Innovation among Small-Scale Firms in Shea Butter Production in Ghana

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ABSTRACT

This study examines innovation among small-scale shea butter processors in Ghana, guided by Schumpeter's Innovation theory. Using a descriptive research design, the study investigates product innovation, process innovation, marketing innovation, and organizational innovation. Data was collected through a questionnaire administered to 181 firms selected from a comprehensive list of shea butter processors, drawing inspiration from the European Community Innovation Survey (2019). Regression analyses using Stata version 14.2 were employed to identify factors influencing innovation. The findings show the presence of all four types of innovation, with different driving forces behind each. Logistic regression analysis identified access to innovation support services, firm location, and firm size as key determinants of product and process innovation. For organizational innovation, the study yielded a Pseudo R-squared of 0.157, a Chi-square value of 37.036, and an average innovation score of 0.771. Location, product demand, and foreign training for managers emerged as statistically significant factors. Urban firms displayed a higher propensity for both organizational and marketing innovation. Firms in urban settings were over three times more likely to innovate in marketing than rural firms (odds ratio: 3.377). A larger product portfolio was also associated with increased marketing innovation. Younger firms tended to innovate in products and processes (odds ratio: 9.137). The study concludes that firm size positively correlates with product innovation adoption, supporting Schumpeter's theory. However, regional constraints may necessitate a greater focus on process innovation, particularly efficiency improvements and waste reduction strategies. Interestingly, managerial demographics (age and education) did not significantly influence innovation, suggesting that regional entrepreneurial spirit and necessity-driven innovation may be more important factors in this context. The unique geographical and resource context of the region presents both challenges (limited infrastructure, financial resources, and research institutions) and opportunities (proximity to raw materials, potential for community collaboration) for innovation in the shea butter industry. Based on these findings, the study recommends that the government and relevant stakeholders provide support mechanisms such as training programs, access to technology, mentorship, and funding to enhance product innovation capabilities in the shea industry. These interventions should consider the regional context and focus on leveraging local resources while addressing specific constraints faced by firms in different locations.

Keywords: Shea Butter Processors, Small-Scale Businesses, Process Innovation, Marketing Innovation, Organizational Innovation

I. INTRODUCTION

Literature offers various definitions of 'innovation.' Joseph Schumpeter is widely regarded as the first economist to emphasize its significance. In Schumpeter's theory, innovation is closely linked to development: economic growth is fueled by the emergence of new combinations (innovations) that are more economically viable than previous methods (Callegari & Nybakk, 2022). In the latter half of the 20th century, innovation theory evolved through three primary approaches to understanding technological change: induced innovation, the evolutionary approach, and the path-dependent model (Michaelides & Papadakis, 2023).

The evolutionary and path dependency approaches highlight the impact of past decisions on current innovation, suggesting that previous choices may limit present opportunities (Cantwell, 2002). Conversely, the induced innovation perspective focuses on how changes in relative prices influence the direction of technical advancements. These theories incorporate several key concepts essential to modern innovation theory (Schumpeter et al., 2017). The evolutionary model, for instance, introduces the concept of 'uncertainty' across various domains - technological, resource, competitive, supplier, consumer, and political - and the notion of 'bounded rationality,' which points out that decision-makers have a limited capacity to gather and process information (Arranz et al., 2020).

One of the most significant outcomes of the evolution of innovation theory has been the recognition that fostering innovation requires more than just technological R&D (Christensen, 2006). It also involves policy measures to enhance the institutional framework and create opportunities for interactions that better incentivize innovation. Table 1 provides a list of definitions given to innovation by various scholars.

Table 1

Defining Innovation

Scholar	Definition
Joseph Schumpeter et al., (2017)	▪ Product; Unveiling a ground-breaking new product (or) Announcing exciting upgrades to our existing product line. ▪ Innovation; Starting a revolutionary new process within the industry or disrupting the status quo with a groundbreaking innovation. ▪ Market; Tapping into an untapped market opportunity or uncovering a hidden consumer demand. ▪ Supply Chain; Securing reliable new sources of raw materials or streamlining our supply chain with strategic partnerships. ▪ Organizational Changes; Implementing exciting changes to propel our organization forward or embracing a new era of growth with key organizational shifts.
De Olde et al., (2020)	Merging product, market, technology, and organization to create a new offering.
Cuerva et. al., (2020)	Driving innovation through successful creation and utilization of new ideas.
Miller (2015)	This process bridges knowledge creation with knowledge sharing.
Bao, et al., (2020)	A business unit manager should see any novel policy, structure, method, process, product, or market opportunity as a potential driver of growth.
Henderson and Lentz (1995)	Bringing new concepts to life
Orlay (1993)	Integrating innovations to enhance value for both the organization and its customers.
Knox (2002)	Innovation is the science of driving value creation through novel processes, products, and marketing, benefiting organizations, suppliers, and customers.
Jones-Evans & Westhead (1996)	Innovation is the process of uncovering hidden connections, reshaping perspectives, and forging novel combinations from established ideas.
Davenport (1993)	Innovation disrupts traditional task development with entirely fresh approaches.
Simmonds (1986)	Innovation sparks new value through fresh products, services, uses, markets, or marketing methods.
Mohr (1969)	Adoption rate of new organizational changes
Howard and Sheth (1969)	From the buyer's perspective, innovation is any novel element they encounter, regardless of its internal development status.

1.1 SMEs in Ghana

In Ghana, different institutions have varying criteria for defining SMEs. For instance, the Ghana Statistical Service's (GSS) 1987 industrial census categorized micro- and small-scale enterprises as those with up to nine employees, medium-scale enterprises as those with ten to twenty-nine employees, and large-scale enterprises as those with thirty or more employees (Ofori & Aryeetey, 2011). On the other hand, the National Board for Small-Scale Industries (NBSSI) considers the number of employees and the value of fixed assets when defining Micro and Small Enterprises (MSE) (Mensah, 2004). According to the NBSSI, micro-enterprises employ up to five people and have fixed assets not exceeding $10,000, excluding land and buildings, while small enterprises employ between six and twenty-nine people and have fixed assets not exceeding $100,000, excluding land and buildings (Peprah et al., 2016).

Another classification, based on a survey of 133 enterprises, by Ofori and Aryeetey (2011), classifies SMEs into four categories: microenterprises with fewer than six people, very small enterprises with six to nine workers, small enterprises with ten to twenty-nine workers, medium-sized enterprises with thirty to 140 workers. The common criteria for defining SMEs are the number of employees and the value of fixed assets. In developing countries, the employee-based definition of SMEs tends to use lower thresholds compared to advanced countries, reflecting the different nature of their industries (Deku et al., 2023). The Registrar General's Department indicates that about 90 per cent of registered companies in Ghana are SMEs, although the exact data on the number of SMEs is unavailable (Deku et al., 2023).

1.2 Statement of the Problem

While there is a growing body of research on innovation among small businesses in Ghana, there is a lack of specific studies on small-scale shea butter processors. Existing literature mainly focuses on the technical and economic aspects of shea butter production, such as processing technology, efficiency, profitability, and the impact on women's livelihoods (Ahmed & Gasparatos, 2020; Okorley et al., 2008; Haruna et al., 2011).

However, these studies overlook the innovative capacity of these processors. The Northern Region of Ghana faces challenges such as high poverty rates, limited access to resources, and ineffective top-down solutions (Ahmed & Gasparatos, 2020). The region's shea butter industry, which is dominated by small-scale processors, especially women, has the potential to create jobs and reduce poverty (Ahmed & Gasparatos, 2020). To unlock the full potential of this sector, a deeper understanding of how these processors innovate is needed.

This study aims to investigate the types of innovation adopted by small-scale shea butter processors in the Northern Region of Ghana and identify the factors that influence the implementation of these innovations. By examining product development, process improvement, marketing strategies, and organizational structures, we can gain insights into the grassroots level of innovation. This knowledge is crucial for designing targeted interventions that support and enhance the innovative capacity of these processors, thereby creating a more sustainable and impactful path towards poverty reduction in the Northern Region.

