

Barriers to Innovation Capacity: A Case of Food Processing Small and Medium Enterprises (SMEs) in Lusaka's Industrial Area

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Abstract

The food industry undergoes constant changes due to evolving consumer demands, technological advancements, shifts in family structures, health considerations, and global trends. Small and medium enterprises (SMEs) play a vital role in food processing, with opportunities spanning production, processing, and marketing for both local and international markets. Innovation is instrumental in enhancing a firm's competitiveness and production capacity, yet many food processing SMEs in Zambia face challenges in this regard. This study aims to investigate barriers to innovation capacity among SMEs in Lusaka's Industrial Area. Primary data from 100 SMEs were collected and analysed using SPSS version 25, employing logistic regression models and cross-tabulations. The study reveals the influence of factors such as innovation costs, market dominance, and uncertainties on the innovation process. Lack of funds significantly impedes firms' ability to innovate, although innovation costs alone do not necessarily deter engagement in innovation activities. Strategic measures, including resource allocation, cost-benefit assessments, internal innovation focus, and clear innovation roadmaps, are recommended to address these constraints. Future research should delve into the profitability impact of innovation and explore methodologies like time series analysis for capturing innovation capacity over time.

Keywords

Innovation, Food Processing, Resource Allocation, Production Capacity, Innovation Cost, Small and Medium Enterprises

1. Introduction and Background

The food industry is undergoing rapid transformations due to various factors

such as globalization, technological advancements, changes in family structures, and concerns about health and food safety (Montoya & Vargas, 2023). Innovation plays a crucial role in adapting to these changes, defined as finding better ways to do things or applying improved solutions to meet new requirements (Režek, 2021). Schumpeter (1934) identified five sources of innovation, including the introduction of new goods, production techniques, markets, raw materials, and industry reorganization (Mancini & Gonzalez, 2021). Food technology, a branch of food science, focuses on the process and production of foods using scientific-based technologies and machinery.

Innovation is imperative for organizations of all sizes, driving technological development and management (OECD, 2020). It is essential for companies to implement new or significantly improved products, processes, marketing, or organizational methods to maintain competitiveness (ibid.). However, effective engagement in innovation activities is crucial for both countries and firms to avoid dependency on imported innovative products and to meet evolving customer demands (ibid.). Small and medium-sized enterprises (SMEs) are particularly important in this context, contributing significantly to economic development by creating employment opportunities, introducing innovative goods and services, and driving national prosperity (Chilembo, 2021). In 2021, the government of the Republic of Zambia recognized the importance of SMEs and established a Ministry mandated to stimulate their growth and mitigate their challenges through policy development and interventions (Banda & Hapompwe, 2023).

Despite the importance of innovation for SMEs, they face various challenges such as lack of funds, inadequate technical skills, poor market access, and limited information (Osei, 2016). However, there is limited research on the barriers to innovation capacity among food processing SMEs in Zambia. This study aimed to address this gap by investigating the relationship between fund availability and innovation capacity, analyzing the impact of innovation-related costs, evaluating market dominance through innovation, and identifying factors influencing demand uncertainties in the food processing sector. The research questions and hypotheses were designed to explore these aspects comprehensively.

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The primary objective was to explore the barriers or impediments faced by Food Processing SMEs in Lusaka's Industrial Area with respect to their innovation capacity. The specific objectives were: to ascertain the correlation between the availability of funds and the capacity of a firm to innovate products and services; to scrutinize the relationship between a firm's innovation capacity and the associated costs of innovation; to evaluate the extent to which specific firms dominate markets for products and services through pioneering innovations; and to identify contributing factors to uncertainties influencing demand for innovation in the food processing sector.

2. Literature Review

The literature on barriers to innovation capacity among small and medium-sized enterprises (SMEs) in the food processing sector spans global, regional, and local levels. Empirical studies have increasingly focused on understanding how innovation occurs in SMEs, particularly in the context of the food industry's evolving landscape. In a study involving a significant number of food processing firms in Zambia ($N = 300$), it was found that amidst growing competition and knowledge dissemination, firms' ability to innovate has become crucial for their future sustainability (Ghani, 2016).

