The Social and Economic Impact of Co-creation: Sub-Saharan African Enterprises

By

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Abstract

Co-creation is a collaborative innovation process that involves stakeholders in product or service development, ensuring offerings align with customer needs. It can create adaptable, responsive, and market-relevant solutions. However, its implementation is constrained by factors like the innovation ecosystem, country infrastructure, and resources, with developed countries supporting it through regulations and initiatives.

This thesis explores the social and economic impacts of co-creation in sub-Saharan African businesses. It uses World Bank Enterprise and Innovation Surveys to measure co-creation intensity and its effect on financial and social performance. The results show that co-creation fosters democratization by fostering inclusive environments where diverse voices can shape outcomes. Co-creation enables more democratic and inclusive structures, enhancing collaboration and solutions that better represent the needs and aspirations of all involved.

December 20, 2023

Dedication

To the resilient people of Gaza, whose unwavering courage stands firm against the waves of brutality and atrocity. In the face of profound loss, your perseverance is a testament to the human spirit's strength. Your endurance amid unimaginable aggression stands as a testament to the struggle for justice, human rights and freedom. It serves as a beacon, reminding the world of the urgent need to uphold and protect the Palestinian people's rights.

Acknowledgments

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List of Abbreviations

BoP	Bottom of Pyramid
HEI	higher education institutions
NPD	New Product Development
PPP	Public-private partnership
R&D	Research and Development
SSA	sub-Sahara Africa.
WBES	World Bank Enterprise Survey

Chapter 1 Introduction

Companies increasingly embrace new connections to customers, suppliers and other stakeholders to maximize the value creation (Freudenreich et al., 2020; Loureiro et al., 2020) (Loureiro et al., 2020). This takes different models and levels, from consultation to full partnership through various channels. Such partnerships can be driven and supported with institutional support from governmental or international organizations.

Stakeholder cooperation can take different degrees and scope from co-production, co-creation or crowdsourcing (see (Lee et al., 2012b; Michalik, 2023b; Ramaswamy & Ozcan, 2014; Yang et al., 2021)). Considering the relationship scope, these concepts complement each other, involved parties and collaboration goals ((Redlich et al., 2019). By embracing these approaches, businesses can tap into various stakeholders' collective intelligence, creativity, and resources, enhancing innovation, value creation, and customer satisfaction ((Lee et al., 2012a; Malik & Ahsan, 2019; Ozdemir et al., 2020).

Co-creation as a concept covers diverse topics and disciplines, including collaboration with customers as innovators (Pee, 2016), efforts of users in customizing products to their needs (Verleye, 2015), co-production (Contreras-Espinosa et al., 2022), and open innovation (Chesbrough et al., 2018).

While the impact of collaboration and co-creation can be measured by commercial and financial measures (Ranjan & Read, 2016)co-creation can facilitate the emergence of novel social trends with local impact, which is broader than direct business value. Such

an impact might offer new working opportunities, provide new professional skills or improve labour productivity (van Ewijk & Ros-Tonen, 2021).

Co-creation studies covering developing countries, particularly sub-Saharan Africa, were limited compared to those covering developing countries (Aminoff et al., 2016; Saha et al., 2022). With this study, I address this gap by considering two research questions: First: To what extent does the intensity of co-creation activities influence firm financial performance (such as labour productivity, Innovation, and Export intensity)? Clarifying the relation between co-creation and overall enterprise success. Secondly, I tried to answer the following question: Can a significant correlation be observed between firms' engagement in co-creation activities and their generation of social impact (labour market inclusivity/women employee & education measured by training provided to employees)? This would help to understand the co-creation impact outside the firm's boundaries. Our research covers Sub-Saharan Africa based on the research gap identified.

To address this gap, we investigated the trend and direction of co-creation adoption in SSA firms using World Bank enterprise and innovation surveys. Then, we tried to measure the association between the intensity of co-creation and different financial and social factors.

These factors were innovation (measured by the firm launching new products or services in the last three years), labour productivity, export intensity, women's inclusivity and training programs offered to enterprise employees. The sample selected was based on 5,179 SSA firms. We started the analysis by excluding the sample bias using propensity score matching. Then, we used linear and probit regression based on the variable type.

Our study measured the value of co-creation as a social and economic function since it involves new forms of collaboration and cooperation between different stakeholders, which

might help entrepreneurs, managers and policymakers engaged in or trying to shape the co-creation landscape in SSA.

Following the data analysis, we tested the association between co-creation intensity and various economic and social measures using probit or logit regression. We tried to draw a lesson and conclusion. This was done. We examine the impact of co-creation on the social and economic function of SSA firms, which would be helpful for policymakers, businesses, and communities trying to maximize the utilization of available resources and expect social and economic output.

Chapter 2 Literature Review.

2.1 Co-creation and associated concepts:

Co-creation is the collaborative process between businesses and their customers or partners to create value jointly (Saha et al., 2022). The focus of co-creation is on creating value through cooperation with stakeholders. (Fan & Luo, 2020; Lee et al., 2012c).

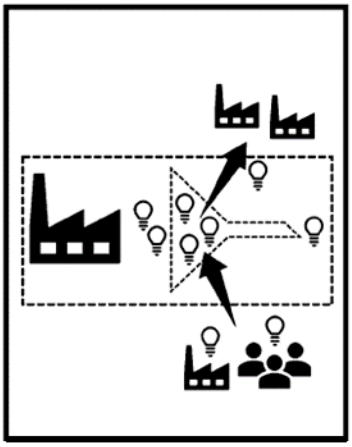
While co-creation and co-production share similarities in participation and collaboration, they have distinct characteristics. Co-production typically refers to the involvement of users or consumers in the production or delivery of services (Voorberg et al., 2015). It often involves the division of labour between service providers and users, where users contribute their time, skills, or resources to co-produce the desired outcomes. In contrast, co-creation encompasses a broader scope, extending beyond the production phase to include the entire value-creation process (Zwass, 2010). Co-creation emphasizes the active involvement of stakeholders in the ideation, design, and evaluation stages, fostering a more holistic and collaborative approach to value creation (ref.).

Co-creation and co-production need knowledge sharing, which involves exchanging and disseminating knowledge, information, and expertise among individuals and organizations (Lin, 2007). Knowledge sharing facilitates learning, innovation, and problem-solving by leveraging collective intelligence and experiences (Loureiro et al., 2020). However, the individual institution sets the objectives, and the relation is

transactional compared to co-creation, where the goals are jointly set. The relationship requires deep engagement and joint agreements (de Koning et al., 2016).

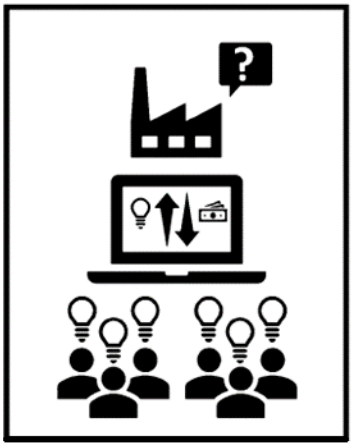
On the other hand, open innovation is a broader concept encompassing opening a firm's innovation processes to external sources of knowledge and ideas (Schenk & Guittard, 2011). It emphasizes leveraging external expertise and resources to drive innovation (Ghezzi et al., 2017). Open innovation can involve collaborations with external partners, such as suppliers, customers, and research institutions, to co-create and co-develop new products, services, or solutions (De Silva & Wright, 2019). Open innovation focuses on accessing and integrating external knowledge and resources to enhance innovation capabilities (Ghezzi et al., 2017).

Crowdsourcing is a specific approach in open innovation that involves outsourcing tasks or problems to a large group of people, typically through an open call or competition. It leverages a crowd's collective intelligence and creativity to generate ideas, solve problems, or complete tasks. Crowdsourcing can tap into many individuals' diverse perspectives and expertise, often through online platforms, to co-create and co-produce value (Galateanu & Avasilcai, 2018). The focus of crowdsourcing is on harnessing the power of the crowd to generate innovative solutions or content (Seltzer & Mahmoudi, 2012).



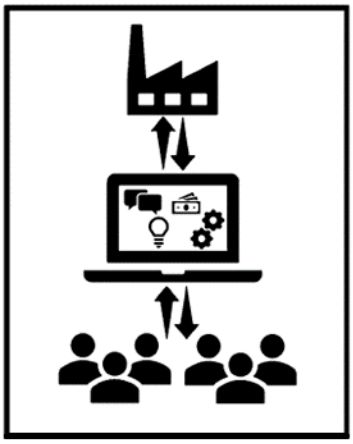
Open Innovation

- Strategic approach to firm-centric innovation.
- Focus on B2B
- Long-term Oriented.



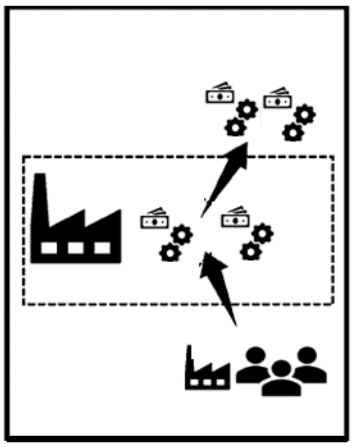
Crowdsourcing

- Outsourcing of problem-solving
- Little interaction.
- Short-term oriented.



