Emerald International Journal of Entrepreneurial Behaviour & Research

Dealing with Adversity: Innovation among Small and Medium-Sized Enterprises in Developing Economies

Journal:	*International Journal of Entrepreneurial Behavior & Research*
Manuscript ID	IJEBR-02-2023-0183.R2
Manuscript Type:	Research Paper
Keywords:	Innovation, Resource-based theory, Institutions, Institutional Theory, SMEs

SCHOLARONE™ Manuscripts

Dealing with Adversity: Innovation among Small and Medium-Sized Enterprises in Developing Economies

Abstract

Purpose

Small and medium-sized enterprises in developing economies, particularly in the Sub-Saharan African region, struggle to innovate mainly due to severe resource constraints and high institutional voids. This paper examines the international channels these companies utilise to introduce innovations in the face of these challenges.

Design/methodology/approach

The study uses comprehensive data from the World Bank Enterprise Survey. It applies the Instrumental Variable Probit approach to analyse a sample of 8,466 SMEs from eleven countries in the Sub-Saharan African region.

Findings

The empirical results reveal critical new insights, including foreign ownership's negative impact on product and process innovation. The findings show that small and medium-sized enterprises leveraging exporting and international quality certifications are likely to implement innovations.

Originality/value

The paper contributes to the literature by showing that small and medium-sized enterprises must exploit strategic alternatives to improve their innovation efforts when operating in a weak institutional environment. Thus, by exploring company-level strategic responses to institutional difficulties when implementing innovations, this paper goes beyond the prevailing research approach in developing economies that emphasises mainly the barriers to innovations.

Keywords: Innovation, SMEs, Sub-Saharan Africa; Resource-based view; Institutions; Export Foreign ownership; Quality certifications

International Journal of Entrepreneurial Behavior & Research

1. Introduction

Small and medium-sized enterprises (SMEs) in developing countries face substantial challenges in implementing innovation activities (Adomako *et al.,* 2019; Saka-Helmhout *et al.,* 2020; Urban, 2016). This situation has triggered an ongoing discussion on how these companies can overcome these constraints (Donbesuur *et al.,* 2020). To this end, studies suggest that these companies can tackle these challenges by acquiring relevant resources within their local context (Goedhuys *et al.,* 2014). This claim is supported by the resource-based view, which proposes that innovation success depends on the resources that companies own and control (Barney, 2001). Thus, the locally acquired resources are essential as they enable these companies to launch new products and production methods.

Nevertheless, scholars (e.g., Krammer and Kafouros, 2022; Smallbone *et al.,* 2022) argue that the local institutional environments within which developing economy companies operate put considerable constraints on resources and hamper their innovation capacities, especially SMEs. This assumption aligns with the institutional theory, which argues that country-level factors strongly affect innovative SMEs' efficiency and productivity (Galindo-Martín *et al.,* 2020). In many developing regions, especially Sub-Saharan Africa (SSA), the institutional support that should enhance the innovation capacities of SMEs is mainly absent. They face mounting challenges such as unstable political structures, inefficient legal systems, low economic development, energy poverty, weak local capital and unskilled/semi-skilled labour markets (UNCTAD, 2016). Thus, the level of institutional voids in these countries significantly hinders the ability of SMEs to locally generate and acquire resources needed for their innovation activities (Adomako *et al.,* 2019; Tracey and Phillips, 2011). Additionally, unlike large companies, SMEs in developing economies may not have the relevant political connections to engage institutional bodies' attention and their representatives' attention to attract the resources required for innovation activities (Narooz and Child, 2017). In other words, given the weak institutional factors in developing countries, SMEs are less likely to access relevant resources needed to enhance their innovation efforts (Mudombi and Muchie, 2014).

Confronted with these challenges that inhibit resource acquisition, these SMEs are responding by strategically leveraging internationally oriented channels to drive their innovations. These responses are reflected in their proactive engagements with foreign ownership, active participation in exporting activities, and the acquisition of international quality certification. These international

International Journal of Entrepreneurial Behavior & Research

channels serve as adaptive strategies that enable these companies to overcome constraints within their local environments and enhance their innovation capabilities. Besides, there is growing evidence of these adaptive strategies in the SME innovation literature. For example, prior studies suggest that foreign ownership (Li *et al*., 2022), exporting activity (Adekunle *et al*., 2013; Lall and Pietrobelli, 2005), and international quality certification (Materu and Righetti, 2010) are critical to innovation efforts of companies. Nevertheless, a single study examining the impacts of these three internationally oriented channels (foreign ownership, export activity, and international quality certification) on SME innovation activities across multiple countries in SSA is still limited.

More so, most of the extant studies focus on various institutional barriers to innovations or the impacts of informal institutions on innovation in SSA countries (Ryan and Daly, 2019) without explicitly exploring the strategic channels SMEs from these economies utilise to overcome these challenges. For example, Ayalew and Xianzhi (2020) highlight that the inability of many African governments to facilitate access to financial resources hinders enterprise innovations. Abbey and Adu-Danso (2022) find that political instability and inefficient infrastructure are detrimental to the innovation performance of SMEs in Kenya. Additionally, Urban (2016) suggests that institutional factors linked to resource availability affect business innovation in South Africa. Likewise, Saka-Helmhout et al. (2020) show that informal institutions serve as substitutes for underdeveloped formal institutions and that these informal institutions, combined with company-level resources, influence the innovation activities of companies.

Except for a few studies (e.g., Krammer and Kafouros, 2022; Adomako *et al.,* 2019; Abubakar *et al.,* 2019) research that identifies and explores the international strategic channels that SMEs, especially in the SSA region, use to circumvent local constraints and enhance their innovation capabilities relatively rare. As a result, scholars are increasingly calling for more empirical studies in this area (Abubakar *et al.,* 2022; Krammer and Kafouros, 2022). This call is supported by the literature suggesting that companies from a weak environment enter foreign markets where efficient institutions support learning opportunities, knowledge generation and innovation capabilities (Nuhu *et al.,* 2021; Dunning, 1998). Thus, in response to this call, this study addresses the following question: *What types of international channels enable SMEs in developing countries to overcome the challenges of weak institutions and consequently enhance their innovation efforts?* This study answers this question using a comprehensive enterprise survey from the World Bank covering eleven countries in the SSA region: Benin, Cameroon, Ghana, Kenya, Mozambique,

Niger, Nigeria, South Africa, Tanzania, Zambia, and Zimbabwe. These countries provide a suitable research context given the increasing innovation efforts of entrepreneurial companies irrespective of the high institutional voids and resource constraints that characterise their local environments.

The paper contributes to the literature in the following ways. First, this paper draws on a resource-based view and institution-based theory to examine SME innovation efforts in SSA countries. Undoubtedly, resources matter for enterprise innovation (Barney, 2001). This paper advances the resource-based view by arguing that the institutional environments in developing economies have a strong bearing on the value, availability, and allocation of resources required for the successful implementation of innovations, and this has profound consequences for SMEs from these economies. Although there is a burgeoning discourse on the role of institutions, scholars highlight the need for more empirical studies supporting its linkage to SME innovation efforts (Zhu *et al.,* 2012), especially in the SSA region, where evidence is still scarce (Saka-Helmhout *et al.,* 2020; Barasa *et al.,* 2017). The current study contributes to addressing this concern by investigating the international strategic response options that SMEs from SSA countries utilise to improve their innovation efforts in the face of challenges linked to the high-level institutional voids of the region. By exploring the impacts of various international channels on SME innovations, this paper goes beyond the prevailing approach in this region that emphasises innovation barriers and their performance implications (Becheikh and Bouaddi, 2022). Thus, the current study enhances our understanding of how SMEs in developing countries strategically respond to challenges related to their operating environment.

Second, using unique data from the World Bank covering eleven countries in the SSA region, this study empirically examines the impacts of three international-oriented channels – (1) foreign ownership, (2) exporting activity and (3) international quality certification – on SME innovations in SSA countries. By so doing, this study offers fresh insights into the internationally oriented strategic responses used by SMEs in SSA countries to implement product innovation and process innovation in the face of institutional difficulties. The findings of this paper show that these channels are not equally beneficial to innovation efforts. Thus, this study reminds SME managers in developing economies to apply caution when considering international channels to avoid putting additional constraints on their limited resources as it can hamper their innovation performance.

International Journal of Entrepreneurial Behavior & Research

The remainder of this paper is organised as follows: Section 2 presents the theoretical background and hypotheses of this study. Section 3 describes the data and empirical model. Section 4 presents the results of the empirical analysis. Finally, Section 5 discusses the results, and Section 6 concludes and offers future research directions.

1. Theoretical Background

The resource-based view has become a central theoretical framework in international strategy and management research (Pitelis, 2004). As an extension of Penrose's work, the resource-based view emphasises the importance of a company's internal resources in competitive advantage and economic rents (Wernerfelt, 1984; Barney, 1991). Resources are tangible and intangible assets – capabilities, processes, characteristics and knowledge – controlled by an organisation (Barney, 1991). Companies are bundles of heterogeneous resources with different distributions of resources, and these differences are imperfectly mobile over time (Wernerfelt, 1989). Resources owned, controlled or available to companies enable them to increase their efficiency and ability to utilise opportunities (Barney, 2001).

Among the drivers of the company's strategies, the resource-based view pays special attention to innovation (Wu and Chiu, 2015). Research suggests that the company's resources are critical in innovation success or failure (Barney, 1991). Resources are pivotal because they provide companies with the capacity to launch new products and processes, which, in turn, improve competitiveness. However, innovations include complex processes, which are highly resource-intensive. As a result, companies need to possess or have access to a unique set of resources, ranging from human capital to physical resources (Teece, 2007). For example, companies with financial resources can implement new products and protect their technological knowledge from competitors' imitations (O'Brien, 2003). The assumptions of the resource-based view have profound implications for companies from environments lacking market-supporting institutions that serve as a foundation to innovate, grow and succeed (Wellalage and Fernandez, 2019).

Research shows that the institutional environment largely shapes various aspects of strategic decisions and actions of companies, especially the ones linked to innovations (Peng, 2003). Scholars highlight the importance of integrating institutional context when studying the resource implications of companies' innovation activities (Barney, 2001). Such an approach can

International Journal of Entrepreneurial Behavior & Research

explain the strategic behaviour of resource-limited companies in hostile local environments (Peng et al., 2009). On this basis, this study focuses on companies originating from the SSA region to better understand how they adopt strategic resources to manage challenges linked to their institutional contexts. According to North (1990), institutions are the "rules of the game in a society". The existence of these rules and standards, as well as the ability of a country to implement them, largely determine whether an institution would stimulate or hamper innovation efforts (Nelson and Nelson, 2002). Scholars have recognised institutional voids as a critical constraint to SME innovation efforts in developing countries, particularly in SSA (Castellacci, 2015). In most SSA countries, there are high degrees of inefficient market-support structures, which obstruct the ability of SMEs to secure resources relevant to implementing innovations (Adomako *et al.,* 2020). For example, these companies often lack sufficient financial resources to implement their innovation activities. Moreover, weak institutions further increase the burden of raising financial support from external sources (Wellalage and Fernandez, 2019). These factors will likely hamper SMEs in developing countries from realising their innovation objectives.

More so, governments play a fundamental role in deploying policies, incentives as well as creating political and economic environments that enable companies to thrive, grow and compete favourably in the global market (Adjimah *et al.,* 2023). Research shows that effective government policy measures are essential to promoting knowledge sharing and technology diffusion, primarily through national innovation systems (Rosenberg and Nelson, 1993). In today's knowledge-based economy, well-functioning national innovation systems enable companies to interact with other actors (such as research institutes and R&D departments) and access a wide range of resources relevant to the successful implementation of innovations (Spencer, 2003). Despite its importance, most governments in SSA countries still struggle to implement policies that foster effective generation, diffusion, and appropriation of technological innovations (Watkins *et al.,* 2015). Undoubtedly, these deficiencies have far-reaching consequences on the resources and innovation capacities of companies operating in the region.

Furthermore, regulatory uncertainties and legal implementation challenges in most SSA countries affect the legitimacy of companies from this region, mainly when they compete with their peers in the international markets. According to the regulatory pillar of the institution-based view, legitimacy is achieved through compliance with legal requirements (Scott, 2001). Institutional voids have a negative impact on legal environments such as those of SSA countries.