One aspect explored here is the relationship between firms' internal research and development (R&D) activities and their perception of innovation obstacles. Studies have shown that firms actively engaged in internal R&D and product innovation are more likely to encounter various barriers to innovation (Galia & Legros, 2004). Additionally, firms with substantial innovative capabilities may face financial constraints, particularly if they lack internal funds (Hoffman et al., 1998).

Another critical aspect is the examination of a firm's innovation capacity and the associated costs, especially in technologically advanced environments. Research has highlighted the challenges and opportunities faced by firms in advanced technological landscapes concerning innovation investment and expenditure (García-Quevedo & Pellegrino, 2018). Studies have utilized proxies such as interest rates, financial sources availability, and access procedures to assess financial barriers to innovation (García-Quevedo & Pellegrino, 2018).

Furthermore, differences between small and large companies in terms of resources, capabilities, motivations, and strategies influence their perception of innovation obstacles. SMEs, in particular, face unique challenges related to the external environment, human resources, and economic risks. Factors such as market characteristics, infrastructure, human resource qualifications, and economic risks play crucial roles in shaping innovation behaviour and performance among SMEs (Eichner, 2015).

Moreover, uncertainties in the external environment, human resources, and finance significantly affect innovation outcomes in SMEs, especially in developing countries (Hölzl & Janger, 2014). Challenges related to sustainability integra-

tion into business operations, including the lack of financial resources, time, staff, technical expertise, and organizational structures, further compound innovation barriers for SMEs (Nicholas et al., 2011).

In fostering an innovation culture, SMEs often invest resources, particularly managerial time, to encourage frequent product and service introductions. Additionally, intensive cooperation with partners facilitates knowledge sharing and the creation of new knowledge, thereby promoting valuable innovations (Panayides, 2006). Despite the recognition of the importance of innovation for business success, there is still a lack of universally applicable strategies for enhancing creativity and innovation over the long term (Holzmann & Golan, 2016).

2.1. Theoretical Framework

2.1.1. Industrial Economics in the Context of Food Processing SMEs

Arrow's seminal work, as discussed by Solow (1957), explores the allocation of resources for invention under uncertainty. In the case of Food Processing SMEs operating in Lusaka's Industrial Area, characterized by financial constraints, a free enterprise (perfectly competitive) economy might face challenges in investing adequately in invention and research due to inherent risks. The possibility of limited product appropriation and increasing returns in use further complicates this scenario. Emphasizing the financial constraints specific to SMEs in the food processing sector, it becomes crucial to recognize that these enterprises may underinvest in innovation.

Further, in the context of Food Processing SMEs, the monopoly power dynamic acts as a disincentive to innovation compared to perfect competition. This highlights the potential impact of external support, specifically government intervention, as a means to address financial constraints and stimulate Research and Development (R&D) activities within these SMEs. The firm's private considerations, distinct from social benefits, underscore the need for external intervention to align private and social interests in the pursuit of innovation.

The size of the firm emerges as a critical factor in the innovative performance of Food Processing SMEs. While large firms can achieve scale economies, diversify, and develop market reputation, the efficiency gains due to size may plateau after a certain extent. Recognizing the financial constraints faced by SMEs, it becomes imperative to explore how external support, particularly in the form of government intervention, can offset these constraints and foster a conducive environment for innovation within the food processing sector.

2.1.2. Evolutionary Economics: Internal Dynamics and Environmental Factors

In contrast to neoclassical theories, evolutionary economics aligns with Schumpeter's dynamic vision of the financial world (Śledzik, 2013). In the specific context of Food Processing SMEs in Lusaka's Industrial Area, where innovation is a critical factor for growth and sustainability, evolutionary economics takes on

added significance. Unlike viewing innovation as an exogenous force, evolutionary economics considers it as an endogenous process shaped by internal dynamics and environmental factors.

For Food Processing SMEs, the internal dynamics encompass the firm's organizational structure, culture, and strategic approach to innovation. Moreover, the environment in which these SMEs operate is vital. In the food processing sector, considering the literature on innovation methods (Edquist, 1997; Lundvall, 1992), it becomes evident that both internal and external factors play a crucial role in influencing the innovation capacity of SMEs.

2.2. Conceptual Framework

The conceptual framework for this study is illustrated in **Figure 1**, which depicts the relationships between the outcome variable (innovation capacity) and the explanatory variables (availability of funds, costs of innovation, market dominance, and demand uncertainties). The framework highlights how these variables interact to influence the innovation capacity of Food Processing SMEs in Lusaka's Industrial Area.

