size N, the likelihood function is given by

$$L = \prod_{i=1}^{N} P_i^{y_i}(1 - P_i)^{1-y_i}$$

P_i is specified by the logistics distribution function evaluated at $X_i'\beta$. If $F(X_i'\beta)$ means the cumulative distribution function of y_i then the likelihood function of the model becomes:

$$L = \prod_{i=1}^{N} F(X_i'\beta)^{y_i}(1 - F(X_i'\beta))^{1-y_i}$$

Then the log-likelihood function is:

$$\ln L = l = \sum_{i=1}^{N} [y_i \ln\left(F(X_i'\beta)\right) + (1 - y_i)\ln\left(1 - F(X_i'\beta)\right)]$$

Since the first-order conditions arising from the log-likelihood equation are non-linear and non-analytical, maximum likelihood estimates are obtained using recursive numerical optimization methods, such as the Newton-Raphson method.

3.2. Variables

Table 1 presents the variables used in this analysis.

Table 1 near here

4. Data and characteristics of the innovation system in SMEs in Cameroon

4.1 Data

The data used in this study were obtained from the World Bank Enterprise Survey (2016) of formal and informal sector enterprises. The principal objective of this survey was to collect data on the experiences of enterprises and their perceptions of the environment in which they operate (Kuntchev et al. 2013). It uses a standard method through a questionnaire to determine a firm's performance and its specific characteristics. It has thus been conducted in over 125 developing and developed countries, of which 38 are sub-Saharan African countries, including Cameroon. They conducted a survey among Cameroonian companies in two regions of the country, including Yaoundé, the political capital of the country, and Douala, the economic capital, where nearly two-thirds of the country's SMEs are focused. These enterprises are dominated by very small (VSEs), small (SEs), and Medium Enterprises (MEs). These results are reinforced by the second General Census of Enterprises (RGE 2), which first reported a very large number of VSEs (79.1%) out of over 99% of SMEs (NIS 2018). They surveyed 361 enterprises on a range of topics, from access to financial services to the business environment and the major difficulties encountered daily. They also devoted a section to business innovation issues.

4.2 SMEs innovation characteristics

This section presents the characteristics of the informal firms included in this study.

- *SMEs status in Cameroon*

The Survey provides a representative sample of 361 enterprises operating in Cameroon and provides an overall picture of their innovation behavior before 2016 to assess the importance of SMEs in Cameroon's economic activity. The definition of SME taken here is that of law N ° 2015/010 of July 16, 2015[3], amending and supplementing certain provisions of Law No.

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[3] In Cameroon, according to the new law on small and medium-sized enterprises promulgated in 2015, the Very Small Enterprise (VSE) is any enterprise that employs no more than five people and whose annual turnover before tax does not exceed 15 million CFA francs (Article 4). The Small Enterprise, abbreviated PE, is an enterprise that employs between six and twenty persons and whose annual turnover excluding taxes exceeds 15 million CFA francs and does not exceed 150 million CFA francs (Article 5 new). The Medium Enterprise, abbreviated ME, is an enterprise that employs between twenty-one and one hundred

2010/001 of April 13, 2010, on the promotion of the Small and Medium Enterprises in Cameroon. This law provides in articles 3 (new) to 6 that "the SME is measured being any company, regardless of its sector of activity, that uses at the most one hundred (100) persons and whose annual turnover excluding taxes does not exceed three (03) billion CFA francs."

- *Size of companies according to their status*

Table 2 near here

The Enterprise Survey 2016 highlights that, if we group companies by size, Very Small Enterprises (VSEs) (defined as those with fewer than five employees) represent nearly 56.79% of our sample and are therefore the most numerous. Of these, 70.27% are informal. Small companies (SE) represent less than 25%, and medium-sized companies (ME) represent the least (19.11%). Only 8.11% of the ME can be considered informal compared to 21.61% of Small Enterprises (Table 2).

- *Distribution of SMEs in Cameroon by sector of activity*

Table 3 near here

We can divide these SMEs into three activity sectors (Table 3): industry, commerce, and services. Of the 361 companies surveyed, 120 belong to the industrial sector (33.24%), 115 to the trade sector (31.86%), and 126 to the service sector (34.90%).

- *Innovations in Cameroonian SMEs*

The Survey collected data on several innovative activities in Cameroon. The analyses show that SMEs can carry out R&D activities internally or externally (licenses granted by universities), acquire equipment and knowledge as part of the innovation process, and set up training and marketing activities. Across the sample, two activities stand out for SMEs: R&D innovation and ICT.