For instance, the lack of court efficiency and inconsistent application of rules are likely to affect the business environment negatively and, consequently, the economic growth of SMEs (Chakraborty, 2016). Besides, weak enforcement of contracts can influence companies' "willingness or ability to invest: it could induce them to choose less-efficient technologies, inhibit them from building relation-specific assets when those relations are dependent on contracts, or amplify the adverse effects of infrastructure or regulatory shortcomings" (Aboal *et al.,* 2014, p. 323). These institutional factors primarily influence the availability of resources, which SMEs in the SSA region can utilise in their innovation activities. In the next section, therefore, this study explores three main international-oriented channels SMEs in the SSA region use to introduce product and process innovations in the face of weak institutional support.

2.1. Hypotheses development

2.1.1. *Foreign Ownership and Innovations*

Research suggests foreign ownership determines a company's innovation and productivity performance, enabling access to necessary resources for innovation activities (Dachs and Peters, 2014). Foreign-owned companies face fewer financial constraints, benefit from superior governance structures (Rhee and Wang, 2009), and have better access to innovation resources compared to domestically-owned companies (Choi *et al.,* 2011). This claim has a profound significance for SMEs from developing countries that often grapple with weak institutional support and constraints in innovation capabilities (Edeh and Acedo, 2021).

Due to their peculiar situations, SMEs from developing countries tend to lean on foreign investors to overcome their financial resources and technological limitations and improve their capabilities to develop product and process innovations (Dachs and Bersberger, 2009). For these companies, there are several reasons to expect a positive impact of foreign ownership on their innovation activities (Baumol, 2010). First, the cost of successfully launching new products or processes in the marketplace is rapidly rising and becoming an uphill struggle for SMEs from developing economies (Wellalage and Fernandez, 2019). Foreign ownership can facilitate access to financial resources to help these companies enhance their innovation capacities. For example, resources in the form of R&D investments from foreign investors to these SMEs can help in the development phase of new products and production methods. Besides, such resources enable them

International Journal of Entrepreneurial Behavior & Research

to hire qualified personnel to improve their success in commercialising new products and processes. Second, as SMEs from developing countries are far from the technological frontiers, foreign ownership provides domestic companies with efficient models for developing technology and innovation capabilities and enables the transfer of advanced technological resources (Chang *et al.,* 2006). Prior studies confirm that foreign ownership enhances the resource commitment to technology transfer and, consequently, increases the capacities of SMEs to successfully launch new products to the markets and implement novel production methods that can help them achieve cost-efficiency (Isobe *et al.,* 2000). In other words, technologies and knowledge flowing from foreign ownership can increase the capacities of SMEs in developing countries to introduce product and process innovations (Park, 2011). Third, organisational management is at the core of innovation performance (Ozen and Ozturk-Kose, 2023). As most SMEs from developing countries face management and resource allocation challenges, they can benefit from better corporate governance of foreign investors. For example, the organisational structure and design of foreign-backed SMES in the SSA region enable them to identify and efficiently invest in new products or production methods. In other words, access to finance and advanced technologies, as well as better organisational practices provided by foreign ownership, serve as a catalyst for SME innovation enhancements in developing countries.

Despite these reasons, the empirical evidence on the impact of foreign ownership on innovation is mixed. On the one hand, scholars suggest foreign ownership has a negative effect on innovation (Bishop and Wiseman, 1999). In a recent study, Adu-Danso and Abbey (2022) find that foreign ownership does not contribute to product and process innovations. More so, Díaz-Díaz *et al.* (2008) reveal no differences between foreign-backed companies and domestically-owned companies in terms of their innovation implementations. On the other hand, scholars established a positive relationship between foreign ownership and innovation performance (Corsi and Prencipe (2018). For example, Ayyagari et al. (2011) find that foreign ownership positively impacts innovation performance. Finally, in a recent study, Yi et al. (2023) suggest that foreign ownership positively impacts companies' innovation activities and exposes them to updated technology.

Regardless of these mixed findings, the prevailing argument is that foreign ownership fosters new product and process creations among SMEs. The national policies in SSA support this notion, suggesting that foreign investments in local companies are instrumental in promoting innovations (Adu-Danso and Abbey, 2022). In summary, foreign ownership aids SMEs in

International Journal of Entrepreneurial Behavior & Research

developing countries to overcome local resource constraints and, consequently, fosters innovation activities. On this basis, the first hypothesis is presented as follows:

Hypothesis 1: The weaker the institutional environment, the more likely foreign ownership positively contributes to SME innovations.

2.1.2. Export Activities and Innovations

SMEs in developing countries, such as those in SSA, often operate under the constraints of weak institutional environments characterised by unstable political climates, inefficient market intermediaries, and corruption (Rodríguez–Pose and Zhang, 2020). These challenges can prevent technological advancements and erode human capital development and managerial skills essential for innovation. Nonetheless, exporting has been identified as a pivotal mechanism for overcoming these domestic limitations and spurring innovation.

Furthermore, SMEs from developing countries can benefit from technology spillovers, gaining insights into foreign market demands and technological advancements (Wang and Ma, 2018). The learning-by-exporting hypothesis strongly supports this assumption by theorising that international trade is not merely an exchange of goods but also a crucial conduit for knowledge transfer (Salomon and Shaver, 2005). By tapping into diverse knowledge resources, SMEs from developing countries can innovate in product development, production methods, and distribution channels (Love and Roper, 2015). Direct exporting, in particular, presents opportunities for SMEs from developing countries to forge relationships with international customers and suppliers, facilitating the transfer of technological knowledge (Howells, 1996). Customer feedback becomes an invaluable asset for product innovation, aligning offerings with market demands (Tavassoli, 2018), while suppliers can play a pivotal role in process innovation, lending their expertise to enhance efficiency (Un and Asakawa, 2015). Additionally, by collaborating with research institutes or innovation consultancies in export markets, SMEs from developing countries can innovate better than their domestic counterparts, thereby overcoming the challenges of limited local resources (Monjon and Waelbroeck, 2003).

More so, SMEs from developing countries often enter the global market as technology followers – latecomer-innovators. However, through exporting, they can rapidly advance their process innovation, a phenomenon described by Salomon and Jin (2008). This acceleration is

International Journal of Entrepreneurial Behavior & Research

driven by the need to meet the sophisticated demands of global trade partners. In other words, export markets serve as an international channel through which SMEs from developing countries amass extensive knowledge of production techniques and market intelligence, essential for fostering product and process innovation (Grossman and Helpman, 1993). Thus, exporting becomes a lever for accessing valuable resources, a cornerstone for achieving competitive advantage according to the resource-based view (Barney, 1991). Companies engaging in exporting find themselves at the intersection of market demands and cutting-edge technology (Li and Atuahene-Gima, 2001), which is conducive to product innovation. In the African context, companies with a moderate level of exporting are positioned to harness their international exposure to drive innovations, as Zhou and Li (2008) suggested. While cultural and operational challenges in global markets are inevitable, they can also provide learning opportunities that, when appropriately leveraged, result in innovative practices and products that meet market demands.

In summary, exporting can significantly affect company innovation in developing countries through knowledge acquisition and exposure to competitive market forces. The multifaceted nature of exporting provides companies with a rich tapestry of technical knowledge, consumer insights, and competitive pressures that collectively foster a culture of innovation, ensuring that SMEs from weaker institutional backgrounds are not left behind in the global innovation race. Therefore, the second hypothesis is presented as follows:

Hypothesis 2: The weaker the institutional environment, the more likely export activity positively contributes to SME innovations.

2.1.3. *International Quality Management and Innovations*

In developing countries, SMEs increasingly adopt international quality standards such as ISO 9001, which serve as strategic and managerial assets, aiding trade facilitation and productivity enhancement (Manders *et al.,* 2016). Adopting these standards can help SMEs mitigate operational inefficiencies, reduce costs, and signal quality to international markets, overcoming informational asymmetries (Ullah, 2020). Despite mixed empirical findings regarding the impact of such certifications on innovation, with studies reporting positive (Wu and Chen, 2011), negative (Naveh and Erez, 2004), and mixed effects (Terziovski and Guerrero, 2014), the pursuit of these standards is argued to be beneficial for product and process innovation in SMEs from developing countries.

International Journal of Entrepreneurial Behavior & Research

The drive for international certifications necessitates the adoption of quality management practices that integrate new structures and techniques into product development and production methods, thus fostering innovation and cost efficiency (Kim *et al.,* 2012). Although costly and resource-intensive, this process is expected to enable SMEs to overcome resource constraints and spur innovation (Ali *et al.,* 2021). For example, international certifications are especially pivotal in sectors like food and agribusiness in Africa, where they directly influence product and process innovation. These certifications enforce global standards, open market access, and demand continuous upgrades, which encourage the adoption of advanced technologies and innovative practices, especially among SMEs in developing countries (Ali *et al*., 2021). The dynamic nature of maintaining these international standards instils a culture of continuous improvement and development. As companies strive to meet the stringent requirements of certifications such as ISO 9001, Fair Trade, Organic, and HACCP, they innovate to comply and attract foreign investment, enhance workforce skills through mandatory training programs, and forge global networks that provide new ideas and partnerships.

In summary, international certifications like ISO 9001, Fair Trade, Organic, and HACCP are instrumental for SMEs from SSA countries, propelling product innovation by improving quality management systems. Through the lens of these certifications, SMEs can leverage their limited resources to foster innovation and carve a niche in the international market. These certifications provide a strategic framework within which SMEs in developing countries can navigate resource constraints and institutional weaknesses to introduce product and process innovations. Therefore, the last hypothesis is presented as follows:

Hypothesis 3: The weaker the institutional environment, the more likely international quality certification positively contributes to SME innovations.

3. Data and Method

3.1. Data source

This study uses the World Bank Enterprise Survey (WBES) database for the empirical analysis (http://www.enterprisesurveys.org/). Started in 2005, the WBES offers comprehensive and high-quality data on the world's investment environment and the behaviour of companies in different

International Journal of Entrepreneurial Behavior & Research

economies. The database has been widely used in previous enterprise growth, innovation, and international business studies (e.g., Williams *et al.,* 2016). The WBES collects data using standardised instruments and a uniform method of sampling, which reduces measurement errors and delivers comparable data across different economies. It is administered by local staff who conduct one-on-one interviews with company representatives, top managers or functional managers who know their organisation's operations and performance. From 174,000 companies in 151 countries participating in the WBES, data from 8,466 SMEs in 11 SSA countries between 2011 and 2020. Out of the 8,466 companies, 1601 (18.91%) are from Nigeria, 1516 (17.89%) are from Kenya, 1154 (13.63%) are from Zambia, 1037 (13.24%) are from Zimbabwe, 979 (11.56%) are from South Africa, 641 (7.57%) are from Ghana, 539 (6.37%) are from Tanzania, 529 (6.25%) are from Mozambique, 244 (2.88%) from Cameroun, 119 (1.41%) from Benin and 107 (1.26%) are from Niger.

3.2. Variables and measures

Dependent variable – Innovation

The dependent variable is innovation output indicators. First, *Product Innovation* is a bivariate variable, coded as 1 if a company introduced a new or significantly improved product/service and 0 otherwise (WBES Variable code: H1). Second, *Process Innovation* is coded as 1 if a company introduced a new or significantly improved process and 0 otherwise (WBES Variable code: H5). These measurements are consistent with extant literature (Mendi and Mudida, 2018).

Explanatory variables

This study focuses on the following constructs to empirically examine the impact of three main international-oriented strategic channels SMEs in the SSA region utilise to introduce innovations in the face of weak institutions. First, consistent with the literature (Yurevich *et al*., 2023), this study measures *Foreign Ownership* using the percentage of the companies owned by foreign individuals, companies, or organisations (WBES Variable code: b2b). Second, following prior studies (Banerjee *et al.,* 2022), this study measures *Export Activity* using the percentage of the companies' sales from direct exports (WBES Variable code: d3c). Third, in line with existing literature (Ullah, 2022), this study measures *International Certification* as a dummy variable based

International Journal of Entrepreneurial Behavior & Research

on the WBES question: Does the establishment have an internationally recognised quality certification? (WBES Variable code: Qb8).