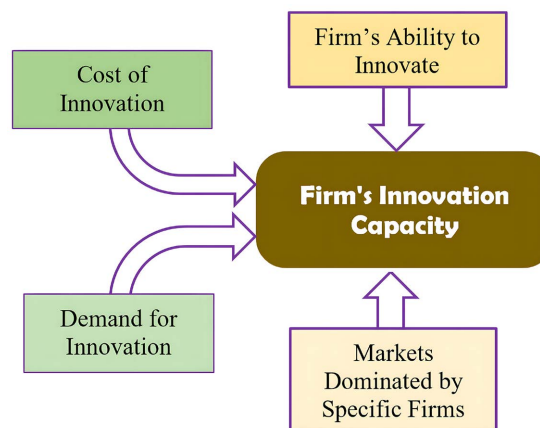


Figure 1. Conceptual framework.

This conceptual framework serves as a guide for understanding the dynamics that impact innovation capacity among SMEs in the food processing sector. It illustrates the hypothesized relationships that were explored in the study, providing a structured approach to analysing the barriers and facilitators of innovation within this context.

3. Methodology

The study employed a cross-sectional design utilizing quantitative methods. It adopted a quantitative survey approach to gather current data on innovation in the food processing industry. This non-experimental design was suitable for the study as it aimed to understand the determinants of innovation through the application of statistical tools.

As of recent data, there are approximately 1500 food processing businesses in Zambia, with about 300 of these being SMEs located in Lusaka (TechnoServe, 2020; FAO, 2019; Blekking et al., 2017; BRR, 2023; PACRA, 2023). Applying the Cochran formula (Conchran, 1997) to determine the sample size from the unknown population works out as follows:

$$n = n_0 / 1 + (n_0 - 1) / N \quad (1)$$

where “ n ” is the adjusted sample size, “ n_0 ” is the recommended Cochran sample size, and “ N ” is the population. Our recommended Cochran sample “ n_0 ” is 150. Thus,

$$\begin{aligned} n &= 150 / (1 + (150 - 1) / 300) \\ n &= 150 / 1.50 = 100 \text{ Sample size.} \end{aligned}$$

Probability sampling was used to select the sample from the target population and employed a structured questionnaire as an instrument of data collection. $K^{\text{th}} = N/n$, where “ N ” is the population sample, and “ n ” is the sample size obtained from the Cochran Formula (Conchran, 1997). $K^{\text{th}} = 300/100 = 3$ implying that every 3rd SME was selected. In descriptive studies, a sample of 30 per cent of the population is acceptable. The study targeted a 50 per cent threshold in computing sample size to achieve a strong representative sample. This translated into 100 respondents considering the estimated population of 300 SMEs in the informal economy operating in the Lusaka industrial area.

Data was coded from the questionnaire, entered into a spreadsheet and after that, exported for analysis to SPSS version 25. The analysis was conducted in three stages; the first stage involved univariate analysis in which frequencies and percentages were drawn for individual variables of the study in table and graph formats; the second stage was bivariate in which the researcher used the cross-tabulations and correlations to understand the associations among the key variables and thirdly the logistic regression was used to report the odds ratio and p -values in an attempt to measure the effects of each independent variable on the dependent variable.

Logistic Regression Model

The study developed the following multiple regression model:

$$Y_i = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + u \quad (2)$$

where Y_i represents the firm’s innovation capacity (the dependent variable); X_1 represents demand for innovation; X_2 represents the cost of innovation; X_3 represents the firm’s ability to innovate; and X_4 represents markets dominated by specific firms. The term “ u ” is the error term. B_0 is the intercept, while B_1 , B_2 , B_3 , and B_4 are the coefficients of the explanatory variables.

A logistic regression model was used to analyse the relationship between the ability to innovate and determinants of innovation in the food processing sector in Lusaka. The determinants of innovation were estimated as parameters at a 95% confidence interval, with the statistical level of significance set at 0.05. The

analysis included all variables in the model using systematic variable selection; any variable in the model with a significance level of less than 0.05 was regarded as a determinant of innovation.