Table 4 near here

Table 4 describes major innovations in SMEs. Looking at the entire sample, SMEs perform less R&D and gain more equipment, software, and machinery during their innovation process than other firms. This means that, among the four innovations considered, most firms do not adopt any. 10.25% invested in R&D, 14.4% used process innovations, 40.44% used product

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persons and whose annual turnover excluding taxes exceeds 250 million CFA francs and does not exceed 03 billion CFA francs (Article 6 new).

innovations, and only 19.11% used Information and Communication Technologies. However, there is wide disparity between companies according to their status. Formalized firms adopt more innovations, except for product innovations, for which informal firms adopt more. SMEs can innovate products, processes, organizations, and marketing. New products may be new to the market or to firms (incremental innovations or imitations). Regardless of activity, SMEs in Cameroon depend heavily on process innovations (85.6%) to expand their market share.

Table 5 presents the characteristics of the SMEs in Cameroon. It shows that the enterprises studied are mostly VSEs (56.79%) at least five years old, run by men (75.9%) with at least eight years of experience (52.7%). Even if they had access to some funding (79.22%), they still faced problems with obtaining formal finance (79.22%), land (50.14%), regulation of the labor market (50.97%), and problems with the business environment (97.51%).

Table 5 near here

5. Results and Discussion

5.1 Impact of innovation on the formalization of SMEs

Table 6 near here

The results are interpreted by evaluating the presentation of the model's goodness of fit, Odds Ratio analysis, and marginal effects.

The value of the pseudo R^2 of McFadden's estimated model (0.1325) suggests that the model with an explanatory variable fits the data 82.71% better than that with a constant. The $\chi^2(17)$ of the likelihood ratio (44,67) is significant at the 1% level, meaning that the model with the explanatory variable is globally appropriate. At least one coefficient estimated in the model differs significantly from zero. The Hosmer-Lemeshow test showed that 78.9% of good predictions were obtained from the estimated model. This means that in 78.9% of the cases, our model can predict with certainty, based on individual characteristics, the formal or informal status of a randomly selected firm in the sample.

The estimation results of the logit model are often presented as odds ratios (OR)[4] (OR).

The analysis of the odds ratio shows that overall, two of the four innovation variables selected are significantly connected to the decision to formalize a business. While technological

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[4]The OR is a measure of association, which captures the relationship between the characteristic x_k of the firms or business owner and the occurrence of the event $y_i= 1$ (formalization of the company). If OR = 1, the 'event y_i and the x_k are independent. If OR > 1 (resp. OR < 1), the link between y_i and x_k is positive (respectively Negative).

innovation increases the chances of formalizing a firm, product innovation reduces the chances of formalizing a firm. Although investment in R&D and process innovation are positively and negatively linked to the decision to formalize a firm, respectively, the results are not significant. Of the four forms of innovation considered in this study, only two affect the decision to formalize an enterprise. Technological innovation positively and significantly affects the chances of enterprise formalization. The analysis of marginal effects first establishes that access to technological innovation increases the chance of enterprise formalization by 3.1%, while access to product innovation reduces this chance by 4%. Process innovation or R&D does not affect the probability of firm formalization. Economically, innovation is known as being mainly confined to large firms and formal enterprises (Schumpeter 1934, 1942; Oslo 2005; OECD 2018; Ayyagari, Demirgüç-Kunt, and Maksimovic 2011). They consider SMEs in developing countries and informal enterprises, particularly those that are not particularly innovative and that do not invest in R&D or knowledge diffusion (Nkouka et al. 2013).

However, the results show that access to technological innovation increases the chances of the formalization of informal enterprises. This means that these enterprises can use or adopt affordable and accessible technologies to create new products that are more accessible to the poor. These findings are consistent with the work of De Beer, Fu, and Wunsch-Vincent (2013) who shows that innovation in African countries is based on the adoption of new technologies. However, access to these technologies is restricted by high costs, such as the Internet[5] and their reduced use for day-to-day business activities compared with other African countries. Similarly, the continuing rise in telecommunications prices (57.19%; fixed band price as a percentage of the GINI index compared to 17.64% and 31.18% for Nigeria and the Ivory Coast, respectively) can also be perceived as an obstacle faced by SMEs, which limits their access to technological innovation (World Bank 2017).