1.3 Objective of the Study

(i) Assess the occurrence of product, process, market, and organizational innovation among shea butter processors.
(ii) Identify the key determinants of product, process, market, and organizational innovation among shea butter processors.

1.4 Hypothesis

H1a: There is a significant occurrence of product, process, market, and organizational innovation among shea butter processors.
H0a: There is no significant occurrence of product, process, market, or organizational innovation among shea butter processors.
H1b: Specific factors, such as firm location, firm size, access to innovation support services, years in the industry, appropriability regime, and training opportunities, are key determinants of product, process, market, and organizational innovation among shea butter processors.
H0b: Specific factors, such as firm location, firm size, access to innovation support services, years in the industry, appropriability regime, and training opportunities, are not key determinants of product, process, market, and organizational innovation among shea butter processors.

II. LITERATURE REVIEW

2.1 Theoretical Review

Attributing innovation theory to a specific individual is challenging as various authors have discussed it under different names (Coccia, 2017; Al-Khatib, 2022). However, Joseph A. Schumpeter proposed the innovation theory of profit, suggesting that entrepreneurs can earn economic profits by introducing a series of successful innovations (Cantwell, 2002). According to this theory, the primary role of an entrepreneur is to introduce innovations and earn profits as a reward (Callegari & Nybakk, 2022). Schumpeter defined innovation as any new policy that an entrepreneur adopts to either reduce the overall cost of production or increase the demand for products or services (Kurz, 2008).

Innovations can thus be categorized into two types: those that lower production costs and those that boost demand for a product or service (Michaelides & Papadakis, 2023; Kurz, 2008). The theory asserts that entrepreneurs are rewarded with profits if their innovations successfully reduce production costs or increase demand (Michaelides & Papadakis, 2023). However, these profits may be short-lived as competitors quickly imitate the innovations, thereby diminishing the benefits. Initially, successful innovations grant entrepreneurs a monopoly position in the market, but this advantage erodes over time as others replicate the innovation, reducing profits and monopoly power (Schumpeter, 2003; Roberts, 2001).

Entrepreneurs can secure larger and longer-lasting profits if they can patent their innovations, providing legal protection against imitation (Michaelides & Papadakis, 2023). When a firm adopts an innovation, the supply of goods and services increases; leading to lower prices. Consequently, while output per unit cost rises, per unit revenue falls (Michaelides & Papadakis, 2023). Eventually, the gap between costs and receipts narrows, causing profits beyond normal levels to disappear. This cycle of innovation and profit fluctuation continues as innovations are introduced and eventually imitated (Roberts, 2001).

2.2 Empirical Review

2.2.1 The Occurrence of Product, Process, Market, and Organizational Innovation among Shea Butter Processors

The study by Ayadi et al. (2018) examines innovation among shea butter processors in response to increasing global demand for shea butter products. Their research combines surveys and case studies of processors in Ghana and Burkina Faso. The study reveals a limited presence of product innovation, as most processors continue to use traditional production methods. However, there is evidence of process innovation, with some processors adopting mechanical de-shelling and churning techniques. The study's strength lies in its use of multiple research methods, but its limitation is its focus on a small number of firms in only two West African countries.

In a similar study, Hillocks et al. (2017) use a quantitative approach with survey data from shea butter processors across Africa. Their research finds a positive correlation between market access and innovation. Processors with access to international markets show a higher propensity for innovation, particularly in packaging and branding. This study emphasizes the role of market forces in driving innovation. However, a limitation of the study is the lack of qualitative data on the specific innovations implemented.

In addition, Dankyi et al. (2020) conducted a case study of a shea butter processing cooperative in Ghana to explore the role of social innovation. They discovered that the cooperative structure facilitates knowledge sharing, improves bargaining power with buyers, and enables process innovation. This study highlights the potential of social models in fostering innovation. However, its limitation is its focus on a single case, which limits generalizability. The authors recommend further research to investigate the scalability and replicability of the cooperative model in the shea butter industry in Africa.

Also, Béligné et al. (2019) surveyed shea butter processors in Benin to understand their innovation capabilities. Their findings reveal a lack of awareness about formal innovation processes and limited access to funding for innovation. This study underscores the need for capacity building and financial support for processors. However, its limitation is its focus on just one country. Market access and organizational structures, particularly those that promote collaboration are key drivers of innovation. Further research is necessary to explore specific types of innovations emerging and effective strategies to promote them across the African shea butter industry.

To foster a vibrant innovation ecosystem in the shea butter industry, a multi-pronged approach is needed. This includes encouraging market access, promoting collaboration among processors, and providing capacity-building and financial support. By leveraging traditional knowledge and modern advancements, the shea butter industry in Africa can unlock its full potential and make significant contributions to economic growth and social development.

2.2.2 The Key Determinants of Product, Process, Market, and Organizational Innovation among Shea Butter Processors

A study conducted by Gallego et al. (2013) investigates the factors that influence product and process innovation in service firms across Europe. Through a cross-sectional survey design and regression analysis, the study identifies market orientation and technological capabilities as significant determinants of innovation. The study's strengths include its extensive geographic coverage and robust statistical methods. However, due to its cross-sectional nature, it is limited in its ability to establish causality. The researchers recommend enhancing market intelligence and investing in technology to promote innovation.

In contrast, a study by Parida et al. (2012) explores the determinants of organizational innovation in small firms in Sweden. This research adopts a longitudinal survey design and utilizes structural equation modelling to analyze data. The findings suggest that external collaborations and internal knowledge management play a crucial role in organizational innovation. The study's strength lies in its longitudinal approach, which allows for the observation of changes over time. However, the focus on small firms in Sweden may limit the generalizability of the results. The researchers recommend implementing policies that support collaborative networks and knowledge-sharing practices among firms.

Another study by Love and Roper (2015) examines market innovation in the UK manufacturing sector. By combining survey data with case studies, the study identifies export activities and customer engagement as key drivers of market innovation. The mixed-methods design is a notable strength as it provides both quantitative and qualitative insights. Nonetheless, relying on self-reported data could introduce bias. The authors suggest the promotion of export-oriented policies and the cultivation of customer relationships to stimulate market innovation.

Shifting the focus to African contexts, a study by Saka-Helmhout et al. (2020) investigates innovation among Ghanaian shea butter processors. Through a qualitative case study approach, the research highlights the significance of local knowledge and community networks in driving innovation. The study's strengths lie in its in-depth qualitative insights and contextual relevance. However, the case study design may limit the generalizability of the findings to other regions. The authors recommend leveraging local knowledge systems and strengthening community ties to enhance innovation.

Lastly, a study by Aderemi and Adedoyin (2022) examines the determinants of process innovation among Nigerian shea butter processors. By employing a survey design and conducting multivariate analysis, the study identifies access to finance, training, and infrastructure as significant determinants. The study's strengths lie in its comprehensive analysis and practical implications for policy. However, the cross-sectional nature limits the understanding of long-term impacts. The authors recommend increasing financial support, providing training programs, and improving infrastructure to foster innovation in the shea butter industry.

To conclude, innovation among shea butter processors is influenced by various factors, including market access, organizational practices, and local knowledge. While global studies emphasize technological capabilities, external collaborations, and export activities, African studies highlight the role of local knowledge, community networks, and access to resources. These findings underscore the need for context-specific policies and support mechanisms to foster innovation in the shea butter processing industry.

III. METHODOLOGY

3.1 Research design

In this study, a descriptive research design is employed to provide a depiction of the current state of the subject under investigation. Descriptive research involves the systematic collection, analysis, and interpretation of data to shed light on the factors that influence the research problem (Huntington-Klein, 2021).

3.2 Characteristics of the study area

The Northern region of Ghana covers about 70,384 square kilometres, making it the largest region by land area. It borders the Upper East and Upper West regions to the north, Brong Ahafo and Volta regions to the south, North East region to the east, and Savannah region to the west. The terrain is mostly low-lying, except for the northeastern corner with the Gambaga escarpment and along the western corridor (Haruna et al., 2011; Husseini et al., 2020).

In 2010, the Northern region had a total population of 2,479,461, with more females (1,249,574) than males (1,229,887). Between 2000 and 2010, the region's population grew by 36.2 per cent, making it the fastest-growing region in Ghana after the Central (38.1%) and Greater Accra (38.0%) regions (Husseini et al., 2020).