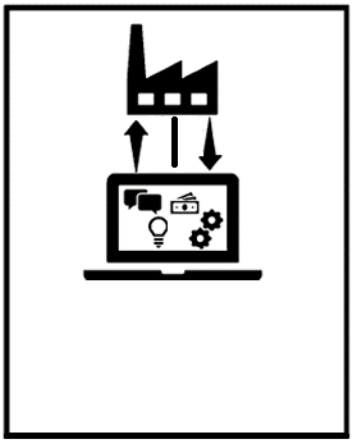
Co-creation

- Value co-creation beyond innovation.
- Intense Interaction.
- Long-term oriented.



Co-production

- Limited to production and delivery of services.
- Limited interaction.
- Short-term oriented.



Knowledge Sharing

- Transactional.
- Arms-length distant
- Short-term oriented.

Figure 1 Differentiation between concepts of the open paradigm (adapted and expanded from (Redlich et al., 2019))

While co-creation, co-production, and knowledge sharing are interconnected, they have distinct focuses and implications. Co-creation emphasizes the collaborative creation of value and experiences involving multiple stakeholders. Co-production emphasizes the collaboration between service providers and consumers in producing and delivering services. Knowledge sharing underpins co-creation and co-production, facilitating the exchange and dissemination of knowledge and expertise. These concepts contribute to various innovation domains, customer satisfaction, and organizational performance (de Koning et al., 2016; OECD, 2021; Redlich et al., 2019).

It is essential to note that co-creation does not always guarantee positive outcomes. Several studies have contributed to forming this developing theme of value co-destruction. One showed that value can be co-destroyed through the interactions between different systems, resulting in value destruction through misuse. This is consistent with relationship management, where one service system accidentally or intentionally misuses resources (its own and those of another) (Ple & Caceres, 2010). It is crucial for enterprises to carefully manage the co-creation process, ensuring that it aligns with their business goals and customer needs. This may involve selecting and training employees to engage in positive and helpful behaviours, establishing trust with customers and partners, and creating a supportive environment for co-creation activities. Otherwise, rude employees or negative stakeholder experiences might aggravate the relationship, instigating customers' desire for revenge and turning the co-creation into co-destruction. (Zhang, T. et al., 2018).

2.2 Value of Co-Creation:

Traditionally, innovation was often seen as an in-house corporate capability, where a company's research and development department worked secretly to develop groundbreaking products and services (Almirall & Casadesus-Masanell, 2010). C.K. Prahalad and Venkat Ramaswamy introduced the "co-creation of value with stakeholders" paradigm by publishing their landmark book " The Future of Competition" in 2004. (Writer, 2014). Co-creation has emerged as a novel strategy, redefining the boundaries of creativity and problem-solving. (Ramaswamy & Ozcan, 2014). Vorbach et al. (2019) reviewed co-creation business cases and demonstrated that the benefits of co-creating value propositions include hedonic, cognitive, social, personal, pragmatic, and economic benefits.

2.2.1 Co-creation and financial impact:

Co-creation enables organizations to gain valuable insights into customer preferences, needs, and aspirations, leading to the development of more customer-centric products and services (Iglesias et al., 2020). However, the benefits of co-creation extend beyond customer satisfaction and loyalty to financial performance. Co-creation can lead to economic gains, such as increased sales and profits, as businesses better satisfy customers' needs (Ge J. et al., 2019; Simba et al., 2023). It has been found to enhance enterprise performance, market efficiency, and overall efficiency of enterprises (Laforet, 2013). Additionally, co-creation can foster innovation, allowing enterprises to utilize their customers' and partners' knowledge and ideas (Arica et al., 2023). By involving customers in the co-creation process, enterprises can better understand their hidden needs and preferences (Du et al., 2021).

The mechanism of co-creation impact on finances can vary from sector to sector; for example, in banking, co-creation has improved innovation, customer satisfaction, and business outcomes (Malik & Ahsan, 2019). In the tourism industry, co-creation has been linked to enhanced financial indicators, brand value, customer satisfaction and loyalty (Arica et al., 2023). In supply chain management, co-creation is vital to promoting green investment and sustainability (Shi et al., 2020). Online education enterprises are exploring value co-creation business models in the education sector to create compelling value and address competitive pressures (Jing-jing et al., 2021).

2.2.2 Co-creation and social impact:

By involving a wide range of stakeholders, including customers, research institutes, government and the community at large, companies can establish a network of innovation and provide development opportunities that would help address societal challenges innovatively. Prahalad and Ramaswamy (2004) enunciated the DART model (Dialogue, Access, Risk assessment, Transparency) where they emphasize dialogue, accessibility, risk and transparency as founding stones(2004), Biggemann et al. (2014) have found that the involvement of numerous interrelated parties, such as manufacturers, suppliers, retailers, or more broadly, stakeholders, whose deeds are encouraged by social responsibility, which feeds the members of the value chain's pride, trust, and constancy, Co-creation can result in solutions that address environmental issues and improve sustainability. These initiatives can improve the overall quality of life, drive positive change, and foster a sense of shared responsibility in society. In social enterprises, value co-creation between customers and enterprises has enhanced enterprise performance and promoted growth (Ge, J. et al., 2019).

In the public sector, co-creation has been recognized to enhance public value creation by involving citizens in decision-making processes and service design (Voorberg et al., 2015). Co-creation also plays a crucial role in community-based initiatives, empowering individuals and communities to shape their services and environments actively (Redlich et al., 2019)

2.3 Co-creation: dissemination and impact on developed and developing countries:

Innovation strategy and its results vary from one firm to another. One way to innovate is by taking the closed approach, using the enterprise's resources to research and make all choices. The open innovation strategy would collaborate with external resources such as its customers, suppliers and external resources (Almirall & Casadesus-Masanell, 2010). Through this co-creation process, a new enterprise or practices will emerge as a result or requirement of such collaboration (Michalik, 2023b). Such an impact might not be the planned goal of the co-creation process, which would make its measurement out of the co-creation project direct measurement. However, such impact is broader than the project's scope, considering the process and its players whom they will impact. Such an effect will be wider than the enterprise and would have a long-term impact compared to the transitional new product or service development project timeline. At the same time, this impact is indirect but more potent than other direct impacts. (Iglesias et al., 2020) .

Co-creation drives innovation by combining diverse knowledge and expertise of research institutions, industry, and public civil society stakeholders. The approach and impact of co-creation can vary nationally from one company to another and between and internationally between developed and developing countries due to differences in priorities, resources, infrastructure and governing innovation ecosystems.

From a resources point of view, the availability of resources would provide firms and their network opportunities for innovation through co-creation. This is because each actor brings access to new resources, knowledge and skills, which can be integrated into the co-creation process to drive value creation (Frow et al., 2015a). The availability of resources allows for a strategic approach to co-creation, where firms can leverage their partners' distinctive capabilities and customer experiences to innovate and co-create new services or products.

Such integration would necessitate a network or collaboration ecosystem that varies between inter and intra-countries. At the same time, developing and developed countries differ in infrastructure and technology, which enhance knowledge sharing and dissemination (OECD, 2019) through high-speed internet and a robust technology ecosystem. This enables them to implement and leverage solutions for co-creation effectively.

The main factor impacting co-creation is the government's approach to regulation and eco-system to foster co-creation. Developed Countries tend to have well-established research and innovation regulatory bodies and ecosystems, with numerous universities, research institutions, private companies and government agencies. Some firms in developed economies, such as P&G, believe in "connect & develop" rather than R&D. This enables them to tap into a wealth of knowledge and expertise for co-creation projects (Kreiling & Paunov, 2021).

Before our research project, we scanned earlier research covering co-creation and its socio-economic impact, drew lessons based on such surveys, and compared the results

between developing and developed countries. Table 1 and Table 2 summarize these studies.

Table 1: Co-creation studies and results related to developed countries:

Author/Y	Impact	Independent Variable	Dependent Variable	Sample	Results
(Fang, 2008)	Financial	Customer Participation	Customer participation, customer network connectivity and process interdependence	235 American Companies	Customer participation enhances product performance depending on customer network connectivity and process interdependence.
(Reay & Seddighi, 2012)	Financial	Co-creation	Incidence of Co-creation. Company Characteristics that enable capabilities for innovation via co-creation	80 companies in NE of England	Co-creation activities and capabilities were limited in the sample population. Companies strategically focused on meeting the demands of individual customers were more inclined to have developed capabilities necessary for co-creation activities.
(Iglesias et al., 2020)	Social and Financial	Co-creation and Corporate Social Responsibility	Customer Trust. Customer Loyalty.	1101 Spanish Companies	CSR influences customer loyalty both directly and indirectly through co-creation and customer trust. Co-creation has a direct effect on customer trust.

Author/Y	Impact	Independent Variable	Dependent Variable	Sample	Results
(Kim et al., 2020)	Financial	Co-creation	Fairness, Visibility, Risk-benefit, Information share Mutual benefit, Shared value, Flexibility Relationship Commitment	188 South Korean companies	Co-creation has a significant positive impact on organizational performance through its enhanced strategic advantage. Co-creation provides small and medium manufacturers and suppliers with strategic. advantage (relationship commitment, visibility, flexibility, and fairness), which in turn improves their performances
(Cheng & Huizingh, 2014)	Economic	Open innovation activities	New product/service innovativeness Further product/service success Customer performance Financial performance	223 Taiwanese service company	Performing open innovation activities is significantly and positively related to innovation performance.