4. Results

4.1. Demographics

Table 1 illustrates the age distribution of respondents in the study. The majority of respondents, comprising 43%, fell within the age range of 20 to 30 years. Additionally, 20% of respondents were aged between 31 to 40 years, 17% were aged between 41 to 50 years, 12% fell within the age group of 51 to 60 years, and 3% were above 60 years old. Notably, 5% of respondents did not disclose their age.

Table 1. Age of respondents.

Age distribution		
Age Groups	Frequency	Percentage
20 years - 30 years	43	43
31 years - 40 years	20	20
41 years - 50 years	17	17
51 years - 60 years	12	12
Above 60 years	3	3
Did not disclose	5	5

Mean age = 35.93, Median Age = 32.00, Modal age = 27, Minimum age = 20 and Maximum age = 71.

Table 2. Respondents level of education.

Level of education		
Education Level	Frequency	Percentage
Grade 12 (School Leaver) Certificate	14	14
Crafts Certificate	8	8
Diploma	38	38
Degree	22	22
Masters	12	12
PhD	2	2
Other	4	4
Total	100	100

Table 2 presents the highest level of education achieved by the research participants. Among the respondents, 38% reported attaining Diplomas, while 22% indicated having obtained Degrees. Additionally, 14 respondents reported having at least a Grade 12 (School Leaver) Certificate, and 12 respondents stated

having attained a Master's Degree. Furthermore, 8 respondents reported holding Crafts Certificates, and 2 respondents mentioned possessing a Doctor of Philosophy (PhD) qualification. A small portion, constituting 4% of the respondents, indicated other forms of qualifications.

4.2. Profitability Status of Organization

Table 3 presents the responses regarding the profitability status of the organizations where the respondents are employed. Among the respondents, 28% indicated that their organizations had made profits over the last three months, while 24% reported that their companies had broken even during the same period. Additionally, 25% revealed that their respective organizations had incurred losses but also generated some profits in the previous three months. Moreover, 20% of the respondents were uncertain about the profitability status of their organizations during the specified timeframe, while 3 respondents mentioned that the organizations they worked for had experienced losses in the same period. Understanding the profitability of an organization is crucial as it can significantly impact its ability to undertake innovations.

Table 3. Profitability status of organization.

	Profitability status of organization		
	Frequency	Percentage	Cumulative
We made profits	28	28	28
We broke even	24	24	52
We made losses	3	3	55
I am not sure	20	20	75
We have incurred losses and profits	25	25	100

4.3. Financial Status Affecting Innovation

The results presented in **Figure 2** show the responses for how much respondents agreed to the notion that their organization's financial status affected its ability to come-up with (innovate) new products and services. 43% and 21% of the respondents agreed and strongly agreed to this notion respectively. 18 respondents were not in support of this notion with 14 disagreeing to the notion and 4 strongly disagreeing. The remaining 18 respondents (18%) remained neutral as they were not sure on whether to support the notion or not.

4.4. Sources of Funds for Innovation

The researcher investigated the funding sources for innovations within these organizations, as depicted in **Figure 3**. The majority of respondents (46%) cited profits generated from the core business as the primary funding source for innovative projects. Additionally, 16% indicated that funds came from profits

generated by selling other goods or services, not necessarily the core product. Another 15% relied on financial institutions such as banks for funding, while 14% accessed grants from NGOs or other interested parties. Nine respondents were uncertain about the primary funding source for innovation within their organizations.