Currently, the Northern region is divided into sixteen administrative districts. Table 2 shows the administrative districts in the Northern region.

Table 2

Districts in the Northern Region

Name of District	District Capital
Tolon	Tolon
Tatale/Sanguli	Tatali
Sagnarigu Municipal	Sagnarigu
Savelugu Municipal	Savelugu
Mion District	Sang
Nanton District	Nanton
Gushiegu Municipal	Gushiegu
Karaga District	Karaga
Kpandai District	Kpandae
Nanumba North	Bimbilla
Nanumba South	Wulensi
Saboba	Saboba
Tamale Metropolitan	Tamale
Kumbungu	Kumbungu
Zabzugu	Zabzugu
Yendi Municipal	Yendi

Source: https://www.ghanadistricts.com/Home/Region/

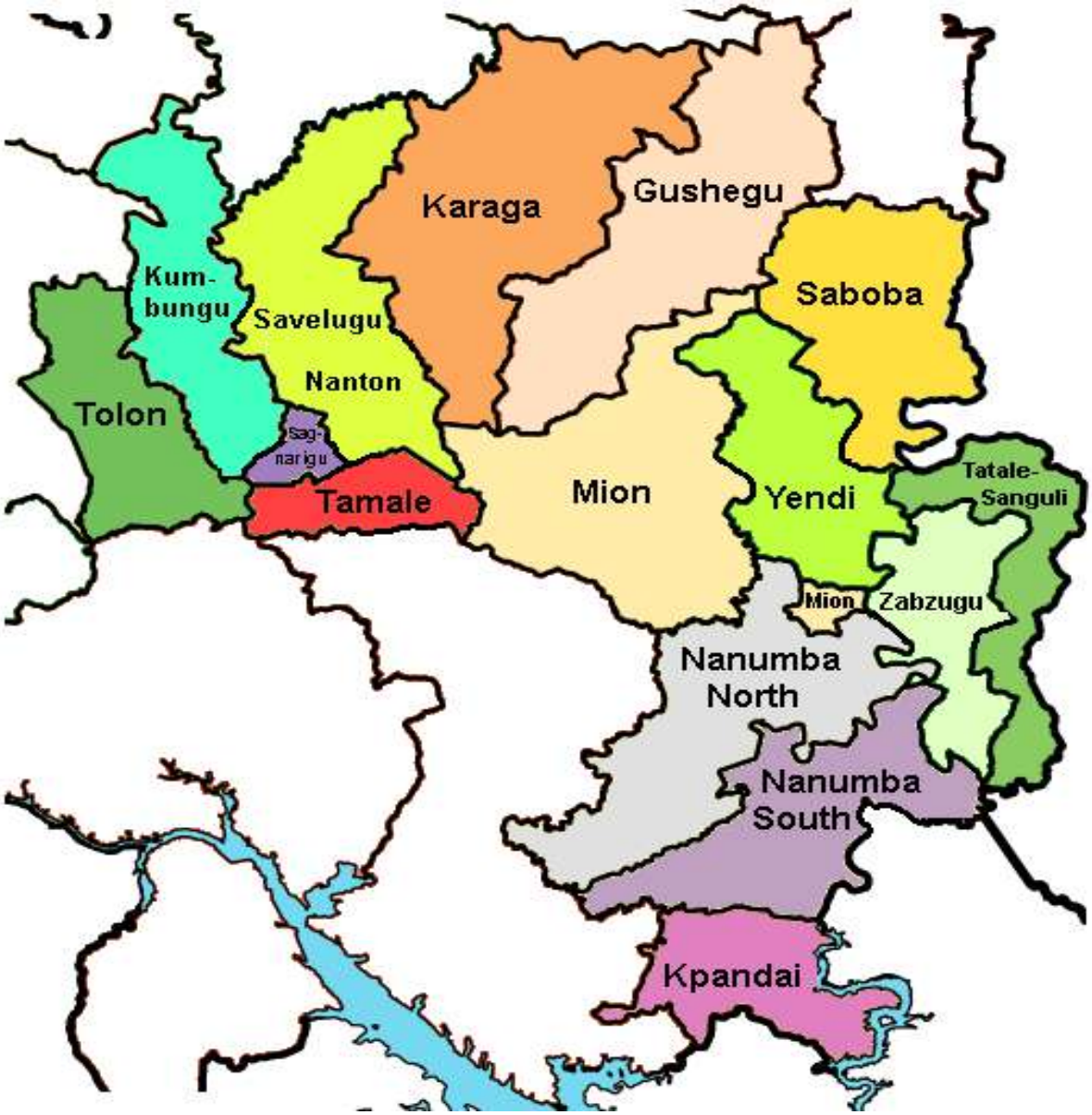

Figure 1
District map of the Northern Region
Source: https://www.ghanadistricts.com/Home/Region/

3.3 Target Population

According to the Global Shea Alliance, Ghana has a total of 455 enterprises and cooperatives engaged in shea processing, with 332 of them operating in the sixteen administrative districts of the Northern Region (Alliance, 2020).

3.4 Sampling and Data Collection

Cross-sectional data was gathered through a field survey of selected shea enterprises in the study area, with questionnaires completed by the managers of these enterprises.

Due to the lack of existing surveys on innovation among small enterprises in Ghana's industrial sector, primary data was used. Selecting a sample of these businesses was deemed more efficient in terms of resources like finance, time, and labor, compared to conducting a census (Afful Jr., 2010). However, it is crucial to ensure that the sample accurately represents the population from which it is drawn (Stephen et al., 2020). To determine the appropriate sample size, the researcher applied the Taro Yamane formula at a 5% level of significance.

Yamane (1967) formula:

$$n = \frac{N}{1+N(e)^2}$$

Where:

n = sample size
N = Population of the study
e = level of significance/Error estimate at 5%
1 = Constant

Selecting a sample out of the total study population;

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{332}{1 + 332(0.05)^2}$$

$$n = \frac{332}{1 + 332(0.0025)}$$

$$n = 181.4207$$

Therefore, the sample size is 181.

The data collection instrument used in this study was a questionnaire designed for managers. The questionnaire aimed to gather data that aligned with the study's objectives and conceptual framework. The respondents provided concise answers, which can be considered a form of personal interview (Kumekpor, 1999; Afful Jr., 2010). The questionnaire included a mix of open-ended and close-ended questions. Open-ended questions allow respondents to provide detailed information, offering researchers deeper insights into their understanding of the issue under study. Close-ended questions facilitate easier comparison and rating of answers, simplifying most forms of statistical analysis. The questionnaire was validated by the research supervisors before being administered by the student researcher. The researcher edited all responses for completeness and correctness before leaving the interviewees, ensuring the consistency and accuracy of the collected data. Subsequent checks were also conducted. The data was then coded and entered into STATA software for further analysis.

3.5 Econometric Model

To achieve these objectives, the researcher begins by identifying and describing the forms of innovation: Product innovation, process innovation, organizational innovation and marketing innovation. Whatever type of innovation occurs, it is driven by several variables in a relationship. Hence the probability of innovation occurring would be based on an interplay of such variables. Traditionally, these relationships can be expressed as follows:

$Y^* = \beta X + \mu$ where X is observable and Y^* is the outcome variable.

$$Y = 1 \quad if\ \beta X + \mu > 0$$
$$Y = 0 \quad if\ \beta X + \mu < 0$$

Y represents the type of innovation (product, process, organizational and marketing). X represents the exogenous explanatory variables. The conditional probability of innovating at the enterprise level is given as:

$E(Y_i^* / x_i)$, which gives a prob $(y_i = 1) = prob\ (\mu > -\beta x_i)$

$= \Delta(\beta x_i)$

$= \exp(\beta x_i)/(1 + \exp(\beta x_i))$ (1)

This expression is a logistic model of the logit type. The researcher therefore estimated a logistic model as expressed in equation (1).

