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The Effect Of Process Innovation Strategies On The Performance Of Manufacturing Firms In Malawi

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Abstract: ***This study examined the effect of process innovation strategies on the performance of manufacturing firms in Malawi. The study used the descripto-explanatory research design. A stratified random sample of 197 manufacturing firms was drawn from a population of 388 licensed and registered manufacturing firms using stratified random sampling. Data were collected from owners and managers of manufacturing firms using structured questionnaires. Data analysis was conducted using SPSS software program version 28.0. Both descriptive and inferential statistical analyses were done. In the descriptive statistical analysis, frequencies, percentages, mean scores and standard deviation were used. In the inferential statistical analysis, the study used linear regression to examine the effect of process innovation strategies on the performance of manufacturing firms in Malawi. The findings showed that process innovation strategies had a positive and significant effect on the performance of manufacturing firms in Malawi. Manufacturing firms that implemented process innovation strategies registered a greater performance in terms of sales growth than the manufacturing firms that did not implement process innovation strategies. The study recommends that manufacturing firms should embark on process innovation strategies to increase their performance. They should invest in new manufacturing processes or improve the existing processes. Manufacturing firms need to invest in process innovations as such innovations help the firms not only to reduce production costs but also to increase efficiency, quality, customer satisfaction and competitiveness.***

Keywords: Innovation, Process Innovation strategies, Performance, manufacturing firms.

I. INTRODUCTION

Most developed countries transformed their economies and achieved a high level of economic development through manufacturing (World Bank, 2024). According to United Nations Industrial Development Organization (UNIDO), manufacturing plays a fundamental role in driving economic prosperity by creating jobs, incomes, innovations and multiplier effects which in turn ignite other parts of the economy (UNIDO, 2024). It also improves the balance of trade by processing goods for export and replacing imports.

Globally, according to Word Bank (2025), manufacturing sector contributes significantly to the gross domestic product (GDP) and exports of developed countries. For example, in 2023, the sector contributed 15 % to the GDP of developed countries and 67 % to the exports of developed countries (World Bank, 2025). Thus, manufacturing plays a pivotal role in the economic development of industrialized countries.

Similarly, in Sub-Saharan Africa, the manufacturing industry positively contributes to the region's economic growth. In 2023, for example, manufacturing contributed 11 % to the GDP of the region and 22 % to the exports of the region (World Bank, 2025). In Malawi, manufacturing sector accounted for 9 % to the GDP in 2023 and contributed 8 % to the country's exports in 2023 (World Bank, 2025).

However, most developing countries have experienced a marked decline and fluctuating growth rates in their manufacturing output since 2005 (World Bank, 2024). The manufacturing industry in Malawi has equally faced a decline in the output and its contribution to the GDP. For example, Malawi's manufacturing sector's contribution to GDP in 2023 was 9 % and its highest value was recorded in 1992 at 19.05% (World Bank, 2025).

Thus, despite the contribution manufacturing firms in Malawi make to the economic growth through exports, GDP and employment, their output is on the decline. This is attributed to the challenges they face in their business environment. According to Kawira (2021) business firms experience increasing levels of uncertainty due to rapid changes in operating environment and hence the need for more innovative approaches. In other words, manufacturing firms have to innovate to spur their performance and overcome some of the challenges they face.

Schumpeter (1934) as cited in Langroodi (2021) defines innovation as "the introduction of a product which is new to consumers or one of higher quality than existing products, new methods of production, the opening of new markets, the use of new sources of supply and new forms of competition, that lead to the restructuring of an industry". The Organization for Economic Co-operation and Development (OECD) defines "innovation as the implementation of a new or significantly improved product or process, or a new marketing method, or a new organizational method" (OECD, 2018).

Dimensions of innovation include product innovation, process innovation, marketing innovation and organizational innovation. A process innovation is the implementation of a new or significantly improved production method or delivery method. This includes significant changes in techniques, equipment and software (OECD, 2018; Saka, 2021). Process innovations can be intended to decrease unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products (OECD, 2018; Ekeh, 2023). This implies that process innovation helps to retain product functioning while cutting production costs.

Process innovation strategy is a long term plan an organization puts in place to implement new processes, new methods and new techniques to achieve superior firm performance. According to Taouab and Issor (2019), firm performance refers to how organizations efficiently and effectively use resources to develop capabilities in order to meet their objectives. Firm performance can be measured in terms of return on investment, sales volume, profitability, total assets, employment size, capital employed and market share among others (Taouab et al., 2019). Sales growth, as an indicator of business performance, is usually easier as compared to other indices (Taouab et al., 2019). Business owners often view sales as the key performance indicator.