Additionally, to capture the effect of the institutional environment in which these SMEs originate and operate, this study constructs the *Institution* variable by summing the average of country-level factors related to (1) legal system (WBES Variable code: h30), (2) lack of educated workforce (WBES Variable code: l30b) (3) corruption (WBES Variable code: j30f), (4) political instability (WBES Variable code: j30e), (5) and trade regulations (WBES Variable code: d30b). Consistent with prior research (Castellacci, 2015), the *Institution* variable represents the degree to which the country-level factors hinder the company's operations.

Control variables

Several control variables are included, whose impact on innovation has been documented in the literature. First, the effect of *Firm Size* is controlled using the number of full-time, permanent employees, which is transformed into a nominal variable capturing micro enterprises (less than 10 employees), small enterprises (less than 50 employees), and medium-sized enterprises (less than 200 employees) following prior research (Abor and Quartey 2010). Second, this study controls for *Firm Age* using the years between the company's founding year and the interview's year. Third, ownership structure has a considerable impact on companies' innovation efforts. This study controls ownership effects using two indicators. *Domestic Ownership* is the percentage of the company owned by domestic individuals, companies or organisations (WBES Variable code: b2a). *State Ownership* is measured as the percentage of the company owned by the government/state (WBES Variable code: b2c). Fourth, this study controls for *R&D activities* as a dummy variable based on the WBES question: Did this establishment spend on formal research and development activities, either in-house or contracted with other companies, excluding market research surveys? (WBES Variable code: h8). Fifth, formal training is vital to a company's stock of human capital and innovation efforts. Thus, this study controls for *Formal Training*, using a dummy variable based on the WBES question: Did this establishment have formal training programs for its permanent, full-time employees? (WBES Variable code: L.10). Finally, managers' experience can influence companies' innovation efforts in developing countries. Hence, this study controls for

International Journal of Entrepreneurial Behavior & Research

experience, measured as the top manager's years of experience working in the company's sector (WBES Variable code: B.7).

–Insert Table 1 here –

3.3. Model specifications

For the empirical analysis, this study adopts the Probit model approach because of the bivariate nature of the dependent variables. First, this study estimates the effects of foreign ownership, export activity, and international certification on the combined innovation activities, namely, whether a company is engaged in innovation (product innovation or process innovation) or not. The empirical models are described as follows:

$$Innovation_i = \beta_0 + \beta_1(\text{Institution x Foreign Ownership})_i + \beta_2(\text{CV})_i + \text{Fixed effect} + \mathcal{E} \quad (1)$$

$$Innovation_i = \beta_0 + \beta_1(\text{Institution x Export Activity})_i + \beta_2(\text{CV})_i + \text{Fixed effect} + \mathcal{E} \quad (2)$$

$$Innovation_i = \beta_0 + \beta_1(\text{Institution x International Certification})_i + \beta_2(\text{CV})_i + \text{Fixed effect} + \mathcal{E} \quad (3)$$

Where *Innovation* is a binary variable set that equals '1' if the company introduced a new or significantly improved product or process; '0' otherwise. More so, to capture the effect of the institutional environment in which the companies are embedded, the interaction terms for *Institution* and *Foreign Ownership*, *Export Activity* and *International Certification* are introduced in Eq.1, Eq. 2 and Eq. 3, respectively. CV represents a set of control variables. The models include fixed effects to control for unobserved country conditions, industry characteristics and temporal effects.

Second, this study estimates the effects of explanatory variables on the different types of innovation introduced by the companies as follows:

$$Prod_i = \beta_0 + \beta_1(\text{Institution x Foreign Ownership})_i + \beta_2(\text{CV})_i + \text{Fixed effect} + \mathcal{E} \quad (1a)$$
$$Proc_i = \beta_0 + \beta_1(\text{Institution x Foreign Ownership})_i + \beta_2(\text{CV})_i + \text{Fixed effect} + \mathcal{E} \quad (1b)$$

$$Prod_i = \beta_0 + \beta_1(\text{Institution x Export Activity})_i + \beta_2(\text{CV})_i + \text{Fixed effect} + \mathcal{E} \quad (2a)$$
$$Proc_i = \beta_0 + \beta_1(\text{Institution x Export Activity})_i + \beta_2(\text{CV})_i + \text{Fixed effect} + \mathcal{E} \quad (2b)$$

$$Prod_i = \beta_0 + \beta_1(\text{Institution x International Certification})_i + \beta_2(\text{CV})_i + \text{Fixed effect} + \mathcal{E} \quad (3a)$$
$$Proc_i = \beta_0 + \beta_1(\text{Institution x International Certification})_i + \beta_2(\text{CV})_i + \text{Fixed effect} + \mathcal{E} \quad (3b)$$

Where *Prod.* is a binary variable, which equals '1' if the company introduced a new or significantly

International Journal of Entrepreneurial Behavior & Research

improved product/service; '0' otherwise. Proc. is a binary variable, which equals '1' if the company introduced a new or significantly improved process; '0' otherwise. Finally, β is the coefficient vector, and ε is the error term.

Moreover, innovation studies face endogeneity issues, which could lead to biased estimation outcomes (Chundakkadan and Sasidharan, 2020). Research suggests endogenous problems may be due to missing variables, measurement errors and reverse causality (Savignac, 2008). For example, there may be reverse causality existing between the dependent variables – innovations and the explanatory variables – foreign ownership, export activity and international certification. Under this condition, implementing simple Probit or logistic estimations is inefficient as they may provide biased outcomes. Thus, to address these endogenous concerns, this study utilises the Instrumental Variable-Probit (IV-Probit) estimation technique (Angrist and Krueger, 2001). Other innovation studies have widely used the IV-Probit approach because it produces more robust and reliable results (Barra and Ruggiero, 2022).

4. Results

4.1. Descriptive Statistics and Correlation Matrix

Table 2 presents the descriptive statistics of the main variables. Among the sample, 3612 companies (42.67%) introduced product innovation, whereas 2555 companies (30.19%) process innovation. Private foreign individuals, companies, or organisations own 742 companies (8.77%). About 1167 companies (13.79%) have internationally recognised quality certifications. Besides, in the sample, the companies are, on average, 20 years old, while the top managers have 15 years of experience in the industry. 2403 companies (28.39%) engaged in formal employee training. Table 3 presents the results of the Pearson correlation analysis. In addition, the variance inflation factor (VIF) was checked. The VIF values are between 2.74 and 1.08, whereas the mean VIF is 1.53. The values are less than the proposed threshold of 10 (Hair et al., 2006). Thus, multicollinearity is not a significant concern.

-- Insert Tables 2 and 3 here –

International Journal of Entrepreneurial Behavior & Research

4.2. Regression Results

4.2.1. *Joint Innovation Activities*

The purpose of the first phase of the analysis is to ascertain the impact of foreign ownership, export activity and international certification on the combined innovation activities. Table 3 presents the results of the five IV-Probit regression models. First, a set of control variables are regressed on the *innovation*. As shown in Model 1, only firm age (β =0.12332; p<0.000) and manager's experience (β =0.00403; p< 0.034) have a positive impact on innovations. These findings align with previous research highlighting the importance of age and managers' experience in companies' innovation efforts. (Petruzzelli *et al*., 2018) Next, Model 2 includes the *institution* variable to examine the effect of institutional environments. The results reveal a negative and significant impact on the likelihood of engaging in innovation activities in developing economies (β = -0.00779; p<0.000). The results obtained here are consistent with other studies highlighting the detrimental impact of weak institutional environments on innovative SMEs in developing economies (Deng and Zhang, 2018). Furthermore, foreign ownership is not significantly associated with the likelihood of implementing innovation (β =0.00243; p< 0.615), as shown in Model 3. However, Model 4 and Model 5, respectively, reveal that export activity (β =0.00378; p<0.000) and international certifications (β=0.00437; p<0.000) significantly contribute to the likelihood of introducing innovations. Generally, these results indicate that SMEs tend to leverage export activity and international certifications more than foreign ownership to introduce innovations in a weak institutional environment.

4.2.2. *Innovation Types: Product and Process Innovations*

In the second phase of the analysis, this study examines the impact of foreign ownership, export activity and international certification on product and process innovation. Model (6) shows that foreign ownership has a positive effect on the likelihood of implementing product innovation (β =0.00473; p< 0.081), albeit with a weak significance (at the 90% level). Model (7) shows that foreign ownership does not contribute to process innovation (β =0.00425; p< 0.420). Thus, based on these results, the first hypothesis is not supported. These results are consistent with scholars

International Journal of Entrepreneurial Behavior & Research

suggesting that innovative companies in developing economies do not benefit from foreign ownership (Adu-Danso and Abbey, 2022). Likewise, Model (8) reveals that export activity has a positive and insignificant impact on the likelihood of introducing product innovation (β= 0.00299, p<0.131). However, Model (9) shows that export activity is positive and significantly associated with implementing process innovation (β= 0.00375, p<0.000). These results indicate that export activity heterogeneously impacts innovations in developing economies. As export activity contributes to the propensity of implementing process innovation among developing economy SMEs, hypothesis 2 is partially supported. Finally, Models (10) and (11) show that international certification has a positive and significant effect on product innovation (β= 0.00436, p<0.000) and process innovation (β= 0.00029, p<0.031), respectively. Thus, hypothesis 3 is fully supported.

5. Discussion

5.1. Theoretical Implications

Amidst today's competitive pressure, SMEs in developing economies face additional resource constraints linked to their local institutional environment. This paper examines the types of international channels that enable these SMEs to overcome these challenges and consequently enhance their innovation efforts (Li *et al*., 2022; Materu and Righetti, 2010; Lall and Pietrobelli, 2005). Burgeoning research recognises the vital role of these channels as a company-level response strategy to the institutional environment (e.g., Krammer and Kafouros, 2022). Thus, this study makes several contributions by drawing from a resource-based view and institution-based theory to explain the innovation efforts of SMEs in developing economies.

First, most prior explanations of the linkage between institutions and enterprise innovation efforts in SSA countries tend to focus on barriers or policy recommendations for fostering effective institutions at the national level (Mudombi and Muchie, 2014). Despite the relevant contributions, they need to explain the company-level strategic responses to institutional difficulties. As a result, the current study contributes to filling this research gap by arguing that SMEs operating in environments with a high level of institutional voids must exploit strategic channels that enable them to improve their efficiency and innovation efforts. More precisely, this study enhances our understanding of the three main international-oriented strategic channels SMEs in the SSA region utilise to introduce innovations in weak institutional environments. Thus, this paper not only contributes to prior innovation literature exploring resource-based view through the lens of

International Journal of Entrepreneurial Behavior & Research

institution-based theory but also burgeoning research that is uncovering company-level strategic responses to institutional difficulties (Wu and Deng, 2020).

Second, prior studies in developed economies suggest that foreign ownership contributes to companies' innovation (e.g., Corsi and Prencipe, 2018; Falk, 2008). However, unlike these findings, the current study shows that foreign ownership does not increase the likelihood of implementing innovations among SMEs in the SSA region. The variations in these findings show that the impact of foreign ownership on innovation is context-based. These findings reaffirm the importance of integrating the local institutional context when studying the alternative resource mechanisms companies in developing economies utilise to enhance their efficiency. This claim is further validated by other studies in developing countries suggesting that foreign ownership does not contribute to innovations (Adu-Danso and Abbey, 2022; Krammer and Kafouros, 2022). Possible explanations for the insignificant impact of foreign ownership may be due to the unique institutional situations of the SSA region. For example, a high degree of uncertainty in business environments is more likely to escalate agency problems. Under this condition, managers can use information costs in the external capital market to engage in opportunistic behaviour, leading to reduced efficiency (Myers and Majluf, 1984). In other words, the managers of SMEs in developing countries may prioritise their private interests over the demands of foreign investors by using the funds they collect for purposes other than innovation activities (Sahut *et al.,* 2021). Moreover, the high information asymmetry that characterises most developing countries makes it difficult for foreign investors to evaluate the innovation capacities of SMEs (Wellalage and Fernandez, 2019). When faced with such challenges, foreign investors may underinvest or even hesitate to engage in long-term R&D investments in these companies (Leuz *et al.,* 2010). Therefore, the findings of this study contribute to the institution-based view literature in the SSA region (Adu-Danso and Abbey, 2022; Krammer and Kafouros, 2022) by emphasising that foreign-owned SMEs are less likely to implement innovations in environments with a high degree of institutional voids.