Table 2: Co-creation studies and results related to developing economies:

Developing Economies					
Author/Y	Impact	Independent Variable	Dependent Variable	Sample	Results
(dos Santos et al., 2023)	Economic	Co-creation	Sales volume, customer satisfaction, technical competence commercial competence profitability corporate image efficiency of the management process.	91 Brazilian company	positive and significant relationships between co-creation with customers and customer satisfaction and technical competence
(Hsu, 2016)	Economic	Cocreation strategy	Marketing strategy. Innovation strategy Design strategy Firm size Business Type	247 Taiwanese company	Enterprises adopting diverse co-creation strategies improved their NPD performance. Four co-creation strategies were identified: market development, technology improvement, cost direction and customer service.
(Zhang, X. & Chen, 2008)	Economic	Key co-creation activities	Customization Capability: Service Capability	174 Chinese companies	co-creation with customers positively impacts customization capabilities and service capabilities.
(Ma et al., 2017)	Economic	Customer Involvement	Perceived relationship Coordination cost.	252 Chinese Hotel	Higher coordination cost no direct positive effect on perceived relationship quality

Developing Economies					
Author/Y	Impact	Independent Variable	Dependent Variable	Sample	Results
(Mathibe et al., 2023)	Social	Value co-creation	The relationship between strategic planning and social enterprise performance. Ascertain the mediation of value co-creation to the relationship between strategic planning and social enterprise performance.	147 South African social enterprise	Value co-creation had a relatively weak positive and significant mediating effect on the relationship between strategic planning and enterprise performance.
(Cheng & Huizingh, 2014)	Economic	Open innovation activities	New product/service innovativeness Further product/service success Customer performance Financial performance	223 Taiwanese service company	Performing open innovation activities is significantly and positively related to innovation performance.
(Huynh et al., 2023)	Economic	Co-creation	Technology innovation. Organizational performance	323 Vietnamese manufacturing enterprises.	Co-creation significantly enhances technology innovation. Technology co-creation stimulates organizational performance.

Table 1 and Table 2 provide a glimpse into earlier efforts to survey the impact of co-creation in developed and emerging developing economies; we can draw the following lessons:

1. The focus was on the financial impact, which was only sometimes positive and highlighted the effect of innovation, regulatory and industry ecosystem on the output of cocreation, which varies between countries, regions and sector to sector.
2. The co-creation is well rooted in the developed countries, exhibited by multiple governmental or international organization-initiated initiatives specifically dedicated to studying, planning and encouraging co-creation and knowledge sharing as well as private sector enterprises.

   For example, EU countries have initiated the CO3 project, which assesses the benefits and risks of disruptive digital technologies to co-create, co-produce, and co-manage public services with citizens (Horizon 2020 Programme, 2021). At the same time, OECD countries have issued multiple studies and policy papers covering knowledge-sharing and co-creation policies adopted by member countries. For example, Knowledge Co-creation in the 21st Century is a cross-country experience-based policy paper which draws upon 13 case studies from different countries and the experiences of knowledge co-creation during the COVID-19 pandemic; the report illustrates the diverse nature of these initiatives and draws valuable policy lessons underscoring the compelling rationale for policy support of knowledge co-creation, given that the advantages of successful co-creation efforts surpass the initial coordination costs. Furthermore, the paper highlights the role of knowledge co-creation initiatives in democratizing

innovation through all stakeholders' contributions, effective governance and management structures, defining ownership and usage rights of collaborative outcomes, and operating under favourable conditions that promote temporary staff mobility and facilitate collaboration and efficient communication among participants. (Laura Kreiling & Caroline Paunov, 2021) The reader can refer to OECD policy papers and the STIP Compass website for further case studies and policy papers. (OECD, 2021)

Most co-creation studies focused on financial performance more than social performance. Even the studies that discussed the social factor focused on its impact on enterprise strategic planning more than on society. Compared to other regions, there is a need for more studies covering African or Sub-Saharan countries.

3. Studies covering Africa, specifically sub-Saharan Africa, focus on the financial impact. A recent review of 91 literature summarized the outputs of knowledge co-creation in agriculture and food-related platforms in Sub-Saharan Africa and found a positive effect on farmers' income but found that this impact is on a local level. Multi-stakeholder platforms are not entirely effective. However, the review did not mention any social impact on communities. (van Ewijk & Ros-Tonen, 2021)

2.4 Impact of co-creation in the context of developed countries:

The impact of co-creation in Western countries has been explored in several studies, shedding light on its implications for different sectors and contexts. One study by Sanders and Stappers (2008) discusses the evolution of design research from a user-centred

approach to co-designing, highlighting the changing roles of designers, researchers, and users. The authors note that co-designing has taken different paths in the US and Europe, suggesting that co-creation's impact may vary from country to country. In the context of public administration, (Jukić et al., 2019; Tajeddin et al., 2023) examine collaborative innovation and co-creation in Northern and Western Europe, particularly in social policy, welfare, and healthcare. The study finds that co-creation is often focused on citizens and internal users rather than companies as target groups in the co-creation of public services.

(Lorenzo-Romero & Constantinides, 2019) Investigate online crowdsourcing and customers' motives to participate in online collaborative innovation processes in Spain and the Netherlands. It provides insights into the attitudes and motives of innovation-minded customers, which can be relevant in understanding the potential impact of co-creation in Western contexts.

(Verleye, 2015) investigates the co-creation experience from the customer perspective, emphasizing the importance of customer role readiness, technologization, and connectivity in influencing the co-creation experience. The study provides insights into the factors that contribute to a positive co-creation experience, which can be relevant in understanding the impact of co-creation on customer satisfaction and engagement. The findings suggest that co-creation experiences are affected by not only the co-creation process itself but also characteristics of co-creation environments (i.e., technologization and connectivity) and (interactions among) co-creation actors (i.e. customer role readiness and interactional quality). (Frow et al., 2015b) discuss managing co-creation design as a strategic approach to innovation, emphasizing the need for tools and processes to identify advantageous co-creation opportunities. The study provides insights

into the strategic aspects of co-creation and its potential impact on innovation; the findings can inform discussions on the effects of co-creation in Western innovation contexts.

Aminoff et al. (2016) discuss the multidimensional value(s) for co-creation networks in a circular economy, emphasizing the importance of shared purpose and collaboration among actors. The study provides insights into the potential benefits of co-creation in a circular economy.

2.5 Impact of co-creation in the context of emerging countries:

Several studies have explored the impact of co-creation on emerging countries, shedding light on its benefits, challenges, and outcomes. One survey by (Zhou et al., 2022) focuses on value co-creation in multinational technology standard alliances (MTSAs) in emerging economies. The study highlights the importance of actor engagement and resource interaction in co-creation. It emphasizes the need to consider the dynamic market environment and multiple relationships across organizational boundaries. The findings suggest that co-creation strategies carried out by the focal firm can lead to valuable outcomes in the context of MTSAs.

Knizkov & Arlinghaus (Oertzen et al., 2018)(2019) questioned the sustainability of co-creation in bottom-of-the-pyramid (BOP) markets. They argue that existing literature on co-creation outcomes in BOP markets needs to be more complex and overly optimistic. The study highlights the need to consider the specific co-creation practices and their necessity in different contexts rather than viewing co-creation as a one-size-fits-all solution. Co-creation with the BOP may only sometimes lead to increased social value and economic success for companies.

Dey & Dwivedi (2021) examine digitally enabled value co-creation at the bottom of the pyramid (BoP) in developing economies. The study highlights the role of technological platforms and digital technologies in facilitating value co-creation. It emphasizes the need for more research on value co-creation from the perspective of BoP customers in developing economies. The study aims to expand academic knowledge on value co-creation by exploring this phenomenon in the context of BoP customers.

Ge, Y. and Miao, J. (2021) Discuss service value co-creation in digital platform businesses using the Xianyu Idle Trading Platform case. The study focuses on the facilitators of value co-creation in the sharing economy context. It highlights the importance of understanding the business models and dimensions of value co-creation and the values created through the co-creation process. The study provides insights into the value co-creation process and its implications for digital platform businesses.

Collectively, these studies demonstrate the significance of co-creation in emerging economies. They highlight the potential benefits of co-creation, such as value creation, innovation, and enhanced customer engagement. However, they also acknowledge the challenges and complexities associated with co-creation, including the need to consider specific practices, outcomes, and contextual factors.

2.6 Hypothesis Development

Research studying co-creation (or related topics) has contributed to widespread practices and applications and impacted enterprises, industry clusters and countries (Pitelis, 2012). However, application of co-creation and results is constrained by socio-economic context (Meister Broekema et al., 2022), technological infrastructure (Lember et al., 2019), cultural factors (Chepurna & Rialp Criado, 2021) and resource constraints (Huynh et al.,

2023); Although co-creation research has been undertaken mainly in developed countries (Nájera-Sánchez et al., 2020), many studies investigated co-creation in developing or African counties (see Alhassan & Girinsky, (2020); Vallejo et al., (2019); and van Ewijk & Ros-Tonen, (2021) for example). While there are many studies investigating co-creation in developing or resource-constrained countries, their analysis is limited to the number of enterprises covered or countries studied, making it difficult to gain an overview of how co-creation in the context of developing countries is practiced and its impact on adopting enterprises (Jagtap, 2022; Osorno-Hinojosa et al., 2022).