3.6 Empirical Model

The full estimation model can be expressed as follows:

Prob (Product_Inno) $= \beta_0 + \beta_1$ AGEmgr $+ \beta_2\ Approbili + \beta_3$Accessiss $+ \beta_4$ TotalP $+ \beta_5$ firmage $+ \beta_6$ firmsize$+ \beta_7$ Demand $+ \beta_8$Location $+ \mu$ (2)

Prob (Process_Inno)$= \beta_0 + \beta_1\ Firmsize + \beta_2$ location $+ \beta_3$Demand $+ \beta_4$ Totalp $+ \beta_5$ Trainingabrd $+ \beta_6$ Skillsacquis $+ \beta_7$ Yearssheaind $+ \mu$ (3)

Prob (Organisational_Inno)$= \beta_0 + \beta_1$ firmsize $+ \beta_2$ Location $+ \beta_3$Demand $+ \beta_4$ TotalP $+ \beta_5$ firmage $+ \beta_6$ Trainingabrd $+ \beta_7$ GtariningGfr $+ \mu$ (4)

Prob(Marketing_Inno)$= \beta_0 + \beta_1$ ACCESSISS $+ \beta_2$ Approbili $+ \beta_3$agemgr $+ \beta_4$ Nationamgr $+ \beta_5$ Yearssheaind $+ \beta_6$ Demand $+ \beta_7$ Location $+ \beta_8$TotalP $+ \beta_9$ firmage $+ \mu$ (5)

Equation 2 indicates that the likelihood of a small-scale shea butter processing firm introducing a product innovation depends on several factors: the age of the firm's manager, the appropriability regime in place, the firm's access to innovation support services, the total number of products offered by the firm, the firm's age, its size, the demand for its products, and its location. The term μ represents the error term or other variables not included in the model.

Equation 3 outlines that the probability of a firm innovating in its processes depends on the firm's size, its location, the demand for its products, the total number of products, the manager's overseas training, skills acquisition, and years in the industry.

Equation 4 suggests that the likelihood of a firm implementing organizational innovation may be influenced by its size, location, product demand, total products, age, and whether the manager has received training both abroad and in Ghana.

Equation 5 addresses marketing innovation as the dependent variable, with independent variables including access to innovation support services, the appropriability regime, the manager's age, nationality, years in the industry, product demand, location, total products, and the firm's age. Table 3 contains some key variables in the study and their description.

Table 3

Summary of Dependent and Independent Variables in the Logit Model

Variables	**Description**
Dependent variables	
Product Innovation	Firms that introduced new or improved products between 2018 to 2020
Process Innovation	Firms that introduced new or improved processes between 2018 to 2020
Organisational innovation	Firms that introduced new or improved organisational management practices between 2018 to 2020
Marketing Innovation	Firms that introduced new or improved marketing strategies or concepts between 2018 and 2020.
Independent variables	
Firm Location	A rural setting has a population of less than 5,000 people and an urban setting has a population of 5,000 or above.
Firm Size	Number of employees:
	▪ 0 - 5 Microenterprises
	▪ 6 - 9 Very small enterprises
	▪ 10 - 29 Small enterprises
	▪ 30 - 140 Medium enterprises
Demand	Innovation was significant for some market gains
Capital size	Firms that rated their capital adequate or inadequate
Access to innovation support services (ISS)	Information and knowledge support sources that are crucial for innovation
Appropriability regime	Firms rated the appropriability regime as functioning or not functioning
Firm age	▪ 21 - 30 years
	▪ 31 - 40 years
	▪ 41 - 50 years
	▪ 51 - 60 years
	▪ 61+ years
Medium of skills acquisition	How firm managers acquire skills to work: Formal, informal or Both
Received training from abroad	Firm managers who received training from outside of Ghana
Received training in Ghana from a foreigner	Firm managers who received training from foreigners in Ghana
Level of education of the Manager	▪ University
	▪ Polytechnic
	▪ Training College
	▪ Technical/Vocational
	▪ Secondary/Commercial
	▪ J.H.S
	▪ Primary
	▪ Non
Training and Development	Number of workshops attended
Age of the Manager	▪ 21 - 30 years
	▪ 31 - 40 years

	▪ 41 - 50 years
	▪ 51 - 60 years
	▪ 61+ years
Gender of the Manager	MALE
	FEMALE
Years of experience in the shea industry	How long a firm has been operating (in years):
	▪ 0 - 5 years
	▪ 6 - 11 years
	▪ 12+ years
Sources of Innovation Support Services	o Within your enterprise or enterprise group
	o Suppliers of equipment, materials, components, or software
	o Clients or customers from the private sector
	o Clients or customers from the public sector
	o Competitors or other enterprises in your industry
	o Consultants and commercial labs
	o Universities or other higher education institutions
	o Government, public or private research institutes
	o Conferences, trade fairs, exhibitions
	o Scientific journals and trade/technical publications
	o Professional and industry associations

IV. FINDINGS & DISCUSSIONS

4.1 Demographic Characteristics

Under this section, data were categorized into different types according to the distinct nature of the variables of interest. The section started by presenting data on the characteristics of the study subjects, which included firm characteristics as well as the demographic characteristics of the manager. This was followed by the empirical results and discussions of the findings. Table 4 presents the firm characteristics of the firms considered in this study.

Table 4

Firm Characteristics

Variables	Categories	Number of firms	Percent (%)
Owner Nationality	Ghanaian	176	97.24
	Foreign	2	1.1
	Dual-Citizen	3	1.66
Type of Business	Sole Proprietorship	110	60.77
	Private ltd. company	52	28.73
	Public ltd. company	2	1.1
	Co-operative society	14	7.73
	Other	3	1.66
Geography	Geolocal/Regional	181	100
	Geonational/Ghana	163	90.06
	Geoworldwide/International	35	19.34
Firm Size	Microenterprises	73	40.32
	Very small enterprises	64	35.35
	Small enterprises	44	24.3
Firm Age	1 - 10 years	79	43.63
	11 - 20 years	68	37.55
	21 - 30 years	25	13.79
	31 - 40 years	8	4.41
	41 + years	1	0.55

The shea industry can be classified into various types of businesses. Sole proprietorships make up the majority at 60.77%, followed by private limited liability companies at 28.73%, cooperatives at 7.73%, public limited liability companies at 1.1%, and other categories, mostly non-profit religious groups, at 1.6%. This means that sole proprietorships dominate the shea industry.

When it comes to ownership nationality, 97.21% of the firms are owned by Ghanaians, 1.60% by individuals holding dual citizenship, and only 1.12% are foreign-owned. This clearly shows that Ghanaians are the main owners of businesses in the shea sector.

In terms of geography, all the firms operate within their local region, 90.06% sell their products nationally, and 19% can operate internationally. This indicates that most enterprises are focused on the Ghanaian market, with only a small percentage having the potential to expand internationally.

The age distribution of firms reveals that 43.63% are between 1-10 years old, 37.55% are 11-20 years old, 13.79% are 21-30 years old, 4.41% are 31-40 years old, and 0.55% are over 41 years old. On average, the firms are 14.12 years old, suggesting that most of them are relatively young and could be considered start-ups.

Examining firm size based on employment, 40.32% are microenterprises (less than six employees), 35.35% are very small enterprises (6-9 employees), and 24.3% are small enterprises (10-29 employees). This indicates that a significant number of shea enterprises are microenterprises that rely on cheap family labour, resulting in low levels of employment.

4.2 Demographic characteristics of firm manager

Data on manager characteristics in the shea industry includes information about gender, age, marital status, nationality, education level, skills acquisition, training abroad, and industry experience. Table 5 contains this data.