Third, this study contributes to the export literature by showing that exposure to foreign markets increases the likelihood of implementing innovations, particularly for SMEs from challenging environments. Export improves the technological knowledge of SMEs, which can be leveraged in implementing product and process innovations. Consistent with prior evidence, the current study finds that export activity positively and significantly impacts combined innovation activities (Rodil *et al.,* 2016). In addition, the findings of this study confirm theoretically supported

International Journal of Entrepreneurial Behavior & Research

by learning-by-exporting literature that suggests that export markets provide diverse knowledge pools, technological resources, and relevant agents of innovation (Salomon and Shaver, 2005). In other words, as it is shown that SMEs in SSA leverage resources in export markets to improve their combined innovation efforts, this study confirms the assumption of the learning-by-exporting hypothesis in SSA.

Nevertheless, when product and process innovations are considered independently, this study reveals that export activities are more beneficial for implementing process innovation. This finding is interesting as it validates the claim that developing countries' SMEs pursuing export growth strategies are more likely to invest in process innovation than product innovation (Edeh *et al.,* 2020). This is not surprising given that incremental product innovation dominates the developing country markets. Under this condition, SMEs investing in innovation that targets new or significantly improved processes, production methods, and delivery channels can achieve better performance (Becker and Egger, 2013). Therefore, this study contributes to the literature by showing that when SMEs exploit and explore technological resources in foreign markets, they utilise them more towards process innovation than product innovation.

Finally, this study shows that SMEs with international quality certifications are more likely to implement innovation. As institutional voids are high in developing countries, implementing international quality management practices can help these companies gain access to financial resources and introduce new products that meet customer and regulatory requirements in foreign markets (Ullah, 2020). This is very important as rushing to market with a new but low-quality product is detrimental to a company's performance, especially for those originating from weak institutional environments. Thus, these findings contribute to burgeoning evidence highlighting the importance of international quality certifications as a strategic mechanism for overcoming the disadvantage of weak institutions, especially for innovative SMEs in developing countries (Ullah, 2022).

5.2. Practical Implications

This study also has some critical implications for policy and practice. First, for governments and policymakers in developing countries, especially those in the SSA region, the institution matters in the performance of companies. Given that SMEs are crucial to national economic growth,

International Journal of Entrepreneurial Behavior & Research

implementing policies and structures that will improve the quality of institutions will significantly enhance these companies' innovation capabilities. For example, policies that increase the efficiency of market-supporting structures and regulatory implementation can facilitate access to resources, especially finance, reduce transaction costs, increase the ease of doing business, and, in turn, improve the innovation performance of SMEs.

Second, for foreign investors, a good understanding of the dynamics and requirements of doing business in developing countries is essential due to the potential negative impact of foreign investment on SMEs' innovation. Such an understanding is critical in implementing governance and managerial structures to mitigate agency challenges and opportunistic behaviour peculiar to developing country companies.

Finally, organisational learning can be resource-consuming, especially in foreign business environments. SMEs face several resource limitations; thus, managers should focus on acquiring technological knowledge inputs that suit that company's resources, objectives, and market demands. As this study reveals that exporting activities are not equally beneficial to introducing product and process innovations, SME managers in developing countries should refrain from spreading their limited resources too thin by engaging in learning activities that do not fit their internal characteristics and objectives.

6. Conclusion and future research directions

This study investigates the impact of three international channels SMEs in developing economies exploit to introduce product and process innovations in the face of resource and institutional challenges. Based on the analysis of SMEs in eleven SSA countries, this study reveals that foreign ownership does not contribute to product and process innovation. On the other hand, SMEs engaging in exporting activities and the ones possessing international quality certifications, respectively, are likely to implement innovations.

This study has some limitations, which need to be acknowledged and overcome in future research. First, this study only examines product innovation and process innovation. However, given that companies in developing countries operate far from the technological frontier, future research may explore the impacts of other forms of innovations. For example, as extant studies focus more on technological innovations, it is vital to understand whether foreign ownership

International Journal of Entrepreneurial Behavior & Research

fosters organisational or marketing innovation. Second, future research could investigate whether searching for superior technological knowledge or self-selection drives the presence of developing country SMEs in foreign markets. Third, global crises such as COVID-19 may place an additional burden on the resource constraints of SMEs in developing countries. Thus, further studies should investigate how companies from these countries navigate them, especially when pursuing innovation and growth strategies. Finally, even though it is included as a control variable, there is a need for more studies examining whether and how state ownership interacts or mediates the relationship between foreign ownership and innovation efforts in the context of developing economies.

International Journal of Entrepreneurial Behavior & Research

References

Abor, J. and Quartey, P. (2010), "Issues in SME Development in Ghana and South Africa", *International Research Journal of Finance and Economics*, 39, 218–228.

Abubakar, Y. A., Hand, C., Smallbone, D. and Saridakis, G. (2019), "What specific modes of internationalisation influence SME innovation in Sub-Saharan least developed countries (LDCs)?" *Technovation*, 79, 56–70.

Abbey, E. and Adu-Danso, E. (2022). "What factors hamper innovation amongst SMEs in Kenya?" *Innovation and Development*, DOI: 10.1080/2157930X.2022.2030890

Aboal, D., Noya, N., and Rius, A. (2014), "Contract Enforcement and Investment: A Systematic Review of the Evidence", *World Development,* 64, 322–338.

Adekunle, A. A., Ellis-Jones, J., Ajibefun, I., Nyikal, R. A., Bangali, S., Fatunbi, A. O., & Angé, A. (2013). "Agricultural innovation in sub-Saharan Africa: Experiences from multiple stakeholder approaches", Accra, Ghana: Forum for Agricultural Research in Africa (FARA).

Adjimah, H.P., Atiase, V. and Dzansi, D.Y. (2023), "Do government incentives increase indigenous innovation commercialisation? Empirical evidence from local Ghanaian firms", *International Journal of Entrepreneurial Behavior & Research*, https://doi.org/10.1108/IJEBR-02-2022-0157.

Adomako, S., Amankwah-Amoah, J., Debrah, Y.A., Khan, Z., Chu, I. and Robinson, C. (2021), "Institutional Voids, Economic Adversity, and Inter-firm Cooperation in an Emerging Market: The Mediating Role of Government R&D Support", *British Journal of Management*, 32, 40-58.

Adomako, S., Amankwah-Amoah, J., Dankwah, G. O., Danso, A., and Donbesuur, F. (2019). "Institutional voids, international learning effort and internationalization of emerging market new ventures", *Journal of International Management,* 25(4), 100666.

Adu-Danso, E. and Abbey, E. (2022), "Does foreign ownership enhance technological innovation amongst manufacturing firms in Sub-Saharan Africa?" *Journal of Small Business & Entrepreneurship*, Vol. 34 No. 2, 195–221.

Ali, J., Reed, M. R., and Saghaian, S. H. (2021). "Determinants of product innovation in food and agribusiness small and medium enterprises: evidence from enterprise survey data of India", *International Food and Agribusiness Management Review*, *24*(5), 777-796.

International Journal of Entrepreneurial Behavior & Research

Amaeshi, K., Adegbite, E., and Rajwani, T. (2016), "Corporate social responsibility in challenging and non-enabling institutional contexts: Do institutional voids matter?" *Journal of Business Ethics*, 134, 135–153.

Angrist, J. D., and Krueger, A. B. (2001). "Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments", *The Journal of Economic Perspectives*, 15(4), 69–85.

Ayalew, M.M. and Xianzhi, Z. (2020), "The effect of financial constraints on innovation in developing countries: Evidence from 11 African countries", *Asian Review of Accounting,* Vol. 28 No.3, 273–308.

Ayyagari, M., Demirgüç-Kunt, A., and Maksimovic, V. (2011), "Firm Innovation in Emerging Markets: The Role of Finance, Governance, and Competition", *The Journal of Financial and Quantitative Analysis*, Vol. 46 No. 6,1545–1580.

Banerjee, S., Karna, A., and Sharma, S. (2022), "Imprinting effects of exposure to the Indian independence movement on export intensity of firms", *Journal of Business Research,* 149, 548–557.

Barney, J.B. (2001), "Resource-Based Theories of Competitive Advantage: A Ten-Year Retrospective on the Resource-Based View", *Journal of Management*, 27, 643–650.

Barasa L., Knoben J., Vermeulen P., Kimuyu P., and Kinyanjui B. (2017), "Institutions, resources and innovation in East Africa: A firm level approach". *Research Policy*, 46, 280–291.

Barra, C., and Ruggiero, N. (2022), "Firm innovation and local bank efficiency in Italy: Does the type of bank matter?" *Annals of Public and Cooperative Economics*, *93*(4), 1083–1128.

Baumol, W.J. (2010), *The Microtheory of Innovative Entrepreneurship*. Princeton University Press.

Becheikh, N. and Bouaddi, M. (2022). "Macro barriers to business and innovation in developing economies: evidence from Egyptian, Moroccan, and Tunisian SMEs," *Canadian Journal of Development Studies / Revue canadienne d'études du développement*, DOI: 10.1080/02255189.2022.2102464

Becker, S.O., and Egger, P.H. (2013). "Endogenous product versus process innovation and a firm's propensity to export". *Empir Econ* 44, 329–354.

Bernard, A. B., and Bradford Jensen, J. (1999). "Exceptional exporter performance: Cause, effect, or both?" *Journal of International Economics*, *47*(1), 1–25.

Bishop, P. and Wiseman, N. (1999), "External ownership and innovation in the United Kingdom", *Applied Economics,* Vol. 31 No. 4, 443–450.

Blazevic, V., and Lievens, A. (2008), "Managing innovation through customer coproduced knowledge in electronic services: An exploratory study. *J. of the Acad. Mark. Sci.* 36, 138–151

International Journal of Entrepreneurial Behavior & Research

Castellacci, F. (2015), "Institutional Voids or Organizational Resilience? Business Groups, Innovation, and Market Development in Latin America", *World Development,* 70, 43–58.

Chakraborty, P. (2016), "Judicial quality and regional firm performance: The case of Indian states", *Journal of Comparative Economics*, Vol. 44 No. 4, 902–918.

Chang, S. J., Chung, C. N., and Mahmood, I. P. (2006), "When and how does business group affiliation promote firm innovation? A tale of two emerging economies", *Organization Science*, Vol. 17 No. 5, 637–656.

Choi, S. B., Lee, S. H., and Williams, C. (2011), "Ownership and firm innovation in a transition economy: Evidence from China", *Research Policy,* Vol. 40 No. 3, 441–452.

Chundakkadan, R. and Sasidharan, S. (2020), "Financial constraints, government support, and firm innovation: empirical evidence from developing economies", *Innovation and Development*, 10:3, 279–301.

Corsi, C. and Prencipe, A. (2018), "Foreign ownership and Innovation in independent SMEs. A cross-European analysis", *Journal of Small Business and Entrepreneurship,* Vol. 30 No. 5, 397–430.

Dachs, B., and Ebersberger, B. (2009), "Does foreign ownership matter for the innovative activities of enterprises?" *Int Econ Econ Policy* 6, 41–57.

Dachs, B. and Peters, B. (2014), "Innovation, employment growth, and foreign ownership of firms: A European perspective", *Research Policy,* Vol. 43 No.1, 214–232.

D'Attoma, I., and Ieva, M. (2020), "Determinants of technological innovation success and failure: Does marketing innovation matter?" *Industrial Marketing Management*, 91, 64–81.

Deng, P., and Zhang, S. (2018), "Institutional quality and internationalization of emerging market firms: Focusing on Chinese SMEs", *Journal of Business Research*, 92, 279–289.

Díaz-Díaz, N. L., Aguiar-Díaz, I., & Saá-Pérez, P. D. (2008), "Impact of foreign ownership on innovation", *European Management Review*, *5*(4), 253–263.