While there is a growing recognition of the importance of innovation and entrepreneurship in promoting socio-economic development in sub-Saharan Africa, the region faces unique challenges and opportunities that set it apart from other developing countries (Cunningham et al., 2016), for example the presence of political stability and resource prioritization and mobilization play a significant role in capturing the value of innovation (Krammer & Kafouros, 2022), while institutional and systemic changes in sub-Saharan Africa impact co-creation prevalence (Bekana, 2021). Aligning co-creation and entrepreneurship with national development plans and their associated funding priorities is another factor that distinguishes innovation practices in sub-Saharan Africa. (Vallejo et al., 2019). These studies identified that there is no well-developed literature on innovation development measurement and its effect on the sub-saharan economy and the lack of official statistical data on innovation and in-formal type of innovation (Alhassan & Girinsky, 2020) associated with the lack of adequate knowledge transfer mechanism (Siyanbola et al., 2016).

Based on the above research gap and considering the importance of co-creation in elevating the constraints and limitations of sub-Saharan countries, I developed the following hypothesis to investigate the prevalence and impact of co-creation in SSA. (Echeverri & Skålén, 2011; van Ewijk & Ros-Tonen, 2021).

2.6.1 Co-creation and innovation.

Co-creation involves engaging diverse stakeholders, including customers, partners, and employees. These stakeholders could provide valuable, original and innovative ideas and enable the company to access market intelligence directly from the customer (Dey et al., 2019).

However, These resources should be relevant to the project or product; at the same time, when an enterprise collaborates with external stakeholders, it may relinquish some control over the innovation process and timeline, which might lead to an extended development process and a slow innovation cycle because of conflicting agendas or conflicting interests of intentions. (Echeverri & Skålén, 2011; Tidd & Bessant, 2021) . such co-destruction can be avoided by applying project governance strategies and alignment of collaboration intention before launching co-creating projects (Wang et al., 2021).

Such an association between co-creation and product/service development or improvement was reported (Hsu, 2016)by Cheng & Huizingh (2014) based on surveying 223 Asian service firms and confirmed by Huynh et al. (2023) following the study of 323 Vietnamese manufacturing companies whose co-creation significantly improves technology innovation.

Considering the above and the fact that there is enough research supporting this argument, and in the context of SSA enterprises, I expect a positive relationship between the co-creation activities and the number of products or services launched by the enterprises:

H1: In the context of less developed economies, there is a positive relationship between the intensity of co-creation efforts and firms' innovation performance.

2.6.2 Co-creation and labor productivity.

After establishing the direct impact of co-creation on new product development and innovation, I examined the effect of co-creation as a unique collaboration channel on labor productivity as an indirect impact measurement.

Co-creation would necessitate connecting enterprise employees with external stakeholders, establishing a common understanding of the project and process, and an agreed-upon decision-making and implementation process (Michalik, 2023b). Such a relationship would bring out ideas where the team would be empowered to debate and deliberate, combining ideas and challenging old norms (Lawson & Weberg, 2023). This could be extended beyond the project scope and potentially transform the organization based on the level of co-creation implementation. (Michalik, 2023a).

Co-creation often involves collaboration among employees, cross-functional teams, and external stakeholders. This collaboration can foster better communication and knowledge sharing, leading to improved problem-solving and more efficient work processes (Michalik, 2023c). When people work together effectively, it can boost overall productivity. (Shrivastava et al., 2015) This is done by bringing together individuals with

different skill sets, backgrounds, and expertise. This diversity can lead to a broader range of ideas and solutions (Kreiling & Paunov, 2021).

Involving employees in co-creation initiatives can enhance their sense of ownership, engagement, and satisfaction. Employees who feel their ideas and contributions are valued are more likely to be motivated and productive (Freudenreich et al., 2020). This increased engagement can positively impact labour productivity and engagement through brand value co-creation (Van Nguyen et al., 2021). (Waseem et al., 2021)

Considering the above arguments, I expect a positive relationship between co-creation and labor productivity:

H2: In the context of SSA, there is a positive relationship between the intensity of co-creation efforts and firms' labour productivity.

2.6.3 Co-creation and export intensity

Studies have shown that co-creation improves the export performance of Small and Medium-sized Enterprises (SMEs) in the international market (Mohamad et al., 2022a). This was achieved using DIP (Digital et al.), which was used to improve the interaction and collaboration between service providers and Malaysian SMEs. Also, co-creation facilitation to exports is based on the notion that co-creation fosters a dynamic and interactive environment that enhances service exchange, innovation, and market strategies, ultimately influencing export performance positively (Tajeddin & Carney, 2019; Tajeddin & Carney, Aug 2021).

Firstly, co-creation in SME internationalization involves a participatory process where firms collaborate with customers, suppliers, and distributors, integrating diverse perspectives and expertise to improve products and services (Perks et al., 2012). This

integration leads to enhanced product quality and service offerings that are better aligned with international market demands, thereby improving the export potential of SMEs.

Secondly, co-creation allows SMEs to share ideas and resources with a broader network of international collaborators (Ober, 2022; Rayna & Striukova, 2015; Troise et al., 2021). This collaborative environment fosters innovation, enhances product differentiation, and aligns SME offerings with global standards, further boosting export competitiveness. Through co-creation, SMEs can develop more competitive products and services, foster innovation, and effectively engage in international markets, leading to improved export outcomes (Mohamad et al., 2022b).

This is not limited to SMEs only; Sima et al. (2023) proved that the association between export venture performance in the year before and the following year could be mediated by guanxi networking (a term used in Chinese culture to describe an individual's social network of mutually beneficial personal and business relationships) and co-creation strategy.

H3: In the context of less developed economies, there is a significant and positive relationship between the intensity of co-creation efforts and firms' export intensity.

2.6.4 Co-creation and women's inclusivity

Co-creation can help organizations looking for external resources to support their innovation plans, which can be done through collaboration with academic entrepreneurs, government or other external capacity resource co-creation since they recognize that such value improvement cannot be done internally without the contribution of external resources (Loureiro et al., 2020; Takahashi & Takahashi, 2022). Although the goal is to project commercial specific, the co-creation process necessitates capability development

of all involved parties, which is translated to indirect and intangible social value (De Silva & Wright, 2019)

This open and outward approach strengthens the ties between the business and its economic and social networks, contributing positively to its social performance and reputation as a responsible corporate citizen. (Iglesias et al., 2020) .Enterprise social performance can take multiple facets, including employability characteristics (Al-Tahitah et al., 2023). One of the employment indicators is female labour force participation. The global labour force participation rate for women is just over 50% (69% for SSA) compared to 80% (79% for SSA) for men (*World Bank Gender Data Portal.* 2023). Female labour participation reflects changes in the pattern of economic growth, educational attainment, fertility rates, employment and social norms of a country (Thaddeus, 2022). I developed the fourth hypothesis because these factors are external to the co-creation process, considering that co-creation-adopting enterprises hire more females than other enterprises, indicating an inclusive policy.

H5: In the context of less developed economies, there is a positive relationship between the intensity of co-creation efforts and the increased inclusion of women.

2.6.5 Co-creation and training programs:

Co-creation can help upskilling enterprise employees directly and indirectly. Directly: The cocreation goal is developing a new product or service, which requires training to develop, assess and offer this product or service, including new practices and processes (Pocol et al., 2022). Indirectly, the co-creation process is collaborative; this would necessitate the participation of enterprise employees in meetings and events with external partners, who might have new or different skills and knowledge that might lead to

knowledge sharing and evaluation (Redlich et al., 2019). This collaborative environment gives practitioners continuous training and upskilling opportunities (Moutinho et al., 2023). This was reported by multiple cases studied by Ramaswamy & Ozcan (2014), starting with Starbucks, which initiated recruitment and training to develop capabilities, adopting and practicing new ways of execution. To Mahindra & Mahindra Ltd (Indian motor company), which used co-creation to pass on knowledge and expertise. Training is an essential part of the healthcare co-creation process (Lazo-Porras et al., 2020)

Considering the above arguments, we developed the fifth hypothesis.

H6: In developing economies, there is a positive relationship between the intensity of co-creation efforts and the enhanced provision of employee training.

We propose the conceptual model presented in Figure 2, which postulates that co-creation positively impacts innovation, labor productivity and training. At the same time, it hurts women's Inclusivity and export intensity.