This study concludes that introducing product innovation or the creation of a new product that is more accessible to the poor reduces the chances of formalizing an informal enterprise. SME that operate partially or entirely informally do not possess sufficient means of innovation. Thus, it cannot register its innovation to comply with regulations or pay subsequent taxes at risk of increasing the price of the final product. It will therefore prefer to continue to manufacture its products informally and make huge profits, at least until it can do so. These results are

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[5]With the price of bandwidth estimated at 460 Mbp/month/USD internationally in Cameroon against 7 Mbp/month/USD for Egypt and Tunisia (Development Report 2017).

consistent with those of Daniels (2010) but are in contrast to the results of Mendi and Mudida (2018), who find that informal firms invest more in process innovations.

Finally, the study shows that a lack of capital appears to be the biggest obstacle that pushes SMEs to use simple technologies instead of advanced technologies resulting from R&D. It also reveals that a lack of capital is a major obstacle for SMEs. This capital gap is due to limited access to formal financing. This may explain the lack of investment in R&D, licenses, and patents. This result is in line with the work of De Beer, Fu, and Wunsch-Vincent (2016). It directs economic policy recommendations near public authorities and improves the National Innovation System (NIS). The first result suggests that the government should promote the adoption of technological innovation[6] by SMEs that still operate informally because this allows for greater transparency in firm management. In addition, access to intellectual property should be enhanced through the creation of new products by encouraging their registration and promotion or by financing the promoters of informal production units, which are devoted to producing products accessible to all sections of the population.

While looking at the current intellectual property policy in Cameroon, we notice the highest prices for registering a product. National law first recommends obtaining a norm certificate, which is around 300.000frsCFA by product. At this price, looking at the low access to capital and large number of products produced by informal SME's (especially those promoted by young women), for example, while they produce juice, they have different preferences for natural juice, which could be very expensive with or without the certificate needed. Therefore, they prefer to sell their products informally with the hope that if they keep the secret of the fabrication of their products, no one is going to copy it. Unfortunately, the same products can be found in another name in the market. Unfortunately, by doing this, they cannot access large markets and formal places to grow their sales, and remain small for a long time. To encourage registration and the promotion of intellectual property registration by SME's, the government can reduce the price of registration and norm certifications and promote intellectual property registration. By putting in place such a policy, SME entrepreneurs, especially those acting informally, would be able to register their products and promote them with any fear of coping.

As innovation is an engine of enterprise growth, it can contribute to economic development in developing countries. However, if the level of technology exported from developed to developing countries allows small and medium-sized enterprises that are still operating

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[6] This survey considers as technological innovation any form of machine involved in the manufacturing processes such as robots, computers, telephones, internet, etc. (Enterprise Survey Questionnaire definition, 2015).

informally to become formalized, can innovation also enable them to improve their productivity? This will be discussed in the next section.

5.2 Impact of innovation on SME growth

- *The impact of innovation on job creation*

Table 7 near here

- *Impact of innovations on type of employment*

Table 8 near here

- *Discussion*

An analysis of the impact of access to innovation on the growth of enterprises proves globally that innovation is significantly linked to the growth of jobs in SMEs in Cameroon. Specifically, R&D and product innovation affect job creation in SMEs in Cameroon by 46.29% and 20.29%, respectively. However, strengthening technological and process innovation has no significant effect on SMEs' job growth. This result can be explained by technological innovations that reduce the need for human capital in a firm. For example. Industries purchase new equipment to increase production and considerably reduce the labor force, and thus job creation. These results are consistent with those reported by Fu et al. (2018).

Given that job creation is the primary aim of SMEs, introducing technological innovations will cause them to lose manpower but gain productivity, because product innovation increases firm performance by 20%. It is important for the government to encourage the dissemination of product innovations because it will have an impact not only on the social level but also on the production level of firms.

When considering the formal or informal status of enterprises, access to innovation in informal enterprises has a significant impact on their growth. This study reveals a significant and positive relationship between innovation and job growth in SMEs. The effect of innovation on growth is more significant for informal enterprises than formal enterprises, particularly for technological innovations (42.95%). This result means that introducing technological innovation in an informal enterprise increases the number of informal jobs by 43%. The enterprise is more likely to use easy and cheaper labor or to subcontract certain one-off activities given its low output rather than employing full-time workers. These innovations have opposing effects on job creation. This result is probably explained by the fact that technology transfer and diffusion in developing countries are facilitated by the interconnectedness of countries through the dissemination of knowledge via the Internet and mobile telephony,

technologies SMEs have the most access to. These findings are consistent with those reported by Fu et al. (2018) and Gebreeyesus (2009).