Donbesuur, F., Ampong, G.O.A., Owusu-Yirenkyi, D. and Irene Chu, (2020), "Technological innovation, organizational innovation and international performance of SMEs: The moderating role of domestic institutional environment", *Technological Forecasting and Social Change*, 161, 120252. https://doi.org/10.1016/j.techfore.2020.120252

Dunning, J. H. (2009), "Location and the Multinational Enterprise: A Neglected Factor?" *Journal of International Business Studies*, Vol. 40 No. 1, 5–19.

Edeh, J. N., Obodoechi, D. N., and Ramos-Hidalgo, E. (2020), "Effects of innovation strategies on export performance: New empirical evidence from developing market firms", *Technological Forecasting and Social Change*, 158, 120167. https://doi.org/10.1016/j.techfore.2020.120167

International Journal of Entrepreneurial Behavior & Research

Edeh, J. N., and Acedo, F. J. (2021), "External supports, innovation efforts and productivity: Estimation of a CDM model for small firms in developing countries", *Technological Forecasting and Social Change,* 173, 121189. https://doi.org/10.1016/j.techfore.2021.121189

Falk, M. (2008), "Effects of Foreign Ownership on Innovation Activities: Empirical Evidence for Twelve European Countries", *National Institute Economic Review*, 204, 85–97.

Galindo-Martín, M.-A., Méndez-Picazo, M.-T. and Castaño-Martínez, M.-S. (2020), "The role of innovation and institutions in entrepreneurship and economic growth in two groups of countries", *International Journal of Entrepreneurial Behavior & Research,* Vol. 26 No. 3, 485–502.

Geffen, C. and Rothenberg, S. (2000), "Sustainable Development across Firm Boundaries: The Critical Role of Suppliers in Environmental Innovation," *International Journal of Operations and Production Management*, Vol. 20,2,166-186.

Goedhuys M., Janz N., and Mohnen P. (2014), "Knowledge-based productivity in 'low-tech' industries: Evidence from firms in developing countries." *Industrial and Corporate Change*, 23, 1–23.

Golovko, E. and Valentini, G. (2011), "Exploring the complementarity between Innovation and export for SMEs' growth", *Journal of International Business Studies*, Vol. 42 No. 3, 362–380.

Grossman, G. and Helpman, E. (1993), *Innovation and Growth in the Global Economy*, MIT Press, Cambridge, MA.

Hair, J., Black, W., Babin, B., Anderson, R. and Tatham, R. (2006), *Multivariate Data Analysis.* 6th Edition, Pearson Prentice Hall, Upper Saddle River.

Howells, J. (1996), "Tacit knowledge", *Technology Analysis & Strategic Management*, Vol. 8, 2, 91-106.

Isobe, T., Makino, S., and Montgomery, D. B. (2000), "Resource Commitment, Entry Timing, and Market Performance of Foreign Direct Investments in Emerging Economies: The Case of Japanese International Joint Ventures in China", *The Academy of Management Journal*, *43*(3), 468–484.

Kim, D.Y., Kumar, V. and Kumar, U. (2012), "Relationship between quality management practices and Innovation" *Journal of Operations Management*, Vol. 30 No. 4, 295–312.

Krammer, S. M. S., and Kafouros, M. I. (2022), "Facing the Heat: Political Instability and Firm New Product Innovation in Sub-Saharan Africa", *Journal of Product Innovation Management* Vol. 39 No.5, 604– 642.

Lall, S., and Pietrobelli, C. (2005), "National technology systems in sub-Saharan Africa", *International Journal of Technology and Globalisation*, 1(3-4), 311–342.

Leuz, C., Lins, K. V., and Warnock, F. E. (2010). "Do Foreigners Invest Less in Poorly Governed Firms?" *The Review of Financial Studies*, Vol. 23 No.3, 3245–3285.

International Journal of Entrepreneurial Behavior & Research

Li, H., and Atuahene-Gima, K. (2001). "Product innovation strategy and the performance of new technology ventures in China", *Academy of Management Journal*, 44(6): 1123–1134.

Li, R. Y., Sousa, C. M., He, X., and Hu, Y. (2022), "Spinning straw into gold: Innovation recycling, innovation sourcing modes, and innovation ability in Sub-Saharan Africa", *Journal of Product Innovation Management*, 39(5), 583–603.

Love, J. H., and Roper, S. (2015), "SME innovation, exporting and growth: A review of existing evidence", *International Small Business Journal,* Vol. 33 No. 1, 28–48.

Lu, Y., Tsang, E.W.K. and Peng, M.W. (2008), "Knowledge management and innovation strategy in the Asia Pacific: Toward an institution-based view", *Asia Pac J Manage* Vol. 25, 361–374.

Manders, B., de Vries, H. J. and Blind, K. (2016), "ISO 9001 and product innovation: A literature review and research framework", *Technovation*, (48–49), 41–55.

Marquis, C. and M. Raynard (2015), "Institutional Strategies in Emerging Markets", *Academy of Management Annal*s 9, 291–335.

Materu, P., and Righetti, P. (2010), "Quality assurance in sub-Saharan Africa", *Research in Comparative and International Education*, 5(1), 3–17.

Mendi, P., and Mudida, R. (2018), "The effect on innovation of beginning informal: Empirical evidence from Kenya", *Technological Forecasting and Social Change*, 131,326–335.

Monjon, S., and Waelbroeck, P. (2003), "Assessing spillovers from universities to firms: Evidence from French firm-level data", *International Journal of Industrial Organization*, *21*(9), 1255–1270.

Mudombi, S., and Muchie.M. (2014), "An Institutional Perspective to Challenges Undermining Innovation Activities in Africa." *Innovation and Development*, Vol. 4 No. 2, 313–326.

Myers, S. C., and Majluf, N. S. (1984), "Corporate financing and investment decisions when firms have information that investors do not have", *Journal of Financial Economics,* Vol. 13 No.2, 187-221.

Narooz, R., and Child, J. (2017), "Networking responses to different levels of institutional void: A comparison of internationalizing SMEs in Egypt and the UK", *International Business Review,* Vol. 26 No. 4, 683–696.

Naveh, E. and Erez, M. (2004), "Innovation and attention to detail in the quality improvement paradigm", *Manag. Sci*., Vol. 50 No.11, 1576–1586.

Nelson, R. R., and Nelson, K. (2002), "Technology, institutions, and innovation systems", *Research Policy*, *31*(2), 265–272.

International Journal of Entrepreneurial Behavior & Research

Nofsinger, J. R., and Wang, W. (2011), "Determinants of start-up firm external financing worldwide", *Journal of Banking & Finance*, Vol. 35 No. 9, 2282–2294.

North D. C. (1990), *Institutions, institutional change, and economic performance*. Cambridge, UK: Cambridge University Press.

Nuhu, N.S., Owens, M. and McQuillan, D. (2021), "International entrepreneurship from emerging to developed markets: an institutional perspective", *International Marketing Review*, Vol. 38 No. 3. 453–486.

O'Brien, J.P. (2003), "The Capital Structure Implications of Pursuing a Strategy of Innovation", *Strategic Management Journal*, 24, 415–431.

Ozen, O., and Ozturk-Kose, E. (2023), "Management innovation: The role of internal, external factors, and business group affiliation", *Journal of Business Research*, *164*, 113964. https://doi.org/10.1016/j.jbusres.2023.113964

Park, B. I. (2011), "Knowledge transfer capacity of multinational enterprises and technology acquisition in international joint ventures", *International Business Review*, *20*(1), 75–87.

Peng, M.W. (2003), "Institutional Transitions and Strategic Choices", *Academy of Management Review*, 28, 275–296.

Peng, M.W., Sun, S.L., Pinkham, B. and Chen, H. (2009), "The Institution-Based View as a Third Leg for a Strategy Tripod", *Academy of Management Perspective*, 23, 63–81.

Petruzzelli, A. M., Ardito, L., and Savino, T. (2018), "Maturity of knowledge inputs and innovation value: The moderating effect of firm age and size", *Journal of Business Research*, 86, 190–201.

Pitelis, C. N. (2004), "Edith Penrose and the resource-based view of (international) business strategy", *International Business Review*, *13*(4), 523–532.

Pla-Barber, J. and Alegre, J. (2007), "Analysing the link between export intensity, Innovation and firm size in a science-based industry", *International Business Review,* Vol. 16 No. 3, 275–293.

Rhee, S.G. and Wang, J.X. (2009), "Foreign Institutional Ownership and Stock Market Liquidity: Evidence from Indonesia", *Journal of Banking & Finance*, Vol. 33, 1312–1324.

Rodríguez-Pose, A. and Zhang, M. (2020), "The cost of weak institutions for Innovation in China", *Technological Forecasting and Social Change*,153, https://doi.org/10.1016/j.techfore.2020.119937.

Rosenberg, N., and Nelson, R. (1993), "Technical innovation and national systems", In R. R. Nelson (Ed.), *National innovation systems: A comparative analysis*. Oxford: Oxford University Press.

International Journal of Entrepreneurial Behavior & Research

Ryan, J. C., and Daly, T. M. (2019), "Barriers to innovation and knowledge generation: The challenges of conducting business and social research in an emerging country context", *Journal of Innovation & Knowledge*, Vol. 4, No.1, 47–54.

Sahut, J-M., Dana, L-P. and Teulon, F. (2021), "Corporate governance and financing of young technological firms: A review & introduction", *Technological Forecasting and Social Change,*163, https://doi.org/10.1016/j.techfore.2020.120425.

Saka-Helmhout, A., Chappin, M., and Vermeulen, P. (2020). "Multiple paths to firm innovation in sub-Saharan Africa: How informal institutions matter", *Organization Studies*, 41(11), 1551-1575.

Salomon, R. and Jin, B. (2008) "Does knowledge spill to leaders or laggards? Exploring industry heterogeneity in learning by exporting", *Journal of International Business Studies*, Vol. 39, No. 1, 132–150.

Salomon, R.M. and Shaver, J.M. (2005). "Learning by Exporting: New Insights from Examining Firm Innovation", *Journal of Economics & Management Strategy*, 14, 431-460.

Savignac, F. (2008), "Impact of Financial Constraints on Innovation: What can be learned from a direct measure?" Economics of Innovation and New Technology, 17:6, 553–569,

Scott, W. R. (2001), *Institutions and Organizations*, 2, Thousand Oaks: Sage

Sharma, A., Sousa, C., and Woodward, R. (2022), "Determinants of innovation outcomes: The role of institutional quality", *Technovation*, 118, 102562. https://doi.org/10.1016/j.technovation.2022.102562

Sila, I. (2020). "Investigating changes in TQM's effects on corporate social performance and financial performance over time", *Total Quality Management & Business Excellence,* Vol. 31 No. (1–2), 210–229.

Smallbone, D., Saridakis, G., and Abubakar, Y. A. (2022), "Internationalisation as a stimulus for SME innovation in developing economies: Comparing SMEs in factor-driven and efficiency-driven economies", *Journal of Business Research*, 144,1305–1319.

Spencer, J. W. (2003), "Firms' knowledge-sharing strategies in the global innovation system: Empirical evidence from the flat panel display industry", *Strategic Management Journal*, *24*(3), 217–233.

Teece D. J. (2007), "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance", *Strategic Management Journal*, 28, 1319–1350.

Terziovski, M. and Guerrero, J. (2014), "ISO 9000 quality system certification and its impact on product and process innovation performance", *Int. J. Prod. Econ.,* 158, 197–207.

Tracey, P., and Phillips, N. (2011), "Entrepreneurship in Emerging Markets", *Manag Int Rev* 51, 23–39.

International Journal of Entrepreneurial Behavior & Research

Ullah, B. (2020), "Signaling value of quality certification: Financing under asymmetric information", *Journal of Multinational Financial Management*, 55, 100629. https://doi.org/10.1016/j.mulfin.2020.100629

Ullah, B. (2022), "The impact of quality certification on SME innovation and the role of institutions", *Research in International Business and Finance*, *62*, 101748. https://doi.org/10.1016/j.ribaf.2022.101748

Un, C.A. and Asakawa, K. (2015), "Types of R & D Collaborations and Process Innovation: The Benefit of Collaborating Upstream in the Knowledge Chain", *Journal of Product Innovation Management*, 32, 138–153.