Table 5

Characteristics of the Firm Manager

Variables	Categories	Number of people	Percent (%)
Gender	MALE	50	28.25
	FEMALE	127	71.75
Age	21 - 30 years	16	8.83
	31 - 40 years	36	19.88
	41 - 50 years	27	14.89
	51 - 60 years	72	39.78
	61+ years	30	16.56
Marital Status	Single	2	1.1
	Married	164	90.61
	Divorced	6	3.31
	Separated	4	2.21
	Cohabitating	3	1.66
	Widowed	2	1.1
Nationality	Ghanaian	177	97.79
	Other	4	2.21
Level of Education	University	47	25.97
	Polytechnic	94	51.93
	Training College	7	3.87
	Technical/Vocational	21	11.6
	Secondary/Commercial	4	2.21
	J.H.S	2	1.1
	Primary	3	1.66
	Non	3	1.66
Medium of skills acquisition	Formal	22	12.15
	Informal	7	3.87
	Both	152	83.98
Received training abroad	YES	9	4.97
	NO	172	95.03
Experience in the Shea industry	0 - 5 years	54	29.82
	6 - 11 years	95	52.49
	12+ years	32	17.66

According to the Alliance (2020), 72% of respondent firms in the shea sector are managed by women, while 28% are managed by men. This aligns with their findings that approximately 900,000 women are employed in the shea industry in Northern Ghana. The largest age group among managers is 51-60 years old, making up 39% of the total. The other age groups include 31-40 (19%), 21-30 (8%), 41-50 (14%), and 61 and above (16%). On average, managers in the shea industry are 49 years old, with a standard deviation of 12 years. The majority of managers are married (90%), while smaller percentages identify as single (1%), divorced (3%), separated (2%), cohabitating (1%), or widowed (1%). The vast majority (97%) of managers are Ghanaians, with only 2% identifying as non-Ghanaians.

Levels of education

The educational levels of managers were considered. Data presented in Table 5 shows the educational attainments of managers from respondent firms. A higher value of 51% of all managers had a polytechnic education, 25% had a university education, 11% had technical/vocational education, 2% had secondary/commercial school education, 3% had a training college education, 1% had JHS education, another 1% had primary education only and another 1% had no formal education at all.

Medium of Skills Acquisition

As good as 83% of managers from respondent firms had acquired their skills through both formal and informal forms of training. Only 3% had informal training and 12% had only formal training. Table 5 contains the data on the medium of skills acquisition.

Training abroad

Table 5 shows that 95% of managers of respondent firms had not received any training from abroad and 4% had received some training from abroad.

Experience

Considering my experience of several years working in the shea industry, three (3) classes were formed. These are 0-5 years of work (29%), 6-11 years of work (52%) and 12 years and above (17%). Table 5 contains this data.

4.3 The Occurrence of Product, Process, Market, and Organizational Innovation among Shea Butter Processors

The occurrence of product, process, market, and organizational innovation among shea butter processors was assessed by analysing firm-level responses and presenting the data in Table 6. This table provides insights into the different types of innovations adopted by these processors.

Product Innovation

Product innovation is notable among shea butter processors, with 55.0% of firms reporting new or significantly improved goods. However, innovation in services is relatively low, with only 6.0% of firms introducing new or improved services. Innovation that is new to the market accounts for 17.0% of firms, while 18.0% have implemented innovations that are new to the firm but not necessarily new to the market. This suggests a stronger focus on tangible product improvements rather than service enhancements.

Process Innovation

Process innovation shows a more varied adoption. Sixteen per cent of firms have introduced new or greatly enhanced methods for manufacturing or producing goods and services. A more significant 42.0% of firms have implemented new or improved methods for logistics, delivery, or distribution of inputs, goods, or services, indicating a substantial focus on optimizing supply chain and distribution processes. However, only 9.0% have adopted enhanced or newly implemented support activities, such as maintenance systems or operations for purchasing, accounting, or computing, suggesting room for improvement in internal support processes.

Organizational Innovation

Organizational innovation appears robust, with 56.0% of firms implementing new business practices like supply chain management, business reengineering, and quality management. Additionally, 18.0% of firms have adopted new methods of organizing work responsibilities and decision-making, which include implementing new systems of employee responsibilities, teamwork, decentralization, and improving education and training systems. However, only 5.0% of firms have employed new methods of organizing external relations with other firms or public institutions, indicating that external organizational innovation is less common.

Marketing Innovation

Marketing innovation varies among the shea butter processors. Significant alterations to the aesthetic design or packaging of goods or services have been made by 28.0% of firms, highlighting the importance of product presentation. Only 5.0% of firms have adopted new media or techniques for product promotion, and an equal percentage have introduced new methods for product placement and sales channels, such as franchising or exclusive retailing. Similarly, new pricing methods for goods or services are used by 4.0% of firms, indicating a limited but present interest in innovative pricing strategies.

Table 6

Product (Good or Service) Innovation

Variable	No. of Firms	Percentage (%)
Goods Innovation: New or significantly improved goods	99	55.0
Service Innovation: New or significantly improved services	10	6.0
New to Market Innovation	31	17.0
New to Firm Innovation	32	18.0
Process Innovation:		
New or greatly enhanced methods for manufacturing or producing goods and services	29	16.0
New or improved methods for the logistics, delivery, or distribution of your inputs, goods, or services.	76	42.0
Enhanced or newly implemented support activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing.	16	9.0
Organisational Innovation:		
New business practices such as supply chain management, business reengineering, knowledge management, lean production, quality management, and more, are being implemented to improve the organization of procedures.	101	56.0
New methods of organizing work responsibilities and decision-making include implementing a new system of employee responsibilities, encouraging teamwork, decentralization, integrating or de-integrating departments, and improving education and training systems.	32	18.0
New methods of organizing external relations with other firms or public institutions, such as alliances, partnerships, outsourcing, or subcontracting, are being employed.	9	5.0
Marketing Innovation:		
Exclude changes that alter the functional or user characteristics of a product (these changes are considered product innovations) when considering significant alterations to the aesthetic design or packaging of a good or service.	51	28.0
New media or techniques for product promotion, such as the first-time use of new advertising media, the introduction of a new brand image, or the implementation of loyalty cards, etc.	9	5.0
New methods such as franchising or distribution licenses, direct selling, exclusive retailing, and innovative product presentation concepts have emerged for product placement and sales channels.	9	5.0
New pricing methods for goods or services, such as variable pricing based on demand or discount systems	8	4.0

Note: Multiple responses

The data reveal that organizational and product innovations are the most common among shea butter processors, followed by process and marketing innovations. The high percentage of firms engaging in new business practices and product improvements suggests a focus on internal efficiencies and product quality. However, the relatively lower adoption rates for service, support processes, and external organizational innovations indicate potential areas for growth and further development.

4.4 Nature of Innovation

The purpose of collecting data was to investigate the type of innovations that firms have. Specifically, we wanted to determine if an innovation is new to the Ghanaian market or if it is new only to the firm that came up with it. The findings revealed that more than 80% of the identified innovated activities were classified as new only to the innovating firm, while less than 20% of the innovations were considered new to the Ghanaian market. For a visual representation, please refer to Figure 2, which displays a bar graph depicting the nature of innovation among firms.