Finally, the results show that other factors are significantly and positively correlated with the growth of SMEs in Cameroon. Firm size, manager gender, and investment level are significantly related to innovation. Firm size increases growth in SMEs. In particular, medium-sized and large firms with sufficiently high capital and innovation increase their use of personnel by 74.92%. These results may indicate that the growth in jobs created is proportional to the size of the firm and depends on the type of innovation carried out by the firm.

These results reinforce the idea that larger firms have a greater chance of creating jobs than smaller ones do. Capital level is positively correlated with job growth in formal and informal SMEs in Cameroon. A firm with a sufficiently high level of capital will also have a higher level of innovation, and its chance of becoming formalized will increase. In addition, the gender of the firm's promoter has a potent influence on employment growth in SMEs in Cameroon. In particular, a female promoter reduced job creation by 44.57% compared to a male promoter. Men have a higher capacity for innovation than women. These results are consistent with those reported by Mendi and Mudida (2018).

Finally, these results highlight other factors that can have a significant effect on the innovative capacity of informal firms, including firm characteristics such as access to capital and entrepreneurial characteristics, such as the gender of the promoter.

This study contributes to the advancement of research on the knowledge of innovation in informal enterprises by highlighting the existence of innovation in the informal sector through the creation of new products and the adoption of the innovation already existing in the country. These innovations lead them to create better products, but unfortunately, because of a lack of funding, they are unable to protect the innovations and continue to be informal. From a perspective point of view, we may look at how these firms can access funding, especially Venture Capita (VC), without all the warranties and connections needed, and how this funding can leverage the level of their enterprise, for example, by helping them protect their innovation and ameliorate their products. We may look at international VC to be more aware of financing them, especially in the technology sector. If there is such a kind of financing in their environment, how can they attract them? Are they any local VC that could be interested in investing in these businesses and making them formal and growing?

6. Conclusion and Policy Recommendation

This study analyzes the role of innovation in the formalization and growth of SMEs operating informally in Cameroon. Thanks to the Enterprise Survey carried out by the World Bank in 2016, we conducted a statistical analysis devoted to describing the characteristics of innovations in informal enterprises in Cameroon and an econometric analysis based on the estimation of a binomial logistic model to identify the determinants and a growth model to measure the various specific effects on the enterprise's growth. From this analysis, it emerges that among the innovation factors, only technological and product innovations significantly affect the formalization capacity of firms in Cameroon. Technological innovation increases companies' chances of formalization by 3.1%, and product innovation reduces it by 4%. Process innovation and R&D do not affect a company's chances of formalization. Thus, informal firms do not invest in R&D (licenses and patents), but can adopt technologies that allow them to create new products that are more accessible to the poor.

This study highlights that the effect of innovation on job creation is greater for informal enterprises than for formal enterprises. However, the jobs created are proportional to the size of the firm and the nature of the firm's innovations. From this perspective, access to technological innovation, in particular, can have contrasting effects on informal job creation. In particular, it increases the creation of informal jobs in informal SMEs in Cameroon by 42.95% because of the practice of low-cost and easily accessible labor in the informal sector to cover its small production. Because innovation is one of the fundamental factors in enterprise growth, it improves the ability of SMEs to contribute to the economic development process in developing countries. Therefore, the Government should promote the adoption of the latest generation of technological innovations and encourage the registration of intellectual property by SMEs by the promoters of informal enterprises to protect their innovations.

Despite these results on the impact of innovation on SMEs' formalization and growth, there are some restrictions related to the study. The first is the use of one African country-Cameroon-comparable study that could be directed to many countries and regions to assess whether similar findings can be reproduced. Second, it would be useful to use other variables of firm growth (sales, job creation, firm size, capital base, business activity, or turnover) to make an important comparison and see if there are changes in the results due to the limitation of data in the informal economy in Africa.