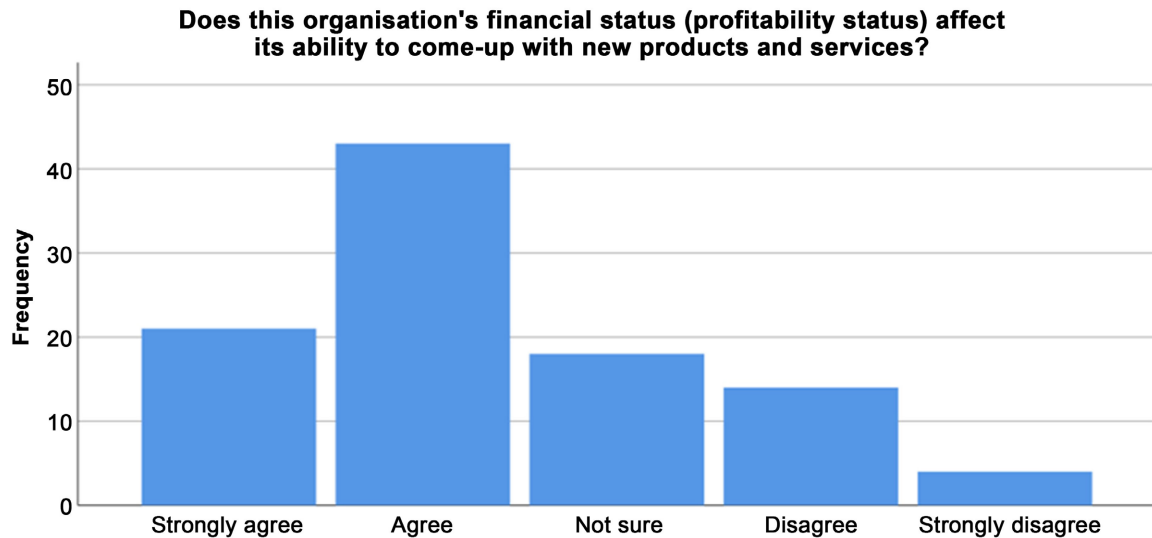


Figure 2. Financial status affecting innovation.

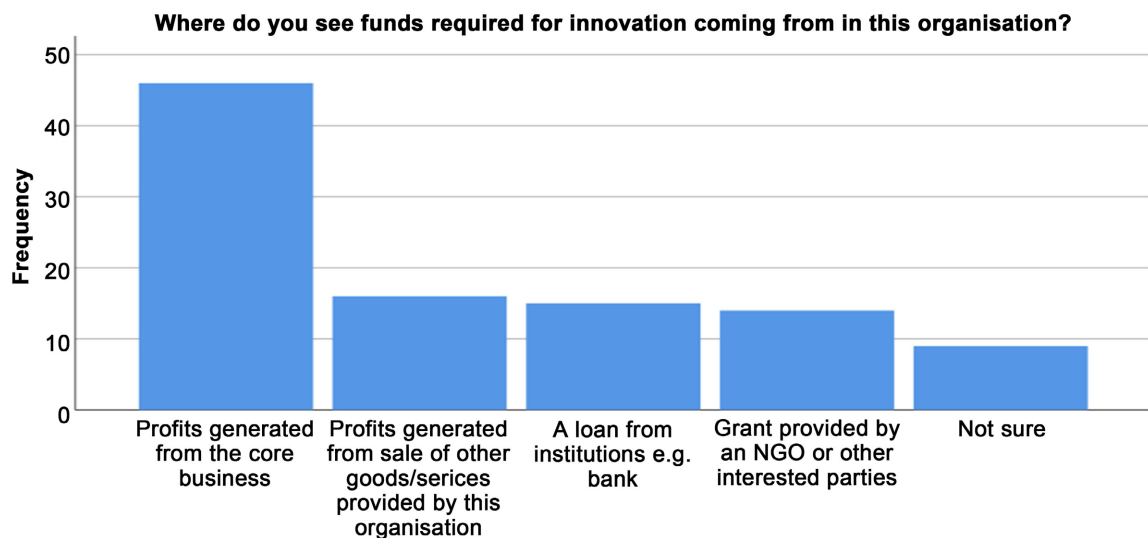


Figure 3. Source of funds for innovation.

4.5. Organisation Ever Invented a New Product

As illustrated in **Figure 4**, respondents were asked to report whether their organization had introduced a new product. The results show that 48% of the respondents confirmed that their organization had developed a new product previously, while 37% reported that their organizations had not. The remaining 15% expressed uncertainty regarding whether their organization had introduced

a new product in the past.