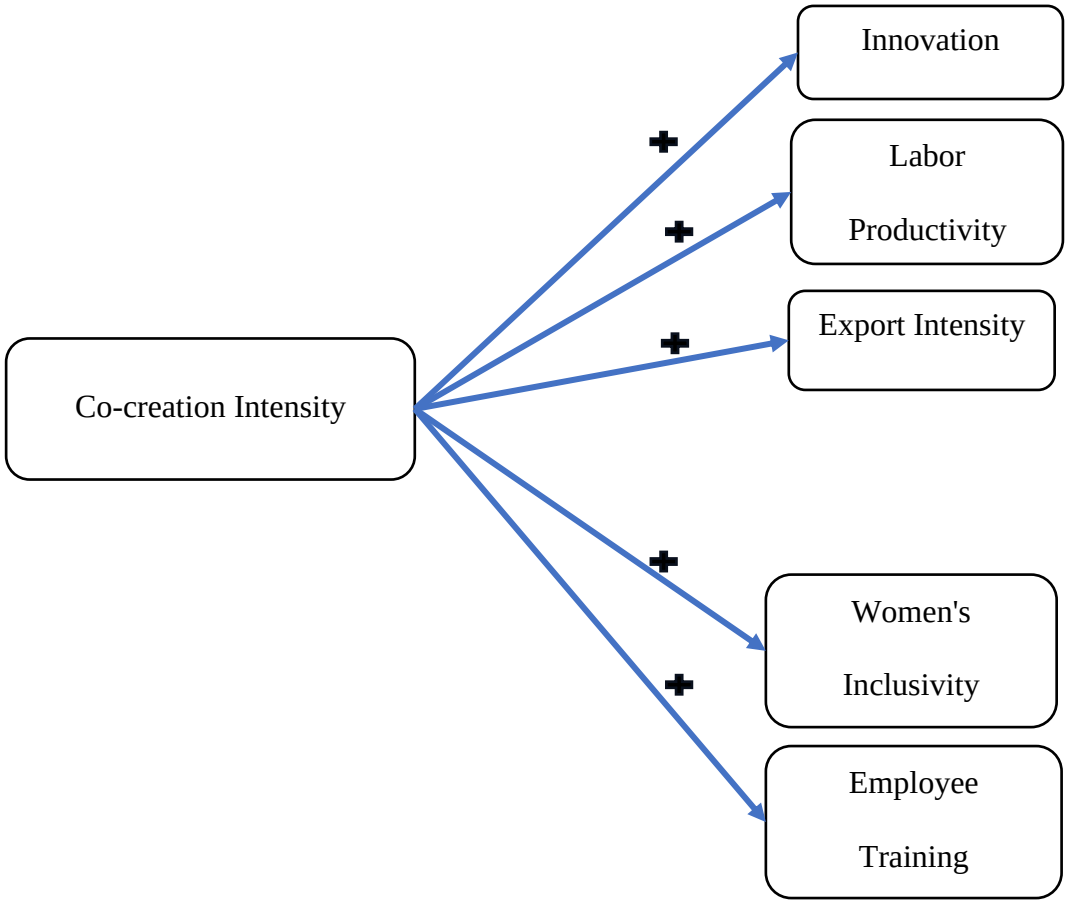


Figure 2 Conceptual Model

Chapter 3 Research Methodology

3.1 Data sources:

The research team utilized the survey data from the World Bank Enterprise Survey (WBES) and The World Bank Innovation Survey (WBIS) to examine the effects of the business environment, institutional factors, gender, industry-specific factors, and other variables on firm behaviour and performance and study the trends and impact on innovation practices on the enterprise socio-economic aspects.

World Bank surveys are valuable resources for conducting research studies in various fields. The survey collects data from firms in different countries, providing researchers with a rich dataset to analyze and draw insights.

One way to use the WBES for research studies is to examine the impact of various factors on firm growth. For example, (Lakuma et al., 2019) used data from the WBES to assess the effects of the business environment, with a particular focus on the impact of finance on firm growth in Uganda. The study used firm-level data from the survey to analyze the differences in firm growth across different sizes of firms. By utilizing the WBES data, the study was able to mitigate potential measurement errors and endogeneity issues.

Another area of research that can be explored using the WBES is the relationship between institutional factors and firm behaviour. (Su, H. et al., 2022)to investigate how institutional constraints affect the exporting activities of emerging-market firms in China. The study utilized the survey data to test their research hypotheses and found that home

country institutional constraints were positively related to export intensity. This demonstrates how the WBES can be used to examine the impact of institutional factors on firm behaviour.

The WBES can also be used to study specific industries or sectors. For example, (Gelb et al., 2017) used data from the WBES to compare labour costs and productivity in selected African countries relative to other countries. The study utilized the survey data to analyze labour costs in the global context and provide insights into the competitiveness of African countries in the manufacturing sector. This highlights how the WBES can be used to conduct comparative analyses across different countries and industries.

Furthermore, the WBES can be used to examine the role of gender in business performance. (Ali & Shabir, 2017) conducted a study using data from the WBES to analyze the difference in business performance and obstacles between male-owned and female-owned enterprises in India. The study used survey data to gather information on enterprise characteristics, ownership, and performance indicators. By utilizing the WBES data, the study provided insights into the gender differences in business performance.

3.2 Sample Selection:

Sub-Saharan African countries, often called Sub-Saharan Africa, constitute the region of Africa that lies south of the Sahara Desert. This region comprises 48 countries with a wide range of cultures, languages, economies, and political systems. National institutions support a large portion of the environment in which trade and competition occur. Fainshmidt et al. (2018) have developed Varieties of Institutional Systems (VIS), which encompasses the two main frameworks of Varieties of Capitalism (VOC) and National Business Systems (NBS), which were adopted earlier.

The framework of Fainshmidt et al. (2018) categorizes countries based on five institutional contextual dimensions. These institution dimensions are the state's role, the financial market, human capital, and corporate governance.

SSA countries were distributed into three configurations, and we selected at least one country from each configuration to effectively encompass the varied and distinct institutional environments in SSA.

Sub-Saharan countries are exhibited only in three configurations:

1. Second Configuration: Fragmented with fragile state: Sudan.
2. Third Configuration: Family-Led: Nigeria.
3. Fifth Configuration: Centralized Tribe: Namibia.

   These countries were selected for this study, considering that each one demonstrates different characteristics and can reflect the diverse economies of sub-Saharan countries.

   My sample contains data collected from four countries (Sudan, South Sudan, Nigeria, and Namibia) comprising 5,179 firms.

3.2.1 Propensity Score Matching:

Following the selection of countries selection, we have accounted for sample variability and bias to account for causal effects using propensity score matching, which is a statistical technique used in social science studies to reduce bias and estimate causal effects when conducting statistical analysis (Rosenbaum & Rubin, 1983). Researchers do not have control over participants' interventions, which can lead to confounding variables and biased estimates of treatment effects. Propensity score matching addresses this issue

by creating a matched comparison group like the treatment group regarding observed covariates.

The propensity score is the conditional probability of receiving a particular treatment given a set of observed covariates (Rosenbaum & Rubin, 1983). It is estimated using a logistic regression model, where the treatment assignment is the dependent variable, and the covariates are the independent variables. The estimated propensity scores are then used to match treated and control units based on their similarity in terms of the propensity score.

Several propensity score matching methods exist, including covariate adjustment using the propensity score, stratification on the propensity score, and propensity score matching itself (Austin, 2007). Covariate adjustment involves including the propensity score in the outcome analysis to control for confounding. Stratification on the propensity score divides the sample into strata based on the propensity score and compares treatment effects within each stratum. Propensity score matching involves pairing treated and control units with similar propensity scores and comparing outcomes.

3.2.1.1 Selection of Variables for PSM:

To reduce sampling bias, the following factors were selected to ensure comparable enterprises were presented in the adopting and not adopting co-creation practices:

1. Age:

   Each enterprise goes through a life cycle from creation, growth, and operation, followed by decline or recreate. Innovation efficiency and output can be affected by enterprise age. (Su, W. et al., 2023)

2. Business Sector:

Sample companies come from all sectors, from chemical, IT, food, and retail to motor vehicle, hotel, and restaurant services. These sectors differ in knowledge and technology, but simultaneously, the boundaries, relationships and networks are different, which affects innovation. (Malerba, 2005).

3. Enterprise Size (log):

   Different enterprise sizes have additional resources and approaches to co-creation; simultaneously, they would have further growth profiles. (Su, W. et al., 2023)

   Following the PSM, the number of companies studied was 2,112.

Here are the descriptive statistics of companies considering the PSM factors of size, age and industry sector.

Table 3: Descriptive Statistics for Companies adopting co-creation and not adopting:

Variable	**Mean**		**Std. dev.**		**Min**		**Max**	
Co-Creation	Yes	No	Yes	No	Yes	No	Yes	No
Enterprise Size (log)	2.60	2.51	1.09	0.97	0	0	7.72	8.16
Enterprise Sector	44.46	43.13	14.66	14.78	15	15	72	72
Enterprise Age	12.94	13.89	11.94	11.31	1	1	117	121

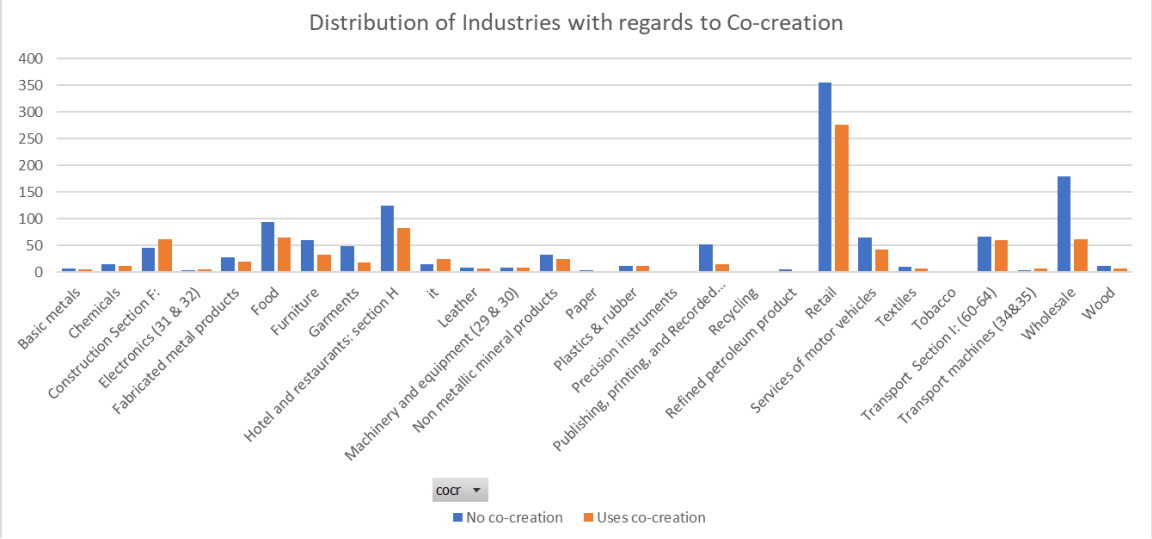


Figure 3: Distribution of Enterprise Industry Sector with regards to adoption of co-creation