UNCTAD (2016), "The Least Developed Countries Report" http://unctad.org/en/PublicationsLibrary/ldc2016 en.pdf

Urban, B. (2016). "Empirical evidence on the influence of the institutional environment on venture innovation performance in South Africa", Journal of Developmental Entrepreneurship, 21(02), 1650011.

Wang, J.Y.and Blomstrom, M. (1992). "Foreign Investment and Technology Transfer: A Simple Model", *European Economic Review*, 36, 137-155.

Wang, W. and Ma, H. (2018), "Export strategy, export intensity and learning: Integrating the resource perspective and institutional perspective", *Journal of World Business,* Vol.53 No. 4, 581–592.

Watkins, A., Papaioannou, T., Mugwagwa, J., and Kale, D. (2015). "National innovation systems and the intermediary role of industry associations in building institutional capacities for innovation in developing countries: A critical review of the literature". *Research Policy*, *44*(8), 1407z1418.

Wellalage, N. H., and Fernandez, V. (2019), "Innovation and SME finance: Evidence from developing countries", *International Review of Financial Analysis*, 66, 101370. https://doi.org/10.1016/j.irfa.2019.06.009

Wernerfelt, B. (1984), "A Resource-Based View of the Firm", *Strategic Management Journal,* 5(2), 171–180.

Wernerfelt, B. (1989), "From Critical Resources to Corporate Strategy", *Journal of General Management*. https://doi.org/10.1177/030630708901400301

Williams, C.C., Martinez-Perez, A. and Kedir, A. (2016), "Does bribery have a negative impact on firm performance? A firm-level analysis across 132 developing countries", *International Journal of Entrepreneurial Behavior & Research*, 22, 3,398-415.

Wu, S-I. and Chen, J-H. (2011), "Comparison between manufacturing companies that are ISO certified and those that are not certified using performance measurement model", *Total Quality Management & Business Excellence*, Vol 22 No. 8, 869 -890.

Wu, I., and Chiu, M. (2015), "Organizational applications of IT innovation and firm's competitive performance: A resource-based view and the innovation diffusion approach", *Journal of Engineering and Technology Management*, *35*, 25–44.

Wu, B., and Deng, P. (2020), "Internationalization of SMEs from emerging markets: An institutional escape perspective", *Journal of Business Research,* 108, 337–350.

Wu, L., Wei, Y. and Wang, C. (2021), "Disentangling the effects of business groups in the innovation-export relationship", *Research Policy*,50(1) https://doi.org/10.1016/j.respol.2020.104093.

Yurevich, M. A., Simachev, Y. V., Kuzyk, M. G., and Fedyunina, A. A. (2023), "R&D synergy between local and foreign-owned enterprises in post-communist economies'. *International Journal of Innovation Studies*, *7*(2), 101-114.

Zhou, C. and Li, J. (2008), "Product innovation in emerging market-based international joint ventures: an organizational ecology perspective", *Journal of International Business Studies*, 39 (7):1114–1132.

Zhu, Y., Wittmann, X. and Peng, M.W. (2012), "Institution-based barriers to innovation in SMEs in China", *Asia Pac J Manag* 29, 1131–1142.

International Journal of Entrepreneurial Behavior & Research

Table 1 Summary statistics of the variables

	Count	Mean	Std Dev	Min	Max
Product innovation	8466	0.42665	0.49461	0	1
Process innovation	8466	0.30191	0.45911	0	1
Foreign ownership	8466	8.76941	25.52498	0	100
Export activity	8466	4.81243	15.93296	0	100
International certification	8466	0.13784	0.34475	0	1
Institution	8466	1.77311	1.35670	0	4
Firm age	8466	19.95631	16.96996	0	220
Firm size	8466	1.55462	0.68516	0	2
Domestic ownership	8466	84.07631	33.29021	0	100
State ownership	8466	0.83782	5.59998	0	99
R&D activities	8466	1.90756	0.29086	0	1
Formal training	8466	0.28396	0.45094	0	1
Experience	8466	15.65474	10.19481	0	72

International Journal of Entrepreneurial Behavior & Research

Table 2 Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Product innovation	1.000												
(2) Process innovation	0.444	1.000											
(3) Foreign ownership	0.030	0.021	1.000										
(4) Export activity	0.048	0.070	0.091	1.000									
(5) International certification	0.107	0.147	0.138	0.110	1.000								
(6) Institution	0.109	0.077	-0.038	-0.068	-0.010	1.000							
(7) Firm age	0.009	0.002	-0.007	0.014	0.167	-0.025	1.000						
(8) Frim size	-0.074	-0.020	0.272	-0.055	0.293	-0.135	-0.013	1.000					
(9) Domestic ownership	-0.050	-0.036	-0.287	-0.180	-0.089	0.059	0.023	-0.126	1.000				
(10) State ownership	0.048	0.059	0.025	0.153	0.030	-0.008	0.024	-0.075	-0.240	1.000			
(11) R&D activities	-0.062	-0.118	-0.061	-0.140	-1.000	0.012	-0.012	-0.293	0.002	-0.288	1.000		
(12) Formal training	0.222	0.246	0.077	0.077	0.200	0.063	0.040	0.141	-0.074	0.041	-0.309	1.000	
(13) Experience	0.030	0.012	-0.009	0.007	0.021	0.015	0.288	0.076	0.034	-0.035	-0.149	0.053	1.000

International Journal of Entrepreneurial Behavior & Research

Table 3. IV-Probit Results: Joint Innovations

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Firm age	0.12332***	0.05295***	0.00881**	0.00801***	0.00894**
	(0.02638)	(0.00473)	(0.00719)	(0.00491)	(0.00323)
Firm size	-0.00167	-0.00676	-0.01085	-0.04824	-0.05639***
	(.00115)	(0.00368)	(0.05245)	(0.00411)	(0.00077)
Domestic ownership	-0.00032	-0.00049	-0.00029	-0.00022	0.00041**
	(0.00019)	(0.00017)	(0.00082)	(0.00061)	(0.00017)
State ownership	0.00005	-0.00004	0.00011	0.000121	0.00008
	(0.00006)	(0.00005)	(0.00021)	(0.00015)	(0.00005)
R&D activities	-0.02481	-0.01038	-0.07418	-0.02812	-0.02598*
	(0.01758)	(0.01753)	(0.09257)	(0.03354)	(0.01531)
Formal training	0.45885	0.24366	0.47238**	0.04014	0.01902
	(0.09723)	(0.14975)	(0.21279)	(0.41577)	(0.10046)
Experience	0.00403**	0.00945***	0.00276**	0.01027**	0.00947***
	(.00189)	(0.00168)	(0.01907)	(0.00504)	(0.00159)
Institutions		-0.00779***			
		(0.00137)			
Inst x Frgn_ownership			0.00243		
			(0.00484)		
Inst x Export_activity				0.00378***	
				(0.00046)	
Inst x Inter_certification					0.00437 ***
					(0.00038)
Sector	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES
Constant	-0.22611*	-.38037**	0.07763	0.30893	0.36139**
	(0.12961)	(.11289)	(0.84842)	(0.32471)	(.11045)
Summary statistics					
Log likelihood	-13872.264	-18476.704	-2617.3578	-3292.7767	-18474.361
Wald chi2	400.78	196.98	6911.22	1017.59	7176.23
P-value	0.0000	0.0000	0.0017	0.0000	0.0000

* p < 0.05, ** p < 0.01, *** p < 0.001

International Journal of Entrepreneurial Behavior & Research

Table 4. IV-Probit Results: Product Innovation and Process Innovation

	Model (6) Product Inno.	Model (7) Process Inno.	Model (8) Product Inno.	Model (9) Process Inno.	Model (10) Product Inno.	Model (11) Process Inno.
Firm age	0.00891	0.00913	0.00683	0.00826*	0.00951**	0.01001**
	(0.00637)	(0.01075)	(0.00639)	(.0049354)	(0.00337)	(0.00389)
Firm size	-0.04312**	0.03604	-0.03614	-0.04841***	-0.05613***	-0.03346***
	(0.01875)	(0.02380)	(0.02359)	(0.00351)	(0.00113)	(0.01026)
Domestic ownership	0.00045	-0.00297*	-0.00007	0.00022	0.00041**	-0.00002
	(0.00053)	(0.00175)	(0.00066)	(0.00063)	(.0001678)	(00023)
State ownership	0.00006	0.00006	0.00019	0.00013	0.00007	0.00006
	(0.00021)	(0.00017)	(0.00016)	(0.00019)	(0.00007)	(0.00006)
R&D activities	-0.02976	-0.16003**	-0.00034	-0.03225	-0.02773	-0.03955**
	(0.08919)	(0.08016)	(0.05602)	(0.04002)	(0.01544)	(0.01722)
Formal training	0.13531	0.52439**	0.31894	0.03645	0.05879	0.44076***
	(0.21937)	(0.26636)	(0.43798)	(0.41941)	(0.11207)	(0.08581)
Experience	-.0137909	0.01027	-0.00663	-0.01057**	-0.00954***	-0.00347
	(0.0087898)	(0.01094)	(0.00881)	(0.00403)	(0.00168)	(0.00278)
Inst x Frgn_ownership	0.00473*	0.00425				
	(0.00179)	(0.00204)				
Inst x Export_activity			0.00299	0.00375***		
			(0.00198)	(0.00049)		
Inst x Inter_certification					0.00436***	0.00293**
					(0.00039)	(0.00086)
Sector	YES	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
Constant	0.32792	-0.58494	-0.05972	0.25366	0.27818	0.01282
	(0.57917)	(-0.58494)	(0.64853)	(0.61445)	(0.17833)	(0.16579)
Summary statistics						
Log likelihood	-2630.8355	-2600.3918	-3318.3711	-3320.5264	-18281.605	-18510.52
Wald chi2	121.32	115.64	137.21	192.90	616.15	273.12
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

International Journal of Entrepreneurial Behavior & Research

Dear Reviewer,

Thanks a lot for agreeing to review our work and for the valuable comments you provided. They were very helpful in revising and improving our paper. We have taken the time to address the issues you raised in the current version of our paper. For more information on how we revised the manuscript, please see the replies to the comments (in bold and italics).

Reviewer: 1

Recommendation: Revision

Comments:

Dear Authors
Thank you for your paper "Dealing with Adversity: Innovation among Small and Medium-Sized Enterprises in Developing Economies. I found the paper to be clear and well written, in a unique context. Like all reviews, I would like to suggest further ideas that may extend the paper and its contributions.

1. Introduction Framing and (Disconnect from international oriented channels)
You commence the paper with a focus on developing countries and suggest Institutions shape resources (particularly value, availability and allocation) and how institutions impact innovation- and it is important to understand how SMES in developing countries can enhance their competitiveness and survival rates through innovation, irrespective of institutional environments. (Pg3). Great.

But, given this framing I would expect to see empirical tests of resource valuation availability, allocation, innovation and outcomes with the performance measure being competitiveness or survival rates. But this is not what you test. You instead test strategic responses particularly the impacts of "three international oriented channels (foreign ownership, exporting activity and international quality certification) on SME innovations in Sub-Saharan African countries"(pg4). Is the RQ focused on:

1.how institutions impact innovation and ways SMEs respond to this/deal with this to be competitive and survive (first framing/first omission in literature pg 3)
2. What types of international channels enable SMEs in developing countries to overcome challenges of weak institutions and consequently, enhance their innovation efforts (identified in page 4/second omission in literature pg 3) or
3 SMES draw on various sources of strategic resources to implement product and process innovation. (p4).
I recommend you tighten the framing- You may want to revise the front section to better align the framing with your empirical tests.

Authors' Reply:

We responded to the above comments as follows:

First, we revised the front section of the introduction to reflect and clarify the focus of the study, which is, examining the impacts of three internationally oriented channels (foreign ownership, export activity, and international quality certification) on SME innovation in Sub-Saharan African countries.

Second, we have also reframed the research question based on this comment. As a result, the revised RQ is: What types of international channels enable SMEs in developing countries to overcome the challenges of weak institutions and consequently enhance their innovation efforts?