Firms implement process innovation strategies with the aim of increasing efficiency and productivity (Saka, 2021), thereby improving firm performance. According to OECD (2018), firms also use process innovations to increase quality, to produce or deliver new or significantly improved products. Changing various aspects of a company's processes optimizes product development and helps to improve quality (Matitz & Chaerki, 2020). An increase in quality implies enhanced customer satisfaction and hence increase in the market share.

Malawi's economy is characterized by low levels of industrialization. According to Malawi Confederation of Chamber of Commerce and Industry (2025), the manufacturing sector remains relatively small and underdeveloped. Several manufacturing firms in Malawi are less innovative and remain uncompetitive due to their low levels of investment in innovation systems and new technologies (Mweta & Suwadi, 2021; World Bank, 2024). Many manufacturing firms in Malawi lack financial resources to innovate their processes. They have inefficient processes and use old outdated production technology to produce goods (MCCCI, 2025). Major firms within the sector include textiles, footwear, clothing, Agro-processing, beverages, food processing, steel and building materials (cement and joinery) as well as furniture (MCCCI, 2025).

Manufacturing firms in Malawi contribute to the economic growth of the country through GDP, exports and employment generation. According to World Bank (2025), for example, the manufacturing sector in Malawi contributed 8 % to the country's exports in 2023. Similarly, the sector accounted for 9 % of Malawi's total GDP in 2023. However, despite this contribution, manufacturing firms in Malawi are stagnant and have registered dismal performance in the past decade (Mkwambisi, Muyanga, Amedie, Makocho, Lifeyo and Khomba, 2020). In fact, manufacturing annual growth rate has dwindled from 7.6 % in 2019 to 4.7% in 2022 and 0.8 % in 2024 (Reserve Bank of Malawi, 2025). The manufacturing sector's contribution to GDP has been declining over the years and has fallen from 19.05% in 1992 to 9 % in 2023 (World Bank, 2025). This contribution is below the Malawi Growth and Development Strategies (MGDS) III target of 25% (Malawi Government, 2021).

The decline in manufacturing production and the dismal performance of manufacturing firms are attributed to various challenges these firms face. The challenges include high cost of finance, high tax rates, volatile macroeconomic environment, limited technology and stiff competition (MCCCI, 2025). Consequently, manufacturing production has markedly fallen as evidenced from the closing down of several manufacturing firms in the last decade citing lack of profitability on account of high costs of operations (Malawi Government, 2021). According to Saka (2021), firms should innovate to overcome some of the challenges they face and to survive and compete in a dynamic business environment. This implies that manufacturing firms in Malawi can invest in process innovations to solve some of the problems they face and spur their performance.

The relationship between process innovation and firm performance has been investigated in other countries (Yego Sang & Kibet, 2021), especially in developed countries. Although several previous studies were conducted in other

countries on the relationship between process innovation and firm performance, little attention has been paid to the effect of process innovation strategies on the performance of manufacturing firms with firm size as a moderating variable; hence the need for this study. Therefore, the main objective of the study was to investigate the effect of process innovation strategies on the financial performance of manufacturing firms in Malawi.

II. LITERATURE REVIEW

A. SCHUMPETERIAN THEORY OF INNOVATION

Schumpeter's theory posits that innovation occurs when the entrepreneur introduces a new product or a new production system, open a new market, discover a new source of raw materials or introduce a new organization into the industry (Langroodi, 2021). According to the theory, entrepreneurship is about combining resources in a new way such as introducing new products, new method of production, identify new source of raw materials or inputs and setting a new standard either in the market or the industry (Sledzik, 2020). This implies that innovators carry out new combinations of factors of production and introduce new products and new processes. In other words, innovation, according to Schumpeter includes the launch of a new product or modification of an already existing product; the application of new methods of production, opening of a new market; use of new sources of supply or raw material and the creation of a new industry structure (Henrekson, Karna & Sanandaji, 2022).

According to Schumpeter, innovation involves the process of "creative destruction" which creates wealth through the disruption of existing firms by the introduction of new products or new processes (Langroodi, 2021). Creative destruction involves the process of industrial mutation in which firms revolutionize the economic structure from within, by destroying the old one and creating a new one (Langroodi, 2021). In 'creative destruction' firms innovate by using the resources to create something new and innovative for customers. This means that firms use innovation as a tool or mechanism to create new processes or significantly improve their processes.

Schumpeter believed that innovation is the driver of competitiveness, profitability and firm growth. According to Schumpeter, innovation, however, does not necessarily mean inventing new products that have never existed but also entails new processes or new methods of doing things, combining methods or processes in order to make different products as well as making use of existing resources to make new products and adapting to new technology (Langroodi, 2021).