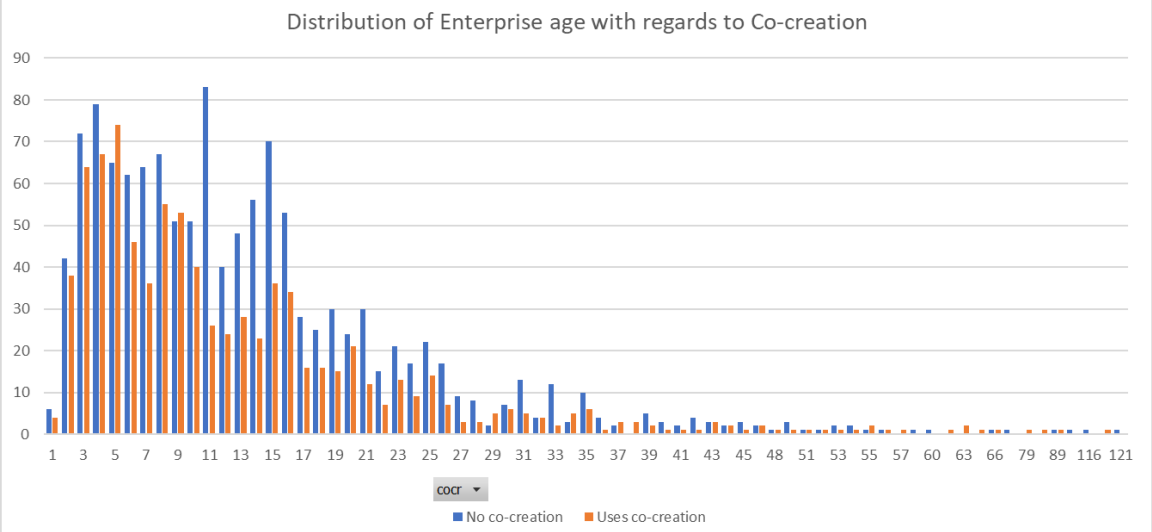


Figure 4: Distribution of Enterprise Age with regards to adoption of co-creation

3.3 Data and Variables:

3.3.1 Measurements and Variables:

3.3.1.1 Independent Variable: Co-creation Intensity:

Cooperation is necessary for any co-creative relationship and has become an essential channel for innovative enterprises. (Yang et al., 2021) To measure the co-creation intensity of sampled enterprises, we used the firm's cooperation with external parties to innovate consistent with the co-creation definition (Fan & Luo, 2020; Lee et al., 2012c; Saha et al., 2022). We calculate the enterprise's total number of cooperation channels to innovate new products or services to measure its intensity. This was calculated using the results of question hf10 and its follow-up questions from the innovation survey, which investigated the cooperation channels of enterprises with external parties.

> hf10: Did this establishment cooperate with any of the following institutions for innovation-related activities?

- hf10a: Did this establishment cooperate with any of the following institutions?
- hf10b: Any foreign firms or a foreign-owned patent firm
- hf10c: Domestic academic or research institutions
- hf10d: Foreign academic or research institutions
- hf10e: Private consulting company or individuals
- hf10f: Government

3.3.1.2 Dependent variables:

1. Innovation:

   Suppose a new or significantly improved product or service was launched in the last three years. … according to WBES, the question asks about …. Which is H.1: "During the last three years, has this establishment introduced new or significantly improved products or services?"

2. Annual Labor Productivity Growth:

   Annual labour productivity growth is measured by annualized growth in labour productivity, where labour productivity is actual sales by a percentage change in labour productivity between the last completed fiscal year and a previous period (three years), where labour productivity is sales divided by the number of full-time permanent workers. (Apostolov, 2016) All sales values are deflated to the survey base year (2009) using each country's GDP deflators. The formula is:

$$\left(\frac{1}{t}\right) * \frac{\left(\frac{d2'}{l1}\right) - \left(\frac{n3'}{l2}\right)}{\left\{\left(\frac{d2'}{l1}\right) + \left(\frac{n3'}{l2}\right)\right\}/2} * (100)$$

Where *t* is the years between the current and previous periods, *l1* and *l2* are the number of full-time permanent workers, and *d2'* and *n3'* are deflated values of *d2* and *n3* variables. Note that the GDP deflators are weighted by the closing month of each firm's fiscal year. These were taken directly from the following questions:

- L1: Num. Permanent, Full-Time Employees at the End of the Last Fiscal Year
- L2: Num. Permanent, Full-Time Employees at End Of 3 Fiscal Years Ago
- N3: What Were the Establishment Sales 3 years ago (FY, 2009)
- D2: What were the establishment's annual sales last fiscal year?

GDP per country was taken from World Bank, Data Development Indicators (*World Development Indicators | DataBank.*)

3. Direct Export Intensity:

   It was extracted from direct export to total sales from the following questions:

   - D.3 In the financial year [insert last complete financial year], what percentage of this establishment's sales were Direct exports (d3c)?

4. Number Female participation:

   It was calculated as the log of the number of female full-time employees:

   - L5: Num. Full-time Employees at the End of Last Fiscal Year: female

5. Training programs offered to employees:

   - L10 Formal Training Programs for Permanent, Full-time Employees in Last Fiscal Year

3.3.1.3 Control Variables:

We used five control variables related to innovation and financial and social performance. Manager experience, enterprise age, size, sector, and country would affect enterprise

innovation and financial and social performance. Controlling these variables would ensure that regression results would be more accurate.

- Manager Experience: measured by the years of experience the top managers have worked in this sector. (Question b7).
- Enterprise Age: measured by the number of years since the establishment began operations (Question b5)
- Enterprise Size is measured by a Log of the number of permanent employees (Question l1).
- Enterprise Sector. (Question a4b)
- Country (Question A1).
- Obstacles: To ensure these obstacles are not contributing to the results, we had to control them.

  This was calculated based on the maximum rating given to any of the obstacles covered by the following questions, which cover different types of obstacles:

C30A How Much of an Obstacle is Electricity to the Operations of This Establishment?
C30B How Much of an Obstacle is Telecommunications to Operations of This Establishment?
D30A How Much of An Obstacle: Transport?
D30B How Much of An Obstacle: Customs and Trade Regulations?
E30 How Much of An Obstacle: Practices of competitors in the informal sector?
G30A How Much of an Obstacle is Access to Land?
I30 How Much of An Obstacle: Crime, Theft and Disorder?
K30 How Much of An Obstacle: Access to Finance
J30A How Much of An Obstacle: Tax Rates
J30B How Much of An Obstacle: Tax Administrations

J30C How Much of An Obstacle: Business Licensing and Permits

J30E How Much of An Obstacle: Political Instability

J30F How Much of An Obstacle: Corruption

H30 How Much of An Obstacle: Courts

L30A How Much of An Obstacle: Labor Regulations?

L30B How Much of An Obstacle: Inadequately Educated Workforce?

3.4 Methodology and Results:

3.4.1 Regression Analysis:

Regression analysis is a statistical method widely used in social science to examine relationships between variables and make predictions. It helps social scientists understand and quantify the relationships between various factors or variables, which can provide valuable insights into human behaviour, attitudes, and social phenomena. It is a statistical method commonly used in social science research to examine the relationship between a dependent variable and one or more independent variables. It is a powerful tool that allows researchers to analyze and understand the complex dynamics of social phenomena and the relationship between a dependent variable and one or more independent variables (Stockemer, 2019; Thrane, 2023).

In social science research, regression analysis is often used to explore the impact of predictor variables on a dependent variable. It helps researchers understand how changes in the independent variables are associated with changes in the dependent variable. For example, in a study on the impact of education on income, regression analysis can be used to examine how education levels are related to changes in income levels (Wu et al., 2020).

3.4.2 Linear Regression:

Different types of regression analysis can be used in social science research, depending on the nature of the data and the research question. One common type is linear regression, which is used when the dependent variable is continuous. Linear regression allows researchers to model the relationship between the independent and dependent variables as a straight line. This can be useful for understanding how changes in the independent variables are associated with changes in the dependent variable. For example, linear regression can examine the relationship between age and income or between education level and job satisfaction (Wu et al., 2020). We used linear regression, considering that linear regression provides coefficients and associations that are easy to interpret, making it possible to understand the direction and magnitude of the impact of co-creation on economic and social factors.