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Appendix

Table 1: variables

Variables	Description
Explained variables (endogenous)	
Registration	1= if yes, 0 = otherwise
Growth of the SME	Number of jobs created - the number of jobs in the current year
Exogenous variable	
Types of innovation in SME	
Copyrights	1= if the entrepreneur has an International Certification or National Certification yes, 0 = otherwise -
Use of ICT	1=if it's email, 0 = otherwise
Product innovation	1= if it is a new product for the market, 0 = otherwise
Process innovation	1= if it is a new product for the company, 0 = otherwise
Innovation in and Research	1= if it is an R&D innovation, 0 = otherwise

Development	
Other innovations	Staff training or Marketing
Control variables	
Investment in R&D	The estimated amount of initial capital
Age of the SMEs	The number of years the company has been in business
Size of the SMEs	Number of people working for the company
Gender of manager	1 = if the manager is male, 0 = otherwise
Age of the manager	Past age of promoter (in years)
Employment	Number of working hours devoted to the business
Owner's level of education	
Without level	
Primary	Reference
Secondary	1 = if it has the primary level, 0 = otherwise
Superior	1 = if it has high school level, 0 = otherwise
	1 = if it has the higher level, 0 = otherwise
Work experience	The number of years of professional experience of the owner in the same sector (informal or formal).
Branch of activity	
Industry	Reference
Trade	1 = if the company is in the industry branch, 0 = otherwise
Service	1 = if the enterprise is in the trade sector, 0 = otherwise
	1 = if the enterprise is in the service industry, 0 = otherwise

Source: Authors' construction

Table 2 Size of SMEs by enterprise status

Size	Enterprise status		
	Informal	Formal	Total
VSE (Very Small Enterprises)	70.27	53.31	56.79
SE (Small Enterprises)	21.62	24.74	24.10
ME (Medium Enterprises)	8.11	21.95	19.11

Source: Authors, based on Enterprise Survey (2016)

Table 3 Sector of activity of SMEs in Cameroon

Sector	Frequency	Percentage
Industries	120	33.24

Trade	115	31.86
Services	126	34.90
Total	361	100

Table 4 Types of innovation by enterprise status

Types of innovations	Enterprise status		
	Informal	Formal	Total
R&D			
No	94.59	88.5	89.75
Yes	5.41	11.5	10.25
Process Innovation			
No	86.49	85.37	85.6
Yes	13.51	14.63	14.4
Product innovation			
No	48.65	62.37	59.56
Yes	51.35	37.63	40.44
ICT			
No	94.59	77.35	80.89
Yes	5.41	22.65	19.11

- *Other characteristics of SMEs*

Table 5 Innovation characteristics of firms

Variables	Enterprise Status		
	Informal	Formal	Total
SME years			
[1 - 4 years]	1.35	5.92	4.99
[5 - 18 years]	55.41	45.99	47.92
[19 years, +]	43.24	48.08	47.09
Turnover			
] 0 - 10]	58.11	24.04	31.02
] 10 - 20]	14.86	20.56	19.39
] 20 - 101]	21.62	25.44	24.65
] 101 et + [	5.41	29.97	24.93
Employees			
[0 - 5 *Employees*[	59.46	51.57	53.19
[6 - 15 *Employees*[	29.73	23.34	24.65
[16 *Employees* and +[	10.81	25.09	22.16
Experience			
[0 - 4]	21.62	27.87	26.59
]4 - 8]	31.08	24.74	26.04
]8 - + [	47.30	47.39	47.37

Firms Size			
VSE(Very Small Enterprises)	70.27	53.31	56.79
SE (Small Enterprises)	21.62	24.74	24.10
ME (Medium Enterprises)	8.11	21.95	19.11
Entrepreneur Sex			
Female	27.03	23.34	24.10
Male	72.97	76.66	75.90
Female owner			
[0% - 50%]	2.70	9.76	8.31
[51% - 100%]	97.30	90.24	91.69
Access to Finance			
No	25.68	19.51	20.78
Yes	74.32	80.49	79.22
Access to Land			
No	54.05	48.78	49.86
Yes	45.95	51.22	50.14
Work Regulation			
No	45.95	49.83	49.03
Yes	54.05	50.17	50.97
Business Environment			
No	2.70	2.44	2.49
Yes	97.30	97.56	97.51

Source: Authors, based on Enterprise Survey (2016)

Table 6 SME innovation and formalization.