Schumpeterian theory of Innovation has been used by several researchers such as Kawira (2021) and Kimathi, Mukuru and Odhiambo (2019) to show how innovation enhances firm profitability. Schumpeter's theory of innovation informs the current study of the fundamental role of innovation in firm performance. It highlights how manufacturing firms can use innovation to enhance firm competitiveness, profitability and firm growth. The theory also informs the current study of the various types of innovation that manufacturing firms can use to create value. These types of innovation include process innovation which is the main independent variable of this study.

B. PROCESS INNOVATION

A process innovation entails the implementation of a new or significantly improved method of production or delivery (OECD, 2018). This implies that process innovation denotes any form of innovation in technology, techniques, equipment, tools, machines, system and procedures that transform inputs into outputs in an organization. Thus, process innovation involves implementing a new or significantly improved process of production.

With regard to the manufacturing operations, process innovation entails improved or new manufacturing methods, devices, techniques, and information in creation of a product (Matitz et al., 2020). Thus, it is the development of a firm's manufacturing processes. This involves a number of heterogeneous activities such as introduction of equipment, new management practices, and changes in the production process (Matiz, et al., 2020). Process innovation involves rethinking an entire process or considerably improving a segment of the process. It entails the reengineering and improvement of the internal functioning and capabilities of business processes (Yego, Sang & Kibet, 2021). This implies that process innovation is concerned with redesigning and improving the internal operation of the business processes. In manufacturing firms, process innovation can, therefore, simply be new or improved techniques, tools, devices, and knowledge.

Process innovation strategy is a long term plan an organization puts in place to implement new processes, new methods and new techniques to achieve superior performance and competitive advantage. Firms implement process innovation strategies with the aim of increasing efficiency and productivity (Saka, 2021). Automation in the production methods, for example, has increased the efficiency and productivity of the manufacturing firms (Von Krogh, Netland, and Wörter, 2018). Von Krogh et al. (2018) notes that process innovation helps to retain product functioning while reducing the cost of production. Thus, managers of manufacturing firms can use process innovation strategies to decrease not only unit costs of production but also the cost of delivery. According to OECD (2018), organizations can also use process innovations to increase quality, to produce or deliver new or significantly improved products. Changing various aspects of a company's processes optimizes product development and helps to improve quality (Matitz et al., 2020). An increase in quality implies enhanced customer satisfaction and hence increase in the market share (Ekeh, 2023).

Manufacturing firms implement process innovation strategies to achieve competitive advantage. Process innovation can slow down competitors by giving the manufacturing firms advantages such as cost efficiency, production speed, and quality consistency (Faturachman, 2023; Ekeh, 2023; Najaf-Tavan, 2020).

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C. THE EFFECT OF PROCESS INNOVATION ON FIRM PERFORMANCE

At the global level, several empirical studies have investigated the relationship between process innovation and firm performance. However, the findings are inconsistent as some studies found that process innovation positively influence the firm performance (Vukovic, Dukic, Urosevic & Ilic, 2025; Faturachman, 2023; Fatah & Amin, 2023; Canbul & Cemberci, 2023; Seclena-Luna, Fernandez & Cancino, 2023; Alkhawadeh, 2020; Herlinawati and Machmud, 2020). In contrast, other studies such as Canh Liem, Thu & Khuong (2019) and Mahmutaj and Krasniqi (2020) found that process innovation does not positively affect firm performance.

Process innovation helps the firms to achieve efficiency in their operations and this in turn spur the firm performance (Seclena-Luna et al., 2023; Crowley, 2019; Kowo et al., 2019; Najafi-Tavan, 2020). Consistent with this observation is the finding of Seclen-Luna, Fernandez and Cancino (2023) study in Peru. Seclena-Luna et al. (2023) observed that process innovation positively influences the performance of manufacturing firms in Peru as it increases the firms' productivity through increasing efficiency. Similarly, Vukovic et al. (2025) observed that process innovation positively affects firm performance as it enhances cost efficiency and operational effectiveness.

Process innovation helps the firms to achieve efficiency in their operations and this in turn spur the firm performance (Najafi-Tavan, 2020). Similarly, Herlinawati et al. (2020) found that process innovation positively affects the performance of SMEs. Continuous innovation in processes helps firms to survive and operate more efficiently and more profitably (Herlinawati et al., 2020). When businesses use optimum processes, such as manufacturing items at the lowest feasible cost, it helps firms to enhance their profit margins and achieve a competitive edge (Torfing, 2019). The findings suggest that managers of manufacturing firms can use the process innovation strategies to increase their efficiency and profitability.