2. Omissions in the literature/novelty.

You offer several omissions in the literature that lead to this research I will note them and then highlight prior work in this domain. Overall, many of your claims indicate limited research, but I found sufficient existing literature that it reduces the novelty of the contributions. Further, some of the omissions are broad claims (ie. Institutional adversity in sub sahran Africa vs the specifics eg foreign ownership etc). I would recommend you revise this.
1. Paucity of evidence on how SMES in Sub Sahran Africa deal with institutional adversity and liabilities when introducing innovation. (pg 3)
Prior work in this area:
Saka-Helmhout, A., Chappin, M., & Vermeulen, P. (2020). Multiple paths to firm innovation in sub-Saharan Africa: How informal institutions matter. Organization studies, 41(11), 1551-1575.
Urban, B. (2016). Empirical evidence on the influence of the institutional environment on venture innovation performance in South Africa. Journal of Developmental Entrepreneurship, 21(02), 1650011.
Adomako, S., Amankwah-Amoah, J., Dankwah, G. O., Danso, A., & Donbesuur, F. (2019). Institutional voids, international learning effort and internationalization of emerging market new ventures. Journal of International Management, 25(4), 100666.

Authors' Reply:

We addressed the above comments by doing the following:

We removed all statements suggesting there is limited research. Instead, we acknowledged existing studies (e.g., Lall and Pietrobelli, 2005; Adekunle et al., 2013; Materu and Righetti, 2010) and suggested our paper is different and extends the literature by offering a robust, and multi-country analysis of SME strategic responses to institutional constraints using international channels, which rare in the literature, especially in the context of Sub-Saharan Africa.

2. Yet to fully examine whether there if there is any specific international channels that enable SMES in developing economies to overcome challenges of weak institutions and consequently, enhance their innovation efforts. (pg 3)
Amaeshi, K., Adegbite, E., & Rajwani, T. (2016). Corporate social responsibility in challenging and non-enabling institutional contexts: Do institutional voids matter?. Journal of business ethics, 134, 135-153.
Abubakar, Y. A., Hand, C., Smallbone, D., & Saridakis, G. (2019). What specific modes of internationalization influence SME innovation in Sub-Saharan least developed countries (LDCs)?. Technovation, 79, 56-70.
Specifically foreign ownership
Li, R. Y., Sousa, C. M., He, X., & Hu, Y. (2022). Spinning straw into gold: Innovation recycling, innovation sourcing modes, and innovation ability in Sub-Saharan Africa. Journal of Product Innovation Management, 39(5), 583-603.

Exporting activity
Lall, S., & Pietrobelli, C. (2005). National technology systems in sub-Saharan Africa. International Journal of Technology and Globalisation, 1(3-4), 311-342.

Adekunle, A. A., Ellis-Jones, J., Ajibefun, I., Nyikal, R. A., Bangali, S., Fatunbi, A. O., & Angé, A. (2013, June). Agricultural innovation in sub-Saharan Africa: Experiences from multiple stakeholder approaches.

Accra, Ghana: Forum for Agricultural Research in Africa (FARA).
and international quality certification
Lall, S., & Pietrobelli, C. (2005). National technology systems in sub-Saharan Africa. International Journal of Technology and Globalisation, 1(3-4), 311-342.

Materu, P., & Righetti, P. (2010). Quality assurance in sub-Saharan Africa. Research in Comparative and International Education, 5(1), 3-17.

Authors' Reply:

We have addressed the above comment by acknowledging the existence of studies in this domain. However, we claim these studies are rare and do not offer sufficient insight into the internationally oriented channels used by developing nations' SMEs to circumvent local constraints and enhance their innovation capabilities.

3. Research that links the role of institutions and innovation in developing countries, especially the Sub Sahran African Groin is still limited. (pg 3).
I would recommend you better articulate how this context of Sub Sahran differs from other countries or other developing countries with institutional voids? Why are these differences important?
RBV/institutional theory- Institutions shape important resource value, availability and allocation in sub-Saharan Africa (pg3) How is this new? How does your work align with pre-existing literature?

Authors' Reply:

We addressed the above comments by explaining how the sub-Saharan African institutional context differs from other countries; second, we highlighted why this difference is important; and finally, further discussed how our study aligns with and potentially contributes to advancing the preexisting literature.

4. Uncover company level strategic responses to institutional difficulties/ Indicate how SMES draw on various strategic resources to implement product and process innovation in the face of institutional difficulties. (pg4)
This is not clear. I'm unsure if you are describing a choice of international channels or something else. Are the channels strategic resources or strategic responses?
I would recommend you focus on better articulating how your research supports, extends, refutes, challenges, the prior literature and clearly highlight the novelty and importance of this research.

Authors' Reply:

We did the following to address the above comment: First, we have revised the sentence referring to the channels as strategic resources, adopting the term strategic responses. The statement is revised as follows: By so doing, this study offers fresh insights into the internationally oriented strategic responses used by sub-Saharan African SMEs to implement product innovation and process innovation in the face of institutional difficulties. Second, we further highlight the novelty and importance of this research.

The current version of the Introduction reads thus:

1. Introduction

Small and medium-sized enterprises (SMEs) in developing countries face substantial challenges in implementing innovation activities (Adomako et al., 2019; Saka-Helmhout et al., 2020; Urban, 2016). This situation has triggered an ongoing discussion on how these companies can overcome these constraints (Donbesuur et al., 2020). To this end, studies suggest that these companies can tackle these challenges by acquiring relevant resources within their local context (Goedhuys et al., 2014). This claim is supported by the resource-based view, which proposes that innovation success depends on the resources that companies own and control (Barney, 2001). Thus, the locally acquired resources are essential as they enable these companies to launch new products and production methods.

Nevertheless, scholars (e.g., Krammer and Kafouros, 2022; Smallbone et al., 2022) argue that the local institutional environments within which developing economy companies operate put considerable constraints on resources and hamper their innovation capacities, especially SMEs. This assumption aligns with the institutional theory, which argues that country-level factors strongly affect innovative SMEs' efficiency and productivity (Galindo-Martín et al., 2020). In many developing regions, especially Sub-Saharan Africa (SSA), the institutional support that should enhance the innovation capacities of SMEs is mainly absent. They face mounting challenges such as unstable political structures, inefficient legal systems, low economic development, energy poverty, weak local capital and unskilled/semi-skilled labour markets (UNCTAD, 2016). Thus, the level of institutional voids in these countries significantly hinders the ability of SMEs to locally generate and acquire resources needed for their innovation activities (Adomako et al., 2019; Tracey and Phillips, 2011). Additionally, unlike large companies, SMEs in developing economies may not have the relevant political connections to engage institutional bodies' attention and their representatives' attention to attract the resources required for innovation activities (Narooz and Child, 2017). In other words, given the weak institutional factors in developing countries, SMEs are less likely to access relevant resources needed to enhance their innovation efforts (Mudombi and Muchie, 2014).

Confronted with these challenges that inhibit resource acquisition, these SMEs are responding by strategically leveraging internationally oriented channels to drive their innovations. These responses are reflected in their proactive engagements with foreign ownership, active participation in exporting activities, and the acquisition of international quality certification. These international channels serve as adaptive strategies that enable these companies to overcome constraints within their local environments and enhance their innovation capabilities. Besides, there is growing evidence of these adaptive strategies in the SME innovation literature. For example, prior studies suggest that foreign ownership (Li et al., 2022), exporting activity (Adekunle et al., 2013; Lall and Pietrobelli, 2005), and international quality certification (Materu and Righetti, 2010) are critical to innovation efforts of companies. Nevertheless, a single study examining the impacts of these three internationally oriented channels (foreign ownership, export activity, and international quality certification) on SME innovation activities across multiple countries in SSA is still limited.

More so, most of the extant studies focus on various institutional barriers to innovations or the impacts of informal institutions on innovation in SSA countries (Ryan and Daly, 2019) without explicitly exploring the strategic channels SMEs from these economies utilise to overcome these challenges. For example, Ayalew and Xianzhi (2020) highlight that the inability of many African governments to facilitate access to financial resources hinders enterprise innovations. Abbey and Adu-Danso (2022) find that political instability and inefficient infrastructure are detrimental to the innovation performance of SMEs in Kenya. Additionally, Urban (2016) suggests that institutional factors linked to resource availability affect business innovation in South Africa. Likewise, Saka-Helmhout et al. (2020) show that informal

institutions serve as substitutes for underdeveloped formal institutions and that these informal institutions, combined with company-level resources, influence the innovation activities of companies.

Except for a few studies (e.g., Krammer and Kafouros, 2022; Adomako et al., 2019; Abubakar et al., 2019) research that identifies and explores the international strategic channels that SMEs, especially in the SSA region, use to circumvent local constraints and enhance their innovation capabilities relatively rare. As a result, scholars are increasingly calling for more empirical studies in this area (Abubakar et al., 2022; Krammer and Kafouros, 2022). This call is supported by the literature suggesting that companies from a weak environment enter foreign markets where efficient institutions support learning opportunities, knowledge generation and innovation capabilities (Nuhu et al., 2021; Dunning, 1998). Thus, in response to this call, this study addresses the following question: ***What types of international channels enable SMEs in developing countries to overcome the challenges of weak institutions and consequently enhance their innovation efforts?*** *This study answers this question using a comprehensive enterprise survey from the World Bank covering eleven countries in the SSA region: Benin, Cameroon, Ghana, Kenya, Mozambique, Niger, Nigeria, South Africa, Tanzania, Zambia, and Zimbabwe. These countries provide a suitable research context given the increasing innovation efforts of entrepreneurial companies irrespective of the high institutional voids and resource constraints that characterise their local environments.*

The paper contributes to the literature in the following ways. First, this paper draws on a resource-based view and institution-based theory to examine SME innovation efforts in SSA countries. Undoubtedly, resources matter for enterprise innovation (Barney, 2001). This paper advances the resource-based view by arguing that the institutional environments in developing economies have a strong bearing on the value, availability, and allocation of resources required for the successful implementation of innovations, and this has profound consequences for SMEs from these economies. Although there is a burgeoning discourse on the role of institutions, scholars highlight the need for more empirical studies supporting its linkage to SME innovation efforts (Zhu et al., 2012), especially in the SSA region, where evidence is still scarce (Saka-Helmhout et al., 2020; Barasa et al., 2017). The current study contributes to addressing this concern by investigating the international strategic response options that SMEs from SSA countries utilise to improve their innovation efforts in the face of challenges linked to the high-level institutional voids of the region. By exploring the impacts of various international channels on SME innovations, this paper goes beyond the prevailing approach in this region that emphasises innovation barriers and their performance implications (Becheikh and Bouaddi, 2022). Thus, the current study enhances our understanding of how SMEs in developing countries strategically respond to challenges related to their operating environment.

Second, using unique data from the World Bank covering eleven countries in the SSA region, this study empirically examines the impacts of three international-oriented channels – (1) foreign ownership, (2) exporting activity and (3) international quality certification – on SME innovations in SSA countries. By so doing, this study offers fresh insights into the internationally oriented strategic responses used by SMEs in SSA countries to implement product innovation and process innovation in the face of institutional difficulties. The findings of this paper show that these channels are not equally beneficial to innovation efforts. Thus, this study reminds SME managers in developing economies to apply caution when considering international channels to avoid putting additional constraints on their limited resources as it can hamper their innovation performance.

The remainder of this paper is organised as follows: Section 2 presents the theoretical background and hypotheses of this study. Section 3 describes the data and empirical model. Section 4 presents the results of the empirical analysis. Finally, Section 5 discusses the results, and Section 6 concludes and offers future research directions.

Hypotheses Development
Given you focus on Product and Process Innovation, better explain why these were selected vs other types of innovation e.g product/process/technological/business model/marketing/social?
In each of your hypothesis clearly articulate arguments for product innovation and process innovation. Your arguments suggest resources are central to innovation. And each of the international channels impact this. Namely,
1. Foreign owned companies have less financial constraints and access to innovation (?) resources, R and D investments, more qualified staff, transfers of advanced technological resources, and access to updated technology.

In revising the manuscript, we have provided more explanations on how foreign ownership affects product and process innovation.

The revised version of the foreign ownership and innovation hypothesis reads thus:

2.1.1. *Foreign Ownership and Innovations*

Research suggests foreign ownership determines a company's innovation and productivity performance, enabling access to necessary resources for innovation activities (Dachs and Peters, 2014). Foreign-owned companies face fewer financial constraints, benefit from superior governance structures (Rhee and Wang, 2009), and have better access to innovation resources compared to domestically-owned companies (Choi et al., 2011). This claim has a profound significance for SMEs from developing countries that often grapple with weak institutional support and constraints in innovation capabilities (Edeh and Acedo, 2021).