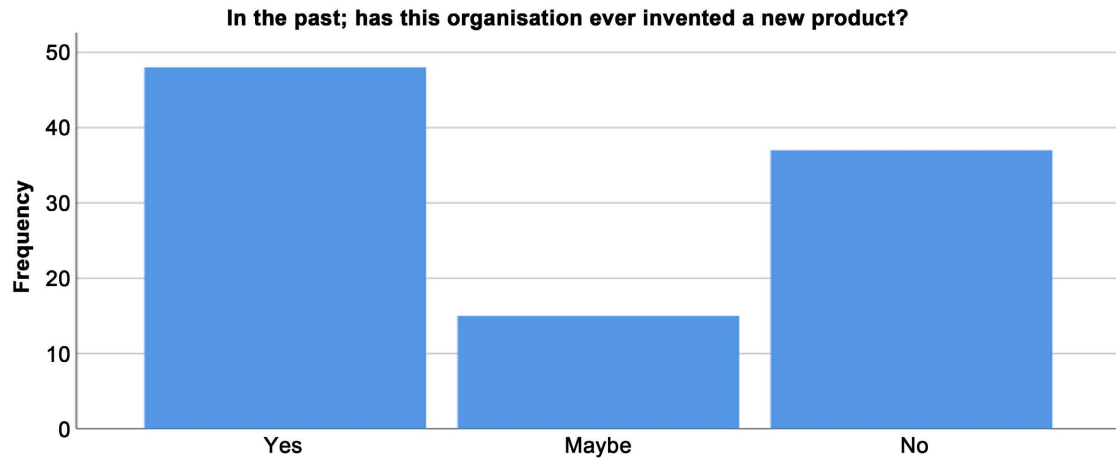


Figure 4. Organisation ever invented a new product.

4.6. Organisation's Capacity to Innovate

Table 4 presents the study's findings on the organizations' innovation capacity. It was found that 32 respondents reported a high level of innovation capacity within their organizations, while an additional 27 indicated the capacity was at its highest. Another 29 respondents provided a neutral rating regarding their firms' innovation capacity. The remaining 12 participants expressed that their firms had low capacities for innovation.

Table 4. What is this organisation's capacity to innovate?

Capacity to innovate 1 - 5	Frequency	Percentage	Cumulative Percentage
1	5	5.0	5.0
2	7	7.0	12.0
3	29	29	41.0
4	32	32	73.0
5	27	27	100
Total	100	100	

4.7. Organization's Stance to Innovate

Table 5 illustrates the responses regarding organizations' perspectives on their ability to innovate and how this is influenced by market demand uncertainty for innovation. Among the respondents, 35% stated that market demand uncertainty had no impact on their organization's ability to innovate. On the other hand, 36% of respondents believed that market demand for innovation significantly affected their organization's stance on innovation ability, with 23 indicating a high effect and 13 indicating the highest effect. The remaining 29 respondents perceived it to have a lesser effect, with 18 indicating a low effect and 11 indicating the lowest effect.

Table 5. Rating the organization's stance to innovate.

On a scale of 1 to 5 where 1 is lowest and 5 is highest; rate this organisation's stance on ability to innovate being affected by uncertainty for demand for the innovation on the market?			
	Frequency	Percentage	Cumulative Percentage
1	11	11.0	11.0
2	18	18.0	29.0
3	35	35.0	64.0
4	23	23.0	87.0
5	13	13	100.0
Total	100	100	

Mean = 3.09, Median = 3.00, Standard Deviation = 1.173 and Variance = 1.376.

4.8. Effects of Challenges of Innovation

The study aimed to discern the primary challenges faced by respondents' organizations in innovation and their corresponding impacts. **Table 6** presents the outcomes of this investigation. Respondents identified lack of resources/capacity and lack of funds as the major factors significantly impacting innovation. Additionally, respondents noted the absence of a clearly defined process as a hindrance to innovation within their organizations. Conversely, challenges such as lack of leadership and fear of failure appeared to have comparatively minimal impact on innovation within the organizations.

Table 6. Rating the extent to which each of the challenges affects innovations [Fear of failure].

		Fear of Failure	Lack of Funds	Lack of Leadership	Lack of Resource/Capacity	No Time	No Clear Process
	Large extent	15	41	12	46	11	13
	Moderate extent	23	37	26	33	44	27
	Not affected	48	16	46	11	32	45
	Lower extent	3	0	4	2	2	5
	Lowest extent	2	0	2	1	2	
	Total	91	94	100	93	91	90
Missing	-1	9	6		7	7	10
	Total	100	100.0	100	100	100	100

4.9. Organisation Lack of Funds and Innovation Capacity of the Firm

Table 7 shows the results of a cross-tabulation analysis between the financial status (profitability) of companies over the last three months and how this financial status influences the firms' ability to innovate or introduce new products. The analysis revealed a chi-square test statistic or *P*-value of 0.035, indicat-

ing a statistically significant relationship between a firm's financial status and its capacity for innovation in terms of new product development. Notably, the majority of respondents who reported that their companies had been profitable also affirmed that their firm's financial status significantly enhanced its ability to introduce new products.