Before linear regression, we tested variables for collinearity to ensure the reliability and accuracy of the model's results. Identifying and addressing collinearity issues among predictor variables is vital as it helps mitigate the risk of unreliable coefficient estimates and ambiguous interpretations of the relationships between variables. Managing collinearity before regression analysis ensures a more robust and dependable model, offering more precise insights into the individual effects of predictors on the target variable (Midi et al., 2010).

3.4.3 Probit Regression:

We have opted to use a probit model, in which the dependent variable exhibits a binary nature with two possible values: zero or one, which is the case of the innovation variable. This model allows for a nonlinear function to depict the conditional probability function

of such a binary dependent variable. The probit model addresses a notable shortcoming of the linear probability model, which erroneously assumes the conditional probability function to be linear and does not impose constraints to ensure predicted probabilities remain within the range of zero to one. This constraint is crucial for maintaining meaningful interpretation. (Imai & Bougher, 2021).

Probit regression inherently handles any multicollinearity among predictors without affecting the estimation process. The coefficients in probit regression represent the effect of each predictor on the probability of an outcome rather than the direct impact as in linear regression. Thus, even if the predictors are highly correlated, the probit model can still estimate the effect of each predictor on the probability of the outcome without undue bias or instability.

To test hypotheses 2,3,4, 5 and 6 by using linear regression after testing for collinearity, and for hypothesis 1, we used probit without collinearity.

We estimated the following five equations:

Equation 1: Correlation between Innovation and Co-creation intensity:

- Innovation = α_1 + β_1 Co-creation intensity + β_2 Manager Experience + β_3 Enterprise Age+ β_4 Enterprise Size (log)+ β_5 Sector + β_6 country-code + β_7 Obstacles+ ε_1

Equation 2: Correlation between labor productivity and co-creation intensity:

- Productivity = α_2 + β_8 Co-creation intensity + β_9 Manager Experience + β_{10} Enterprise Age+ β_{11} Enterprise Size (log)+ β_{12} Sector + β_{13} country-code + β_{14} Obstacles+ ε_2

Equation 3: Correlation between export intensity and co-creation intensity:

- Export Intensity = $\alpha_3 + \beta_{15}$ Co-creation intensity + β_{16} Manager Experience + β_{17} Enterprise Age+ β_{18} Enterprise Size (log)+ β_{19} Sector + β_{20} country-code + β_{21} Obstacles+ ε_3

Equation 4: Correlation between the log number of full-time female employees and co-creation intensity:

- Log number of full-time female employees = $\alpha_4 + \beta_{22}$ Co-creation intensity + β_{23} Manager Experience + β_{24} Enterprise Age+ β_{25} Enterprise Size (log)+ β_{26} Sector + β_{27} country-code + β_{28} Obstacles + ε_4

Equation 5: Correlation between the log number of full-time female employees and co-creation intensity:

- training programs offered to full-time employees and co-creation intensity:= $\alpha 5 + \beta_{29}$ Co-creation intensity + β_{30} Manager Experience + β_{31} Enterprise Age+ β_{32}

Chapter 4 Results and Findings

4.1 Descriptive Analysis:

Enterprises in sampled countries vary in Co-creation Intensity; most enterprises adopt one or two channels collaborating with foreign firms, or a foreign-owned patent firm was the most used channel, and partnership with the government was the least used channel.

Table 4 :Co-creation Intensity adopted per country.

Channels of Collaboration / Country	0*	1	2	3	4	5	Total
Nigeria	656	107	30	4	2	1	800
Namibia	199	88	37	19	12	17	372
South Sudan	322	137	50	17	5	12	543
Sudan	322	32	17	5	2	19	397
Total	1,499	364	134	45	21	49	2,112

(* 0: No collaboration 5: Collaboration was done with five channels.)

Table 5: Percentage of enterprises utilization of co-creation channels:

Co-creation channel	South Sudan	Sudan	Namibia	Nigeria
Foreign firms or a foreign-owned patent firm	26%	11%	24%	4%
Domestic academic or research institutions	9%	9%	12%	4%
Foreign academic or research institutions	7%	8%	10%	1%
Private consulting companies or individuals	19%	13%	27%	12%
Government	8%	5%	22%	4%

4.2 Regression Results:

The correlation matrix, linear and probit regression results are summarized below. Before linear regression, we tested for collinearity. There was no collinearity between variables except for some sectors (wholesale, retail, hotel and restaurants) and the log number of full-time females. Linear regression was done after dropping these sectors, affecting several observations, but we still got significant results supporting the abovementioned hypothesis.

Table 6 Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Co-creation Intensity	1.000											
(2) Innovation	0.093***	1.000										
(3) Labor Productivity	0.019	0.014	1.000									
(4) Percent Direct Export	-0.034	0.043*	0.121***	1.000								
(6) Full-time female employees (Log)	0.023	0.072**	0.017	0.011	-0.021	1.000						
(7) Training Programs	0.088***	0.128***	0.044	0.040*	-0.068***	0.167***	1.000					
(8) Manager Experience	-0.011	-0.030	0.066**	0.000	0.003	0.132***	0.016	1.000				
(9) Enterprise Age (yrs.)	-0.054**	-0.012	0.099***	0.093***	0.063***	0.233***	0.165***	0.084***	1.000			
(10) Enterprise Size (Log)	0.100***	0.081***	0.014	0.065***	0.050**	0.717***	0.173***	0.046**	0.330***	1.000		
(11) Business sector	0.048**	-0.026	-0.102***	-0.058***	-0.062***	0.045	-0.078***	-0.009	-0.167***	-0.173***	1.000	
(12) Obstacles faced	-0.013	0.003	-0.170***	-0.129***	-0.109***	-0.080**	-0.093***	-0.034	-0.194***	-0.150***	0.133***	1.000

**** p<0.01, ** p<0.05, * p<0.1*

Table 7 . Regression for Innovation: (Probit regression)

Innovation	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
Co-creation Intensity	.102	.031	3.32	.001	.042	.162	***
Manager Experience	-.004	.004	-1.02	.308	-.011	.003	
Enterprise Age (yrs.)	.118	.033	3.55	0	.053	.183	***
Enterprise Size (Log)	.088	.052	1.67	.094	-.015	.191	*
obstacle	-.004	.043	-0.10	.918	-.088	.079	
Constant	-.045	.236	-0.19	.849	-.509	.418	

Mean dependent var	0.661	SD dependent var	0.473
Pseudo r-squared	0.028	Number of obs	2047
Chi-square	74.647	Prob > chi2	0.000
Akaike crit. (AIC)	2617.117	Bayesian crit. (BIC)	2813.962

*** *p<.01, ** p<.05, * p<.1*

Table 8 . Regression for Labor Productivity (Linear regression)

	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig	VIF	1/VIF
Co-creation Intensity	1.94	1.595	1.22	.224	-1.19	5.07		1.243	.805
Manager Experience	-.263	.227	-1.16	.247	-.707	.182		1.484	.674
Enterprise Age (yrs)	-2.503	1.78	-1.41	.16	-5.996	.991		1.352	.74
Enterprise Size (Log)	-1.903	3.529	-0.54	.59	-8.828	5.022		1.96	.51
obstacle	-3.866	2.38	-1.62	.105	-8.537	.804		1.253	.798
Constant	20.983	13.713	1.53	.126	-5.924	47.891			

Mean dependent var	-17.025	SD dependent var	55.846
R-squared	0.152	Number of obs	1073
F-test	5.837	Prob > F	0.000
Akaike crit. (AIC)	11565.286	Bayesian crit. (BIC)	11729.567

*** *p<.01, ** p<.05, * p<.1*

Table 9 Regression for Direct Export (Linear regression)

Direct Export	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig	VIF	1/VIF
Co-creation Intensity	-.244	.313	-0.78	.435	-.857	.369		1.109	.901
Manager Experience	-.003	.007	-0.43	.668	-.017	.011		1.027	.974
Enterprise Age (yrs)	.506	.356	1.42	.155	-.192	1.204		1.341	.746
Enterprise Size (Log)	.503	.532	0.94	.345	-.541	1.547		1.81	.553
obstacle	-1.543	.474	-3.26	.001	-2.472	-.614	***	1.208	.828
Constant	10.93	2.583	4.23	0	5.865	15.995	***		

Mean dependent var	3.750	SD dependent var	14.280
R-squared	0.071	Number of obs	1957
F-test	4.218	Prob > F	0.000
Akaike crit. (AIC)	15886.725	Bayesian crit. (BIC)	16087.576

*** *p<.01*, ** *p<.05*, * *p<.1*

Table 10 . Regression for Log number of full-time female employees (Linear regression)

Log Full-Time Female Employees	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig	VIF	1/VIF
Co-creation Intensity	.064	.029	2.17	.031	.006	.122	**	1.286	.777
Manager Experience	0	.003	-0.08	.934	-.006	.006		1.268	.788
Enterprise Age (yrs)	.738	.041	18.07	0	.658	.818	***	1.149	.871
Enterprise Size (Log)	.068	.053	1.28	.202	-.037	.172		1.48	.675
obstacle	-.022	.053	-0.42	.673	-.127	.082		1.197	.835
Constant	-.304	.304	-1.00	.317	-.902	.293			

Mean dependent var	1.274	SD dependent var	0.839
R-squared	0.609	Number of obs	312
F-test	16.392	Prob > F	0.000
Akaike crit. (AIC)	537.437	Bayesian crit. (BIC)	642.242

*** *p<.01*, ** *p<.05*, * *p<.1*

Table 11 . Regression for Training Programs offered for full-time employees: (Linear regression).