Due to their peculiar situations, SMEs from developing countries tend to lean on foreign investors to overcome their financial resources and technological limitations and improve their capabilities to develop product and process innovations (Dachs and Bersberger, 2009). For these companies, there are several reasons to expect a positive impact of foreign ownership on their innovation activities (Baumol, 2010). First, the cost of successfully launching new products or processes in the marketplace is rapidly rising and becoming an uphill struggle for SMEs from developing economies (Wellalage and Fernandez, 2019). Foreign ownership can facilitate access to financial resources to help these companies enhance their innovation capacities. For example, resources in the form of R&D investments from foreign investors to these SMEs can help in the development phase of new products and production methods. Besides, such resources enable them to hire qualified personnel to improve their success in commercialising new products and processes. Second, as SMEs from developing countries are far from the technological frontiers, foreign ownership provides domestic companies with efficient models for developing technology and innovation capabilities and enables the transfer of advanced technological resources (Chang et al., 2006). Prior studies confirm that foreign ownership enhances the resource commitment to technology transfer and, consequently, increases the capacities of SMEs to successfully launch new products to the markets and implement novel production methods that can help them achieve cost-efficiency (Isobe et al., 2000). In other words, technologies and knowledge flowing from foreign ownership can increase the capacities of SMEs in developing countries to introduce product and process innovations (Park, 2011). Third, organisational management is at the core of innovation performance (Ozen and Ozturk-Kose, 2023). As most SMEs from developing countries face management and resource allocation challenges, they can benefit from better corporate governance of foreign investors. For example, the organisational structure and design of

International Journal of Entrepreneurial Behavior & Research

foreign-backed SMES in the SSA region enable them to identify and efficiently invest in new products or production methods. In other words, access to finance and advanced technologies, as well as better organisational practices provided by foreign ownership, serve as a catalyst for SME innovation enhancements in developing countries.

Despite these reasons, the empirical evidence on the impact of foreign ownership on innovation is mixed. On the one hand, scholars suggest foreign ownership has a negative effect on innovation (Bishop and Wiseman, 1999). In a recent study, Adu-Danso and Abbey (2022) find that foreign ownership does not contribute to product and process innovations. More so, Díaz-Díaz et al. (2008) reveal no differences between foreign-backed companies and domestically-owned companies in terms of their innovation implementations. On the other hand, scholars established a positive relationship between foreign ownership and innovation performance (Corsi and Prencipe (2018). For example, Ayyagari et al. (2011) find that foreign ownership positively impacts innovation performance. Finally, in a recent study, Yi et al. (2023) suggest that foreign ownership positively impacts companies' innovation activities and exposes them to updated technology.

Regardless of these mixed findings, the prevailing argument is that foreign ownership fosters new product and process creations among SMEs. The national policies in SSA support this notion, suggesting that foreign investments in local companies are instrumental in promoting innovations (Adu-Danso and Abbey, 2022). In summary, foreign ownership aids SMEs in developing countries to overcome local resource constraints and, consequently, fosters innovation activities. On this basis, the first hypothesis is presented as follows:

Hypothesis 1: The weaker the institutional environment, the more likely foreign ownership positively contributes to SME innovations.

2. Export activity and innovation – export impacts technological resources via knowledge (market and technological knowledge)- direct export has higher degree of involvement enables creation of relationships and customer feedback and suppliers. In this hypothesis section, you could further tighten the arguments solely on the title export activity and innovation, not innovation and firm performance

We strengthened the discussion on the impact of export on product innovation and process innovation as well as focusing on the export activity and innovation nexus. The revised version reads as follows:

2.1.2. *Export Activity and Innovations*

SMEs in developing countries, such as those in SSA, often operate under the constraints of weak institutional environments characterised by unstable political climates, inefficient market intermediaries, and corruption (Rodríguez–Pose and Zhang, 2020). These challenges can prevent technological advancements and erode human capital development and managerial skills essential for innovation. Nonetheless, exporting has been identified as a pivotal mechanism for overcoming these domestic limitations and spurring innovation.

Furthermore, SMEs from developing countries can benefit from technology spillovers, gaining insights into foreign market demands and technological advancements (Wang and Ma, 2018). The learning-by-exporting hypothesis strongly supports this assumption by theorising that international trade is not merely an exchange of goods but also a crucial conduit for knowledge transfer (Salomon and Shaver, 2005). By tapping into diverse knowledge resources, SMEs from developing countries can innovate in product development, production methods, and distribution channels (Love and Roper, 2015). Direct exporting, in particular, presents opportunities for SMEs from developing countries to forge relationships with international customers and suppliers, facilitating the transfer of technological knowledge (Howells, 1996).

Customer feedback becomes an invaluable asset for product innovation, aligning offerings with market demands (Tavassoli, 2018), while suppliers can play a pivotal role in process innovation, lending their expertise to enhance efficiency (Un and Asakawa, 2015). Additionally, by collaborating with research institutes or innovation consultancies in export markets, SMEs from developing countries can innovate better than their domestic counterparts, thereby overcoming the challenges of limited local resources (Monjon and Waelbroeck, 2003).

More so, SMEs from developing countries often enter the global market as technology followers – latecomer-innovators. However, through exporting, they can rapidly advance their process innovation, a phenomenon described by Salomon and Jin (2008). This acceleration is driven by the need to meet the sophisticated demands of global trade partners. In other words, export markets serve as an international channel through which SMEs from developing countries amass extensive knowledge of production techniques and market intelligence, essential for fostering product and process innovation (Grossman and Helpman, 1993). Thus, exporting becomes a lever for accessing valuable resources, a cornerstone for achieving competitive advantage according to the resource-based view (Barney, 1991). Companies engaging in exporting find themselves at the intersection of market demands and cutting-edge technology (Li and Atuahene-Gima, 2001), which is conducive to product innovation. In the African context, companies with a moderate level of exporting are positioned to harness their international exposure to drive innovations, as Zhou and Li (2008) suggested. While cultural and operational challenges in global markets are inevitable, they can also provide learning opportunities that, when appropriately leveraged, result in innovative practices and products that meet market demands.

In summary, exporting can significantly affect company innovation in developing countries through knowledge acquisition and exposure to competitive market forces. The multifaceted nature of exporting provides companies with a rich tapestry of technical knowledge, consumer insights, and competitive pressures that collectively foster a culture of innovation, ensuring that SMEs from weaker institutional backgrounds are not left behind in the global innovation race. Therefore, the second hypothesis is presented as follows:

Hypothesis 2: The weaker the institutional environment, the more likely export activity positively contributes to SME innovations.

3. International Quality Management and Innovation. Standards are strategic and managerial assets, following standards reduce costs and achieve efficiency, signal legitimacy.
In this hypothesis section, you further describe and explain what quality methods rather than focusing exclusively on the hypothesis i.e. international quality management and innovation. Could some of this move to the literature review section?

We strengthened the discussion on the impact of international quality certification on product innovation and process innovation. In addition, we removed the section describing and explaining what quality methods are. The revised version reads as follows:

3.1.1. *International Quality Management and Innovations*

In developing countries, SMEs increasingly adopt international quality standards such as ISO 9001, which serve as strategic and managerial assets, aiding trade facilitation and productivity enhancement (Manders et al., 2016). Adopting these standards can help SMEs mitigate operational inefficiencies, reduce costs, and signal quality to international markets, overcoming informational asymmetries (Ullah, 2020). Despite mixed empirical findings

regarding the impact of such certifications on innovation, with studies reporting positive (Wu and Chen, 2011), negative (Naveh and Erez, 2004), and mixed effects (Terziovski and Guerrero, 2014), the pursuit of these standards is argued to be beneficial for product and process innovation in SMEs from developing countries.

The drive for international certifications necessitates the adoption of quality management practices that integrate new structures and techniques into product development and production methods, thus fostering innovation and cost efficiency (Kim et al., 2012). Although costly and resource-intensive, this process is expected to enable SMEs to overcome resource constraints and spur innovation (Ali et al., 2021). For example, international certifications are especially pivotal in sectors like food and agribusiness in Africa, where they directly influence product and process innovation. These certifications enforce global standards, open market access, and demand continuous upgrades, which encourage the adoption of advanced technologies and innovative practices, especially among SMEs in developing countries (Ali et al., 2021). The dynamic nature of maintaining these international standards instils a culture of continuous improvement and development. As companies strive to meet the stringent requirements of certifications such as ISO 9001, Fair Trade, Organic, and HACCP, they innovate to comply and attract foreign investment, enhance workforce skills through mandatory training programs, and forge global networks that provide new ideas and partnerships.

In summary, international certifications like ISO 9001, Fair Trade, Organic, and HACCP are instrumental for SMEs from SSA countries, propelling product innovation by improving quality management systems. Through the lens of these certifications, SMEs can leverage their limited resources to foster innovation and carve a niche in the international market. These certifications provide a strategic framework within which SMEs in developing countries can navigate resource constraints and institutional weaknesses to introduce product and process innovations. Therefore, the last hypothesis is presented as follows:

Hypothesis 3: The weaker the institutional environment, the more likely international quality certification positively contributes to SME innovations.

Could you please provide further details on the institutions variable? You note that " they measure the degree to which these factors are obstacles to the company's current operations" Pg 11 I am unclear what "they" is.

The *'they'* was referring to the five country-factor indicators we constructed to capture the effect of institutional environments in which SMEs in developing countries operate. In the current version, we can have explained it properly. It reads as follows:

Additionally, to capture the effect of the institutional environment in which these SMEs originate and operate, this study constructs the Institution variable by summing the average of country-level factors related to (1) legal system (WBES Variable code: h30), (2) lack of educated workforce (WBES Variable code: l30b) (3) corruption (WBES Variable code: j30f), (4) political instability (WBES Variable code: j30e), (5) and trade regulations (WBES Variable code: d30b). Consistent with prior research (Castellacci, 2015), the Institution variable represents the degree to which the country-level factors hinder the company's operations.

Control variables

Other variables in the survey include access to finance, which is used as an argument within hypothesis testing. Have you run the analysis with this as a control?

Given the nature of the database, did you also further stratify the sample by type of organization ie manufacturing?

International Journal of Entrepreneurial Behavior & Research

First, yes, we ran an analysis with access to finance as a control variable – that is, the ability of the companies to access funds from banks and non-bank financial institutions (which include microfinance institutions, credit cooperatives, credit unions, or finance companies).

Second, the effect of the sector was controlled.

	Model (1)
Firm age	.1241006***
	(.0259927)
Firm size	-.0031644
	(.0012766)
Domestic ownership	-.0003332
	(.0001959)
State ownership	.0000514
	(.0000605)
R&D activities	.4538286
	(.096328)
Formal training	-.0243391
	(.0175627)
Experience	.0041438**
	(.0018891)
Access to Finance	-.0016267*
	(.0008479)
Institutions	
Inst x Frgn_ownership	
Inst x Export_activity	
Inst x Inter_certification	
Sector	YES
Country	YES
Year	YES
Constant	-.0846885
	(.15259)
Summary statistics	
Log likelihood	-13866.619
Wald chi2	422.36
P-value	0.0000

Given the data collection includes 2020 (during COVID) did you account for this (given further constraints during this time)?

The dataset we used for the analysis does not contain variables on COVID-19; however, we highlighted this limitation in Section 6 of the current manuscript. It reads thus:

Third, global crises such as COVID-19 may place an additional burden on the resource constraints of SMEs in developing countries. Thus, further studies should investigate how

International Journal of Entrepreneurial Behavior & Research

companies from these countries navigate them, especially when pursuing innovation and growth strategies.

Discussion
I enjoyed reading your discussion section but would recommend greater connections/better summarising around the omissions introduced at the start of the document and how your results contribute to this.
I wish you all the very best on your papers continued development.

We have used the insights from omitted literature from the introduction in the discussion sections.

Once again, thanks a lot for your comments and suggestions; they are beneficial in revising our paper.

International Journal of Entrepreneurial Behavior & Research