Table 7. Lack of funds and innovation capacity of the firm.

<i>What is the profitability status in the last three months of this organisation?</i>	Does this organisation's financial status (profitability status) affect its ability to come up with new products and services?					Total
	Strongly agree	Agree	Not sure	Disagree	Strongly disagree	
We made profits	10	13	0	4	1	28
We broke-even	4	15	3	2	0	24
We made losses	0	1	1	0	1	3
I am not sure	2	2	10	6	0	20
We have incurred losses and profits	5	12	4	2	2	25
Total	21	43	18	14	4	100

4.10. Organisation's Financial Status and Innovation Capacity of the Firm

The researchers examined whether an organization's financial status in the recent months influenced its ability to innovate, particularly in terms of inventing new products. The results presented in **Table 8** indicate a p -value of 0.95, suggesting no significant relationship between these two variables.

Table 8. Organisation's financial status and innovation capacity of the firm.

<i>What is the profitability status in the last three months of this organisation?</i>	In the past; has this organisation ever invented a new product?			Total
	Yes	Maybe	No	
We made profits	16	5	7	28
We broke-even	11	0	13	24
We made losses	0	1	2	3
I am not sure	6	6	8	20
We have incurred losses and profits	15	3	7	25
Total	48	15	37	100

The table presents the distribution of responses based on the profitability status of organizations and whether they have ever introduced a new product in the past. The p -value of 0.95 suggests that there is no significant association between an organization's financial status and its innovation capacity, particularly in terms of new product invention.

4.11. Profitability Status and Innovation Capacity of the Firm

The researchers investigated the correlation between an organization's profitability status over the last three months and its choice of funding for innovation. **Table 9** presents the cross-tabulation results, indicating a test statistic value (p -value) of 0.673. This value suggests that there is no significant relationship between the funding sources for innovation and the recent short-term financial performance of the organization.

Table 9. Profitability status and innovation capacity of the firm.

<i>What is the profitability status in the last three months of this organisation</i>	Where do you see funds required for innovation coming from in this organisation?					Total
	Profits generated from the core business	Profits generated from sale of other goods/ services provided by this organisation	A loan from institutions e.g. bank	Grant provided by an NGO or other interested parties	Not sure	
We made profits	14	6	4	3	1	28
We broke-even	9	4	7	4	0	24
We made losses	0	0	1	2	0	3
I am not sure	8	2	1	3	6	20
We have incurred losses and profits	15	4	2	2	2	25
Total	46	16	15	14	9	100

The table illustrates the distribution of responses regarding the profitability status of organizations and the sources of funds for innovation. The p -value of 0.673 indicates no significant association between profitability status and the choice of funding for innovation in the organizations surveyed.

5. Discussion

The findings of this study highlight several critical aspects concerning innovation capacity among food processing SMEs in Lusaka's industrial area in Zambia.

Firstly, the majority of respondents fell within the age range of 20 to 30 years, indicating a relatively young workforce in the sector. This demographic trend aligns with global patterns showing a growing interest among young entrepreneurs in the food industry (Humphrey, 2019). This young demographic is significant as younger entrepreneurs often bring fresh perspectives and are more inclined to adopt innovative technologies (Kaplan et al., 2016).

Secondly, regarding education level, the study revealed a diverse range of qualifications among respondents, with the majority holding diplomas or degrees. This finding underscores the importance of education in preparing individuals for entrepreneurship and innovation in the food processing sector (Olanya et al., 2020). The link between educational attainment and innovation

capacity is well-documented, as higher education levels typically enhance critical thinking and problem-solving skills, which are essential for innovation (Stephan, 2018).

Thirdly, concerning profitability, a significant portion of the organizations surveyed reported making profits or breaking even in the previous three months. However, a notable proportion indicated uncertainty about their financial status, reflecting the volatile nature of the business environment (Bakker et al., 2021). This uncertainty underscores the challenges SMEs face in maintaining financial stability, which is crucial for sustaining innovation activities (Coad et al., 2016).