VARIABLES	Logit	Marginal Effects	Odds Ratio
Technological Innovation (ICT)	1.045*	0.037*	2.843*
	(0.583)	(0.029)	(1.657)
Research and Development (R&D)	0.088	0.004	1.092
	(0.615)	(0.027)	(0.672)
Process innovation	-0.008	-0.000	0.992
	(0.444)	(0.021)	(0.440)
Product innovation	-0.788**	-0.040**	0.455**
	(0.307)	(0.031)	(0.140)
Work experience	-0.016	-0.0007	0.984
	(0.020)	(0.001)	(0.020)
Number of employees	-0.002	-0.0001	0.997
	(0.007)	(0.0003)	(0.007)
Turnover	0.00244**	0.0001***	1.002**
	(0.001)	(3.55e-05)	(0.001)
Cost of labor	-0.005	-0.0002	0.994
	(0.003)	(0.0002)	(0.003)
Age of the firm	0.025	0.001	1.026
	(0.016)	(0.001)	(0.01)

Size of the company			
SE (Small Enterprises)	0.235	0.0112	1.265
	(0.386)	(0.019)	(0.489)
ME (Medium Enterprises)	0.348	0.0157	1.416
	(0.658)	(0.028)	(0.932)
Gender of the head of the company	0.0018	0.87e-05	1.002
	(0.339)	(0.016)	(0.340)
% women owners [51% - 100%]	-1.008	-0.033	0.365
	(0.830)	(0.030)	(0.303)
Sector of activity	-0.108	-0.0046	0.898
Trade	(0.398)	(0.017)	(0.357)
Services	-0.365	-0.0176	0.694
	(0.388)	(0.022)	(0.269)
Funding = 1. yes	0.679*	0.0386*	1.972*
	(0.358)	(0.033)	(0.706)
Business Environment	-0.325	-0.0134	0.723
	(0.874)	(0.032)	(0.632)
Constant	1.905		6.722
	(1.250)		(8.405)

Observations = 327LR
chi2 (17) = 44,67
Prob >chi2 = 0, 0003
Log likelihood = -146, 16
Pseudo R^2 = 0, 1325

The standard errors are shown in parenthese. *Significant*: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source: Authors, based on Enterprise Survey (2016)

Table 7. Impact of innovation on employment growth

Variables	Coeff.
Technological innovation (ICT)	9.962
	(13.38)
Research and Development (R&D)	46.29***
	(16.46)
Process innovation	5.829
	(13.92)
Product innovation	20.29**
	(9.971)
Work experience	-0.174
	(0.632)
Turnover	0.007***
	(0.0015)
Labor	-0.020
	(0.014)
Age of the firm	0.580
	(0.471)
SE (Small Enterprises)	-2.616

	(11.84)
ME (Medium Enterprises)	74.92***
	(14.12)
Gender of the head of the company	-11.82
	(10.88)
% Female owners [51% - 100%]	-44.57**
	(17.25)
Sector of activity	
Trade	-16.26
	(12.26)
Services	-18.19
	(11.53)
Funding	13.88
	(11.64)
Business Environment	11.44
	(28.74)
Constant	11.56
	(34.88)
Observations	327
R-square	0.341

The standard errors are shown in *parentheses*. *Significant*: *** p <0.01, ** p <0.05, * p <0.1

Source: Authors, based on Enterprise Survey (2016)

Table 8. Impact of innovations on employment growth by firm status

	Informal Employment	Std. Err.	Formal Employment	Std. Err.
Technological innovations (ICT)	42.951	6.009	5.714	15.758
Research and Development (R&D)	-0.493	7.068	55.598	20.003
Process innovation	4.229	3.876	1.858	17.833
Product innovation	2.364	2.712	27.513	12.923
Work experience	-0.294	0.177	-0.313	0.803
Turnover	0.119	0.008	0.007	0.001
Labor	-0.063	0.036	-0.026	0.016
Age of the firm	0.280	0.171	0.527	0.567
SE	-2.721	3.759	-2.965	14.620
ME	15.409	6.337	78.881	16.971
Gender of the head of the company	-0.101	2.915	-15.337	13.798
% Female owners [51% - 100%]	-1.073	7.557	-46.616	20.257
Trade	-2.271	3.614	-19.133	15.270
Services	-2.105	3.577	-24.330	14.350
Funding	1.277	3.055	20.457	15.066
Business Environment	3.296	7.646	22.013	36.755

Constant	-19.257	12.002	3.6138	43.705

Number of observations = 69	F(16, 52) = 42.59		Prob > F = 0.0000	R-Squared =0.9291

Standard errors in *parentheses. Significant*: *** p <0.01, ** p <0.05, * p <0.1

Source: Authors, based on Enterprise Survey (2016)