Training	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig	VIF	1/VIF
Co-creation Intensity	.034	.009	3.91	0.001	.017	.051	***	1.105	.905
Manager Experience	0	0	0.38	.701	0	0		1.027	.974
Enterprise Age (yrs)	.055	.01	5.62	0	.036	.075	***	1.336	.749
Enterprise Size (Log)	.057	.015	3.87	0	.028	.086	***	1.792	.558
obstacle	-.01	.013	-0.80	.423	-.035	.015		1.21	.826
Constant	-.015	.071	-0.21	.83	-.154	.124			

*** *p<.01*, ** *p<.05*, * *p<.1*

Mean dependent var	0.209	SD dependent var	0.407
R-squared	0.080	Number of obs	2042
F-test	4.965	Prob > F	0.000
Akaike crit. (AIC)	2022.733	Bayesian crit. (BIC)	2225.113

*** *p<.01*, ** *p<.05*, * *p<.1*

4.3 Results

We report all variable definitions in 3.3 (above) and the sources of all the variables used in my regressions. I present the descriptive statistics in 4.1 and regression results in 4.3 above.

By measuring equation 1, which reflects hypothesis 1, the impact of co-creation in innovation measured by new products introduced to the market, the results show significant positive (β_1=0.102 and p=.001); thus, Hypothesis 1 was supported.

Moreover, measuring equation 2, which reflects hypothesis 2, the correlation of co-creation and labour productivity measured by the increase of labour productivity over the last three years, the results show a positive but not significant association (β_7=1.94 and p=.224); thus, Hypothesis 2 was not supported.

While hypothesis 3 was measured by equation 3, which reflects the correlation of co-creation and export intensity, the results show a negative but insignificant association (β_{13}=-0.244 and p=.435); thus, Hypothesis 3 was not supported.

While hypothesis 4 was measured by equation 4, which reflects the correlation of co-creation intensity and log number of full-time female employees, the results show a positive and significant association (β_{22}=0.064 and p=.031); thus, Hypothesis 4 was supported.

For the last hypothesis, which studied the correlation between co-creation and training programmes offered to firm employees reflected by Equation 5, the results show positive and significant association (β_{29}=0.034 and p<.001; thus, Hypothesis 5 was supported.

Chapter 5 Discussion

5.1.1 Impact of Intensity of Co-creation on Innovation:

The goal of enterprises engaged in co-creation collaboration is to develop new products or services; such association is expected but unnecessary, and a collaborative development process might lead to an extended development phase. Results confirm that in the context of SSA, there is an association between co-creation and introducing new or significantly improved products or services. w product, which is noticed in the regression between the co-creation intensity and innovation measured by products or services introduced to the market, this association was positive and significant.

5.1.2 Impact of Intensity of Co-creation on Labor Productivity:

A positive but insignificant correlation existed between co-creation intensity and labor productivity (P =.224). There are a couple of reasons why co-creation could not help improve labor productivity. The co-creative effort would end up with new products, which would need effort to set up the product or service and associated activities. Sametime co-creation would collaborate and establish new communication channels; this interactive learning process needs resources and time from enterprise managers and employees. Co-creation also might divert staff time to product development and launch activities, reducing the productivity measured by increased sales volume per employee (Shrivastava et al., 2015).

5.1.3 Impact of Intensity of Co-creation on Direct Export Intensity:

There was no correlation between the intensity of co-creation and export intensity; this might be attributed to many factors, but here are the main ones:

1. Exports of studied countries are considered as moderate or low complexity according to the Atlas of Economic Complexity (for example, Namibia's most significant goods exports are metals and stone, which are moderate complexity products, While Nigeria's most significant goods exports are Minerals and Agriculture which are in low complexity products (The Growth Lab at Harvard University, 2019)
2. Collaborating Partners: Collaboration relies on partners' insights and scope, which might be specific to certain regions or markets, making applying these ideas globally challenging. Some collaborating partners were foreign-oriented (such as foreign academics, research institutes, or foreign firms). In contrast, others were domestic-oriented (such as government or domestic educational research firms), which might affect the impact variability.
3. Sector Variability: Some sectors are export-oriented while others are domestic market-oriented. For example, there was a high difference in coefficient and probability between the Petroleum and leather industries.
4. Enterprise Export Orientation is measured by its certification by a recognized quality organization; only 10.98% of the enterprises have an internationally recognized quality certificate, which might impact the penetration of these products in external markets.

5.1.4 Impact of Intensity of co-creation intensity and women's inclusivity:

As expected by the hypothesis, there was a clear association between women's inclusivity and the co-creation intensity activities. Co-creation increased the number of female employees. This was attributed to the open and outward approach of co-creation-engaged enterprises.

5.1.5 Impact of Intensity of co-creation intensity and Training Programs:

A significant correlation was found between co-creation intensity and providing training for permanent full-time employees. Multiple steps in the co-creation process necessitate employee training, starting from the co-creation process to the skills required to produce or offer the new product or service that needs employee training (Moutinho et al., 2023).

Chapter 6 Conclusion

Our study has proved that co-creation can enhance the innovation capabilities of SSA enterprises, which is not different from other developed or developing countries (Hsu, 2016; Reay & Seddighi, 2012). This can be achieved by leveraging external stakeholders' collective resources and skills. When these partners are actively engaged in the co-creation process, they can provide valuable ideas and suggestions that may not have been considered by the company alone; this collaborative approach allows for a diverse range of perspectives and can lead to the generation of novel and creative product concepts (Sanders & Stappers, 2008).

While we could not establish the correlation between co-creation and direct export for the above reasons, it was mainly attributed to the country's export landscape, sector variability and collaborating partners. (Sundaram & Von Arnim, 2008) (Roberts & Darler, 2017)

Although integrating different perspectives through co-creation is a powerful way to promote innovation and improve product development, there may be no direct correlation between co-creation and increased labour productivity. It might not simplify or speed up the labour-intensive tasks associated with a product's manufacturing or operation, mainly when the product is new and the manufacturing process is still developing and going through a learning curve. The co-creation aspect can occasionally require considerable time and resource commitment to gather and incorporate various perspectives into

product development. This can result in a decision-making process that is more involved and resource-intensive.

While co-creation is a potent strategy for product development and market relevance, its direct impact on export increase might be limited. The collaborative process often involves local or specific market insights, which might not readily translate to a universal or global context. The localized nature of co-creation could focus extensively on catering to particular consumer needs, potentially hindering the scalability required for export markets. Additionally, the collaborative process might only sometimes align with the complexities of international trade regulations, cross-cultural dynamics, or the diverse demands of various global markets. Therefore, while co-creation excels in tailoring products to local needs, it might not inherently address the multifaceted challenges and demands of a broader, global export strategy. Successful export expansion often demands a more comprehensive understanding of international markets, competition, and regulatory frameworks beyond the scope of localized co-creation efforts. This was seen since only 10.98% of the enterprises in our sample have an internationally recognized quality certificate, which might impact the penetration of these products in external markets.

Companies engaged in co-creation have diverse perspectives and are open to ideas and inputs from more prominent stakeholders. This would foster a positive and inclusive work environment supporting hiring more females, consistent with the results.

Developing or launching a new product or service involves new procedures and protocols, which eventually would increase training programs offered to enterprise employees. These training initiatives enhance individual capabilities and cultivate a

collective understanding of the co-creation process and manufacturing or offering of new products or services, ultimately maximizing the potential for collaborative success and innovation within and outside the organization.

6.1 Contribution to Literature:

Prior research has revealed a gap in understanding the co-creation impact on enterprises' social and economic functions. Through this study, we have demonstrated that co-creation can help firms to innovate more products and services. Enterprise employees will have more chances to get their skills uplifted through this collaborative process.

At the same time, the study showed that co-creation would not significantly impact the enterprise's willingness to hire more females or to have a percentage of products exported. We attribute this effect to the innovation ecosystem and firm sector variability.

6.2 Contribution to the managers

Our study has shown managers that tapping into external resources would help companies innovate and create new products or services. This was demonstrated regardless of the enterprise's internal R&D resources.

Managers are encouraged to collaborate with multiple stakeholders to ensure value-capturing and living relationships and use multiple co-creation channels rather than one cooperation channel.

6.3 Contribution to Policy Makers:

Government is an essential player in the closed and open innovation processes. Results have demonstrated that co-creation positively impacts enterprise business performance but needs more attention to its social impact. Policymakers are encouraged by the EU and OECD to cooperate and establish a regulatory platform, a knowledge exchange, and collaborative product development initiatives similar to those of multiple co-creative industries.

6.4 Future research.

Following the results of the research, below are some suggestions and opportunities for future research include:

1. Analyze and dissect the impact of co-creation on the enterprise industrial sector: We have noticed the variability based on the industrial sector orientation and how this might impact its co-creation. This would help to target the co-creation channel and align the goals to the enterprise targets.
2. Investigate each country or locality's educational or structure fabrics to define factors affecting the social impact of co-creation.

6.5 Limitation:

Although the positive impact of co-creation has been demonstrated on innovation and training programs offered to the firm’s staff, such effect is controlled by other internal factors such as manager experience, enterprise size and age.

Lessons can be drawn from this study, but its results are limited to SSA countries.

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