Fourthly, the study found a strong association between a firm's financial status and its innovation capacity. Organizations that reported profitability were more likely to have higher innovation capacities, highlighting the critical role of financial resources in fostering innovation (Coad et al., 2019). This aligns with previous literature that emphasizes the importance of financial health in enabling firms to invest in new technologies and innovative processes (Brown et al., 2020).

Fifthly, regarding sources of funds for innovation, profits generated from the core business emerged as the primary funding source. This finding underscores the importance of self-sustainability in driving innovation within SMEs (Doern et al., 2018). It also aligns with the broader literature suggesting that internally generated funds are often more reliable and flexible than external financing, which may come with conditions or constraints (Beck et al., 2006).

Lastly, the study identified various challenges hindering innovation in the food processing sector, including lack of resources, funds, and a clear innovation process. Addressing these challenges is crucial for enhancing innovation capacity and fostering growth in the sector (Goworek et al., 2020). These barriers are consistent with those identified in other studies of SMEs in developing countries, where resource constraints and inadequate infrastructure often impede innovation (Robson et al., 2008).

The findings of this study contribute to the existing literature by providing insights into the factors influencing innovation capacity among food processing SMEs in Lusaka's industrial area, focusing on the relationship between financial status, funding sources, and organizational ability to innovate. The study also underscores the importance of addressing financial constraints, promoting self-sustainability, and creating an enabling environment for innovation to thrive in the sector. Future research will further explore the interplay between these factors and innovation capacity, potentially incorporating longitudinal data to assess changes over time.

6. Conclusion

In conclusion, this study investigated innovation capacity among food processing SMEs in Lusaka's industrial area, focusing on the relationship between financial status, funding sources, and organizational ability to innovate. The findings highlight several key aspects. Firstly, financial resources play a crucial role in driving innovation, with profitability being strongly associated with higher

innovation capacities. Secondly, the primary funding source for innovation was found to be profits generated from the core business, underscoring the importance of financial self-sustainability.

The study also identified significant challenges hindering innovation, such as a lack of resources, funds, and a clear innovation process. Addressing these challenges is essential for enhancing innovation capacity and fostering growth in the food processing sector. Future efforts should include targeted financial support, capacity-building programs, and policy interventions aimed at reducing barriers to innovation.

Moving forward, it is imperative for policymakers, industry stakeholders, and SMEs to collaborate to create an enabling environment for innovation to thrive. Such collaboration will drive economic development, promote sustainable growth, and ensure that Zambia's food processing industry remains competitive in the global market.

7. Recommendations

Based on the findings of this study, the following focused recommendations are proposed to enhance innovation capacity among food processing SMEs in Lusaka's industrial area, Zambia:

- 1) Establish financial programs specifically designed for young entrepreneurs (ages 20 - 30) in the food processing sector to mitigate financial uncertainty and foster innovation.
- 2) Develop and implement specialized training initiatives that build on the existing educational levels (diplomas and degrees) of the workforce, focusing on advanced product development, marketing strategies, and technology adoption.
- 3) Introduce systems and tools for SMEs to better monitor and manage their financial performance, reducing uncertainty and enabling more strategic investment in innovation activities.
- 4) Promote practices and business models that help SMEs reinvest profits into innovation, ensuring long-term sustainability and reduced reliance on external funding sources.
- 5) Address specific challenges identified in the study, such as the lack of clear innovation processes, by providing resources and frameworks that support structured innovation efforts.

8. Limitations and Future Research

This study has several limitations that should be acknowledged. Firstly, the research focused solely on food processing SMEs in the Lusaka industrial area, limiting the generalizability of the findings to other regions or industries. To address this, we employed stratified sampling within the Lusaka industrial area to ensure representation across various types of SMEs. Secondly, the study relied on self-reported data, which may be subject to biases and inaccuracies. To mitigate this, we used triangulation by combining survey data with interviews and

secondary data sources to enhance the validity and reliability of the findings.

Future research could overcome these limitations by employing a larger sample size, using multiple data collection methods, and expanding the scope to include a broader range of industries and geographical areas. Additionally, longitudinal studies could be conducted to assess the long-term impact of interventions aimed at enhancing innovation capacity among SMEs in the food processing sector. Such approaches would provide a more comprehensive understanding of the factors influencing innovation capacity and help validate the current study's findings over time.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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