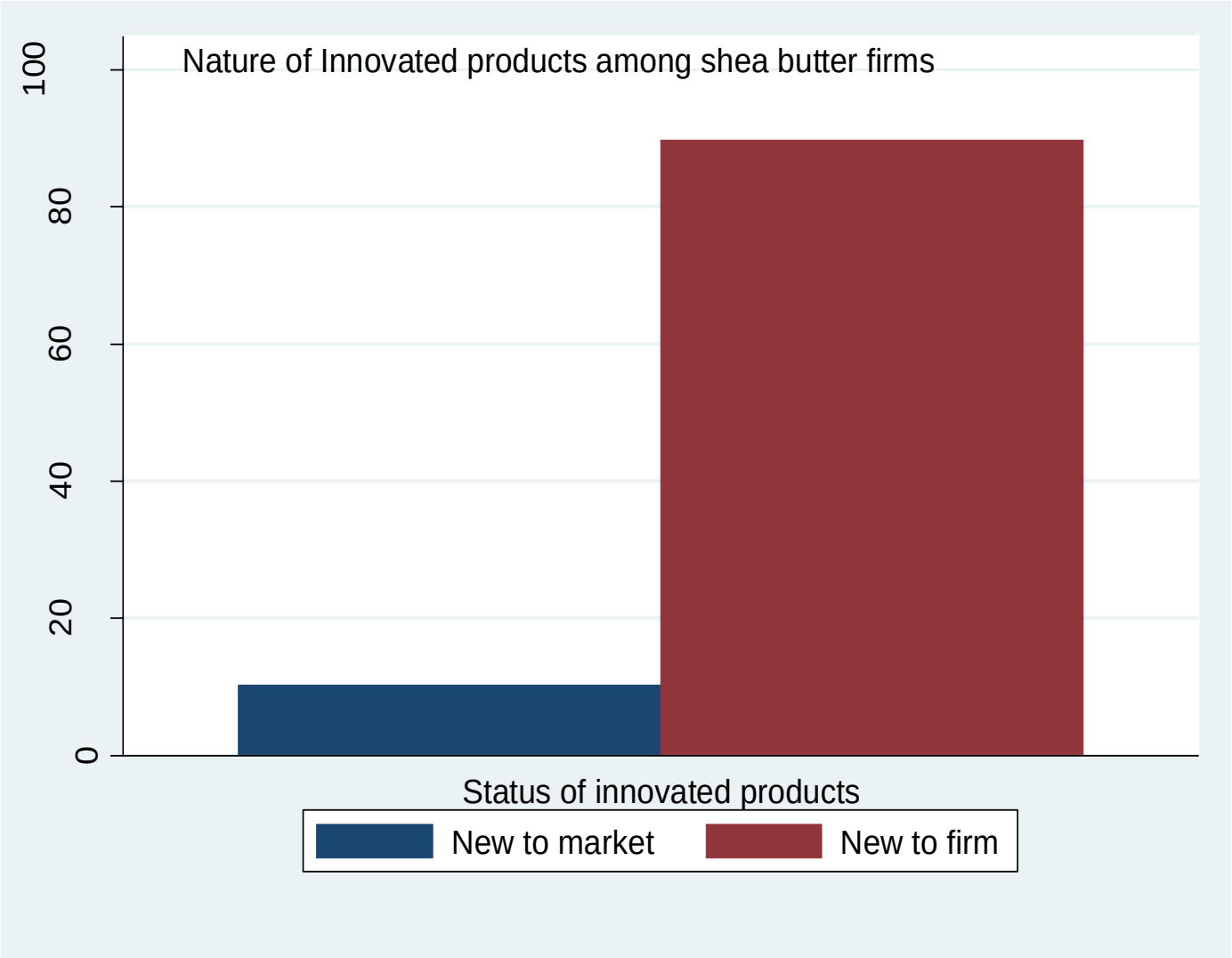

Figure 2
Nature of Innovation

4.5 Regression Results

4.5.1 The key Determinants of Product, Process, Market, and Organizational Innovation among Shea Butter Processors

To determine the key determinants of Product, Process, Market, and Organizational Innovation a logistic regression analysis was conducted. The results of the logistic regression analysis are presented in Tables 7 to 11. The logistic regression results for factors influencing product innovation among shea butter firms are presented in Table 7. The analysis shows that the age of the manager (AGEmgr), appropriability regime (APPROBILI), total production (TotalP), Firm age, Firm size and demand for products are not a significant predictor of product innovation, as indicated by the high p-value.

Access to innovation support services (ACCESSISS), however, significantly increases the likelihood of product innovation, with a p-value of 0.003. The odds of product innovation increase by approximately 28% for firms with access to these services, highlighting their importance in fostering innovation.

Location is a significant determinant of product innovation, with a p-value of 0.009. Firms in favourable locations are almost three times more likely to innovate, emphasizing the critical role of geographical factors. The model's Pseudo R-squared value of 0.138 indicates that approximately 13.8% of the variability in product innovation is explained by the model. The significant Chi-square value (p-value: 0.002) suggests that the model as a whole is statistically significant.

According to Schumpeter's innovation theory, entrepreneurs earn profits by introducing successful innovations. The significant role of access to innovation support services aligns with Schumpeter's emphasis on the importance of resources and support in driving innovation. This finding underscores the need for external support mechanisms to facilitate innovation among firms. The significant impact of location on product innovation supports the idea that innovation environments play a crucial role in fostering radical or incremental innovations. Urban areas with better access to resources, skilled labour, and knowledge networks can drive more significant innovation activities, which is consistent with the findings of this study.

The results align with empirical studies suggesting that firm location and access to support services are critical determinants of innovation. The lack of significant impact from firm size and demand contradicts some literature indicating their importance, suggesting that other factors may be more influential in the context of shea butter firms.

The logistic regression analysis highlights the significant impact of access to innovation support services and firm location on product innovation among shea butter processors. These findings reinforce the importance of external support and favourable geographical conditions in fostering innovation. Future research should explore other potential determinants and their interactions to provide a more comprehensive understanding of innovation dynamics in this sector.

Based on the significant Pseudo R-squared value and Chi-square test (Prob > chi2 = 0.002), we reject the null hypothesis (H0) and accept the alternative hypothesis (H1), indicating a significant occurrence of product innovation among shea butter processors. For the specific factors of access to innovation support services and firm location, we reject the null hypothesis (H0) and accept the alternative hypothesis (H1), recognizing these as significant determinants. For other variables, we accept the null hypothesis (H0) as they are not significant determinants of product innovation.

Table 7: Logistic regression results: Product innovation only

Variable	Coefficient	Odds Ratio	Standard Error	P>z
AGEmgr	-1.052	1.052439	0.1238942	0.664
APPROBILI	-1.264	1.264009	0.4625721	0.522
ACCESSISS	1.28	1.280288**	0.694494	0.003
TotalP	3.455	3.455338	2.774178	0.122
firmage	5.756	5.756355	6.618293	0.128
Firm size	-1.004	1.003681	0.0433216	0.932
Demand	0.791	0.7909443	0.3731478	0.619
Location	2.917	2.916637**	1.193844	0.009
_cons	23.788	23.78793	346.2819	0.828
Mean dependent var	0.537	SD dependent var	0.573	
Pseudo r-squared	0.138	Number of obs	181	
Chi-square	34.582	Prob > chi2	0.002	
Akaike crit. (AIC)	246.067	Bayesian crit. (BIC)	294.044	

Note: ** indicates significance at 5% and * indicates significance at 10%.

The logistic regression results for factors determining process innovation among shea butter firms are presented in Table 8. The analysis shows that firm size, Total production and acquisition of skills are not a significant predictor of process innovation, as indicated by the high p-value. In contrast, location is a significant determinant of process innovation, with a p-value of 0.001. Firms in favourable locations are more than three times as likely to engage in process innovation, emphasizing the critical role of geographical factors. This finding aligns with the notion that access to resources and networks in certain locations can foster innovation activities.

Demand also appears to influence process innovation, with a p-value of 0.073, which is marginally significant. The odds ratio indicates that firms experiencing higher demand are approximately twice as likely to innovate their processes. This suggests that market pressures and the need to meet customer expectations can drive firms to improve their processes.

Training abroad (TRAININGabrd) has a marginally significant effect on process innovation, with a p-value of 0.091. The odds ratio of 0.217 indicates that firms with training abroad are less likely to engage in process innovation, which is counterintuitive and warrants further investigation.

The model's Pseudo R-squared value of 0.202 indicates that approximately 20.2% of the variability in process innovation is explained by the model. The significant Chi-square value (p-value: 0.008) suggests that the model as a whole is statistically significant. The Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values of 248.127 and 286.509, respectively, provide measures for model comparison and fit.

The logistic regression analysis highlights the significant impact of location and, to a lesser extent, demand on process innovation among shea butter firms. These findings reinforce the importance of geographical conditions and market pressures in driving innovation. Future research should explore other potential determinants and their interactions to provide a more comprehensive understanding of innovation dynamics in this sector. Additionally, the counterintuitive finding regarding training abroad warrants further investigation to understand its impact on process innovation.

Table 8

Logistic regression results: Process Innovation Only

Variable	Coefficient.	Odds Ratio	Std. Err.	P>z
Firm size	-1.008	1.008314	0.0438959	0.849
Location	3.364	3.364446**	1.245515	0.001
Demand	2.281	2.28109*	1.050948	0.073
TotalP	0.813	0.8132609	0.3842029	0.662
TRAININGabrd	0.217	0.2170942*	0.1963393	0.091
SKILLSacquis	-0.604	0.6040436	0.584081	0.602
YEARSsheaind	-1.116	1.116155	0.1757361	0.485
_cons	0.312	0.3124502	0.6426768	0.572
Mean dependent var	0.378	SD dependent var	0.35	
Pseudo r-squared	0.202	Number of obs	181	
Chi-square	25.548	Prob > chi2	0.008	
Akaike crit. (AIC)	248.127	Bayesian crit. (BIC)	286.509	

Hypothesis testing: Table 8 shows that we fail to accept the null hypothesis of no relationship between firm location and process innovation. However, we accept the alternative hypothesis that there is a relationship between a firm's location and its ability to process innovation.

Table 9 presents the logistic regression results analysis performed on organizational innovation only as a dependent variable and seven independent variables (firm size, location, demand, total products, firm age, training abroad and training in Ghana by a foreigner). The model specification is good given a Pseudo r-squared of 0.157, a Chi-square value of 37.036 and a mean dependent variable of 0.771.

The logistic regression analysis for factors influencing organizational innovation among shea butter firms is summarized in Table 9. The key variables include firm size, location, demand, total production, firm age, training abroad, and government training programs. Here is a detailed interpretation of the results:

Location: The coefficient for location is 0.46, with an odds ratio of 0.4598506 and a standard error of 0.1773145. The p-value is 0.044, indicating that location is a significant predictor of organizational innovation at the 5% significance level. Firms in certain locations are more likely to engage in organizational innovation.

Demand: The coefficient for demand is 0.134, with an odds ratio of 0.1343686 and a standard error of 0.0896258. The p-value is 0.003, indicating that demand is a highly significant predictor of organizational innovation at the 5% significance level. Higher demand increases the likelihood of organizational innovation.

Government Training Programs (GTRAININGfr): The coefficient for government training programs is 3.801, with an odds ratio of 3.801362 and a standard error of 2.227471. The p-value is 0.023, indicating that government training programs are a significant predictor of organizational innovation at the 10% significance level. Other variables were found to be insignificant. Firms that participate in government training programs are more likely to engage in organizational innovation.

The mean dependent variable is 0.771, and the standard deviation of the dependent variable is 0.731. The pseudo-R-squared value is 0.157, indicating that approximately 15.7% of the variability in organizational innovation is explained by the model. The model's chi-square value is 37.036 with a p-value of 0.001, suggesting that the model as a whole is statistically significant.

Table 9

Logistic Regression Analysis: Organizational Innovation Only

Variable	Coefficient.	Odds Ratio	Std. Err.	P>z
Firm size	-1.063	1.063043	0.0592002	0.272
Location	0.46	0.4598506*	0.1773145	0.044
Demand	0.134	0.1343686**	0.0896258	0.003
TotalP	-0.71	0.7095963	0.3337361	0.466
firmage	-1.537	1.536987	0.6054885	0.275
TRAININGabrd	1.673	1.672825	1.705776	0.614
GTRAININGfr	3.801	3.801362*	2.227471	0.023
_cons	0.841	0.8414526	3.027766	0.962
	Mean dependent var	0.771	SD dependent var	0.731
	Pseudo r-squared	0.157	Number of obs	175
	Chi-square	37.036	Prob > chi2	0.001
	Akaike crit. (AIC)	222.518	Bayesian crit. (BIC)	260.495

Note: ** indicates significance at 5% and * indicates significance at 10%.

Source: Field Survey, 2024

Table 10 presents the logistic regression results analysis performed on marketing innovation only as a dependent variable and nine independent variables (Access to innovation support services, appropriability regime, age of the manager, total products, nationality of the manager, years in industry, demand for products, location and firm age). The model specification is good given the Pseudo r-squared value of 0.223, Chi-square of 20.727, and Prob > chi2 of 0.079.

Table 10

Logistic regression analysis: Marketing Innovation Only

Variable	Coefficient.	Odds Ratio	Std. Err.	P>z
ACCESSISS	0.704	0.7037244	0.4285609	0.564
APPROBILI	1.232	1.231927	0.5634515	0.648
AGEmgr	-1.221	1.221084	0.1718147	0.156
NATIONAmgr	-0.435	0.4348529	0.6846583	0.597
YEARSsheaind	1.249	1.248875	0.2405581	0.249
Demand	-1.588	1.587989	0.9908483	0.459
Location	3.377	3.377007*	1.919335	0.032
TotalP	0.009	0.0085511**	0.0146024	0.005
firmage	1.084	1.084211	0.5056481	0.862
_cons	6.65E+13	6.65E+13*	1.13E+15	0.062
Mean dependent var	0.142	SD dependent var	0.281	
Pseudo r-squared	0.223	Number of obs	166	
Chi-square	20.727	Prob > chi2	0.079	
Akaike crit. (AIC)	175.601	Bayesian crit. (BIC)	219.169	

Note: ** indicates significance at 5% and * indicates significance at 10%.

Source: Field Survey, 2024

Location: The positive sign associated with the coefficient for this variable indicates that firm location affects its propensity to market innovate. This variable is significant at 10%. This means the odds of a firm located in urban settings innovating a marketing strategy is 3.377007. Some locations have thus emerged as "hot spots" for marketing innovation.

Total products: The positive sign associated with the coefficient of total products means that a firm's total products can affect the chance of a firm innovating a marketing strategy. A unit increase in the number of products of a firm would lead to a 0.009-point increase in the probability of a firm to market innovate.

Others: Apart from the constant term which is significant at 10%, the over-independent variables (Access to innovation support services, appropriability regime, age of the manager, nationality of the manager, years in industry, demand for products and firm age) are statistically insignificant.

Hypothesis testing: Table 10 shows that we failed to reject the null hypothesis that there is no relationship between location and marketing innovation. However, we accept the alternative hypothesis that there is a relationship between the location of a firm and the firm's ability to market innovates.

Table 11 presents the logistic regression results analysis performed on product and process innovation combined as a dependent variable and eight independent variables (years in industry, appropriability regime, access to innovation support services, total products, firm age, firm size, demand and location). The model specification is good given that Pseudo r-squared has a value of 0.293, Chi-square is 10.417 and Prob > chi2 0.06.

Table 11
Logistic regression analysis: Product and Process Innovation Combined

Variable	Coefficient.	Odds Ratio	Std. Err.	P>z
YEARSsheaind	-1.189	1.188633	0.3625769	0.571
APPROBILI	2.1	2.10034	1.367234	0.254
ACCESSISS	0.926	0.9261887	0.8187845	0.931
TotalPS	-0.894	0.8942536	0.5373256	0.852
firmage	9.137	9.137215*	10.86351	0.063
Firm size	0.968	0.9682577	0.0682016	0.647
Demand	1.181	1.180784	0.8758438	0.823
Location	0.296	0.2956479*	0.1849325	0.051
_cons	0.001	0.001035	0.0242396	0.769
Mean dependent var	0.818	SD dependent var	0.359	
Pseudo r-squared	0.293	Number of obs	175	
Chi-square	10.417	Prob > chi2	0.06	
Akaike crit. (AIC)	129.149	Bayesian crit. (BIC)	173.456	

Source: Field Survey, 2024

Note: ** indicates significance at 5% and * indicates significance at 10%.

Firm age: The positive sign associated with the coefficient for this variable indicates that firm age tends to affect its propensity to innovate both a product and a process. This variable is significant at 10%. This means the odds of a younger firm innovating both a product and a process is 9.137215.

Location: The positive sign associated with the coefficient for this variable indicates that a firm location affects its propensity to innovate both a product and a process. This variable is significant at 10%. Thus, firms located in urban settings will have 0.2956479 of the odds that a firm will innovate a product and a process.

Others: All the other independent variables (years in industry, appropriability regime, access to innovation support services, total products, firm size and demand) and the constant term are statistically insignificant.

4.6 Discussion of Study Findings

The study's findings provide some understanding of the factors influencing product, process, organizational, and marketing innovations among shea butter processors. The findings reveal critical insights into the determinants of these innovations. Logistic regression analyses were used to identify significant variables that influence these innovations, linking them to existing literature.

Our study found that 55% of firms engage in product innovation. This finding is consistent with Ayadi et al. (2018), who noted limited product innovation due to traditional production methods. However, our research indicates a higher engagement in product innovation than Ayadi et al. (2018), suggesting an evolving landscape. Access to innovation support services and firm location were found to drive product innovation, highlighting the importance of infrastructural and institutional support. This aligns with Schumpeter's Innovation Theory of Profit, emphasizing the role of entrepreneurs in introducing innovations to gain profits. Specifically, firms with access to these services are 28% more likely to innovate, and those in favourable locations are almost three times as likely to do so. The significance of location underscores the role of geographical factors in fostering innovation, consistent with Gallego, Rubalcaba, and Hipp (2013). These findings suggest that urban areas with better access to resources, skilled labour, and knowledge networks are conducive to innovation activities.

Process innovation, with 16% of firms adopting new or significantly improved production methods, is driven significantly by firm location and product demand. This resonates with Hillocks et al. (2017), who found a positive correlation between market access and innovation. The importance of urban settings in facilitating innovation supports the idea that proximity to markets and resources enhances the capacity for process improvements. Moreover, the impact of market demand on innovation supports the market-pull theory, suggesting that firms innovate in response to

market needs. Firm location and demand are significant predictors. Firms in favourable locations are more than three times as likely to engage in process innovation, while those experiencing higher demand are approximately twice as likely to innovate. The marginal significance of training abroad, indicating a lower likelihood of process innovation, is counterintuitive and warrants further investigation. This finding suggests that the impact of external expertise on process innovation may vary depending on the context and implementation.

A significant 56% of firms engage in organizational innovation, driven by firm location and training in Ghana by foreigners. This finding is consistent with Parida, Westerberg, and Frishammar (2012), who identified external collaborations and internal knowledge management as crucial for organizational innovation. The role of foreign expertise highlights the importance of knowledge transfer and spillover effects. Our findings suggest that training programs involving foreign experts can significantly enhance organizational practices, reinforcing the need for policies that facilitate such exchanges. The analysis indicates that firm location, demand, and participation in government training programs significantly influence organizational innovation. Firms in favourable locations and those experiencing higher demand are more likely to innovate organizationally. Additionally, government training programs play a critical role, highlighting the importance of external support in enhancing organizational practices. This is consistent with Parida et al. (2012), who emphasized the role of external collaborations and internal knowledge management in driving organizational innovation. The significance of government training programs underscores the need for policies that facilitate knowledge transfer and capacity building within firms.

Marketing innovation is observed in 28% of firms, primarily through new methods of promoting products and improving product presentation. This aligns with Love and Roper's (2015) emphasis on the role of export activities and customer engagement in driving market innovation. The relatively lower adoption rates for innovative pricing and distribution methods indicate areas for potential growth. The findings suggest that enhancing market access and cultivating customer relationships are crucial strategies for boosting marketing innovation. Firm location and the total number of products offered significantly influence marketing innovation. Firms in urban settings are more likely to innovate in marketing strategies, and those with a broader product range show a higher propensity for marketing innovation. This finding aligns with Love and Roper's (2015) highlighting the role of export activities and customer engagement in driving market innovation. The significance of firm location suggests that urban areas provide better opportunities for marketing innovations due to greater market access and competitive pressures.

The combined analysis of product and process innovation reveals that firm age and location are significant predictors. Younger firms are more likely to innovate both products and processes, which may be due to their flexibility and adaptability to new technologies and market demands. This finding is supported by the literature, which suggests that younger firms often possess a greater propensity for innovation due to fewer entrenched practices and a higher willingness to take risks (Saka-Helmhout et al., 2020). The significance of location once again highlights the critical role of geographical factors in fostering innovation.

The study revealed that the majority of firms are microenterprises owned by Ghanaians and managed predominantly by women aged 51-60 with polytechnic education. This demographic profile underscores the role of local entrepreneurs and highlights the need for capacity-building initiatives tailored to their educational and socio-economic backgrounds. The dominance of female managers suggests that innovation policies should consider gender dynamics to ensure inclusive growth.

4.7 Policy Implications

The findings emphasize the need for targeted policies to promote innovation in the shea butter industry. Enhancing market access through infrastructure development and export facilitation can drive both product and process innovations. Additionally, fostering collaborations with foreign experts and providing comprehensive training programs can significantly enhance organizational practices. Financial support and capacity-building initiatives are crucial to address the limitations identified in previous studies, such as the lack of formal innovation processes and funding constraints (Béligné et al., 2019). The importance of access to innovation support services and favourable locations in driving innovation highlights the need for targeted policies that enhance these factors. Providing comprehensive support services, improving infrastructure, and facilitating market access are crucial steps in fostering innovation among shea butter processors. Additionally, the significance of government training programs underscores the need for policies that promote knowledge transfer and capacity building through collaborations with foreign experts and institutions.

V. CONCLUSION & RECCOMENDATIONS

5.1 Conclusion

This study improves our understanding of innovation dynamics in the shea butter industry. The findings highlight the key factors that drive innovation, including access to support services, location, demand, and government

training programs. These findings emphasize the need for tailored policies and support mechanisms that consider the specific context of the industry. By combining traditional knowledge with modern advancements, the shea butter industry in Africa can reach its full potential and make significant contributions to economic growth and social development.

The study aligns with Schumpeter's Innovation Theory of Profit, which emphasizes the importance of resources and conducive environments in fostering entrepreneurship and innovation. The results also show that younger firms and those facing high market demands are more likely to innovate, illustrating the dynamic nature of market forces and the adaptability of new enterprises. Moreover, the study highlights the significant role of government training programs and external expertise in enhancing organizational innovation. This underscores the importance of knowledge transfer and capacity-building initiatives in driving sustainable innovation.

While the findings are robust, the study identifies areas that warrant further investigation, such as the counterintuitive impact of training abroad on process innovation. This highlights the complexity of innovation dynamics and the need for a deeper understanding of contextual factors that influence innovation outcomes.

The policy implications derived from this study are clear. To foster a vibrant innovation ecosystem in the shea butter industry, it is crucial to improve market access, provide comprehensive support services, enhance infrastructure, and facilitate knowledge transfer through collaborations with foreign experts and institutions. Targeted policies addressing these areas can significantly strengthen the innovation capabilities of shea butter processors, allowing them to leverage both traditional knowledge and modern advancements.

5.2 Recommendations

In light of these findings, this paper offers a series of recommendations for policymakers and businesses to promote a more innovative business landscape.

Support for Innovation

The study highlights the importance of access to innovation support services for product innovation. Therefore, it is recommended that the government and relevant stakeholders provide relevant support mechanisms, such as training programs, access to technology, mentorship, and funding, to help SHEA industry firms enhance their product innovation capabilities.

Geographic Expansion

Since the majority of shea enterprises operate locally and nationally, efforts should be made to support and promote their expansion markets outside Ghana. This could include providing export assistance, research and development support, funding and facilitating international partnerships to help firms access global markets and increase their competitiveness.

Entrepreneurship Development

Given that sole proprietorship businesses are dominant in the shea industry, there is a need to promote entrepreneurship development and provide targeted support for small business owners. This could involve providing training and capacity-building programs to enhance entrepreneurial skills, financial literacy, and business management capabilities.

Collaboration and Networking

Encouraging collaboration and networking among Shea industry firms can facilitate knowledge sharing, best practices, and innovation. Creating platforms, such as industry associations and business clusters, can help foster collaboration and enable firms to collectively address common challenges and pursue growth opportunities.

Research and Development

Promoting research and development activities within the shea industry can lead to new product development, process improvement, and organizational innovations among others. Encouraging collaboration between industry stakeholders, research institutions, and academia can support research and innovation initiatives and contribute to the growth and competitiveness of SHEA firms.

Policy Support

The government should consider formulating and implementing a comprehensive support system for the shea industry. This could involve the establishment of a shea-industry promotion board that could provide support to economic players throughout the shea value chain. This includes providing incentives for innovation, access to finance, infrastructure development, and supportive trade policies to facilitate market access and growth of the

industry. It is noteworthy to state that these recommendations are based on the findings of the specific study. Further research and analysis may be required to validate and tailor these recommendations to specific contexts and evolving industry dynamics.

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