Similarly, manufacturing firms can use process innovation to make their systems more productive and flexible thereby enhancing efficiency and profitability (Matitz et al. 2020). This observation is supported by Alkhawadeh (2020) study which examined the impact of innovation on the profitability of service companies in Jordan. The results indicated that process innovation positively and significantly contributes to the profitability of Jordanian companies. Process innovation attempts, efforts and activities should target efficiency to ensure the rational utilization of resources and target effectiveness to maximize performance (Alkhawadeh, 2020). This implies that process innovation helps to increase organizational efficiency and effectiveness thereby maximizing the firm performance.

In the same vein, Al-Battaineh (2018) in his study on the effect of innovation strategies on the functional performance of firms in Hassan Industrial city in India found that process innovation has positive and significant influence on increasing firm performance. Thus, managers should focus on innovative ways and innovative organizational methods in order to improve the firm performance. Firms should identify resources and embark on technologies that contribute to the improvement of creative processes (Al-Baittaneh, 2018). Such technologies result in cost reduction in the long term. In other words, process innovation helps the firms to lower the cost of production.

Likewise, Faturachman (2023) observed that process innovation positively affects firm performance (ROA) as it enhances the firm's competitiveness. The study observed that process innovation activities help companies to improve their performance by creating production processes different from competitors. Process innovation also enables companies to survive and succeed in environmental uncertainty (Faturachman, 2023).

On the contrary, the study conducted by Kim-Soon, Ahmad, Kiat, and Sapry (2017) shows the opposite results. Kim-Soon et al. (2017), observed that process innovation is not significantly related to financial and operational performance of firms in Malaysia. Similarly, Canh et al. (2019) study on the impact of innovation on the firm performance and corporate social responsibility of Vietnamese manufacturing firms revealed that the effect of process innovation on firm performance in terms of return on asset (ROA) is insignificant. Likewise, Mahmutaj et al. (2020) study in Kosovo found that process innovation is not significantly related with firm growth. This is due to the fact that process innovations might have disruptive effects on the firm in the short run owing to the inefficient production. Process innovation is also a highly costly activity for the firms and this negatively affects the firm profitability (Canh et al., 2019).

At the regional level, researchers have equally investigated the effect of process innovation on firm performance and the studies show mixed results. Some studies found that process innovation positively influences firm performance (Gyadu, 2025; Wanyoike, & Kinyua, 2025; Ehiaguina , Sijibomi, Yakubu & Ediuku, 2025; Kumera,, Amentie, & Bali , 2024; Kachisa, & Otuya, 2024; Ojenike, 2024; Kihiko, Yatich, & Obuba, 2024, Adhaya et al., 2024; Ekeh, 2023; Mboga et al., 2023; Ayinaddis, 2023; Kimani & Simon, 2023; Kithinji et al., 2022; Yego et al., 2021; Majimbo et al., 2020; Ireri et al., 2020; Hongbo et al., 2020; Hu et al., 2020; Yusheng et al., 2020; Mugogo, 2020). In contrast, other studies such as Ohida and Okeke (2023), Kenea (2020), Maingi and Muathe (2021) and Oumayma and Imad (2022) found that process innovation does not significantly influence firm performance.

Process innovation leads to improvements in the methods of production and delivery of products which in turn enhances firm performance, as observed by Hu et al. (2020). Hu et al. (2020) examined the influence of innovation type on the firm performance with specific reference to hotels in Ghana. The findings indicated that process innovation has statistically significant effect on the performance of hotel firms. Process innovation results in improvement in the processes or production methods which triggers an upward trend in the firm performance. Process innovation also promotes the survival of companies as it helps firms retain a competitive advantage throughout rising global and regional competitive markets. This implies that firms can use process innovation as a tool not only to improve their processes but also enhance their competitiveness in their industry.

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Process innovation results in a reduction of production cost, reduction in time taken to deliver the product to the customers, and functionality of the finished good (Saide & Sheng, 2020). Firms that are able to set up new production methods (processes) or service delivery can reduce cost of production, delivery cost, as well as overall cost of doing business and in the long run, make profits as observed by Mutua (2019) and Mugo and Namada (2020). Supporting this observation is the Hongbo et al. (2020) study in Cote d'Ivoire which observed that process innovation has a positive and significant impact on firm performance in terms of profitability and cost reduction.

In the same vein, Kihiko et al. (2024) observed that process innovation positively affects firm performance as it enhances efficiency of the production process, improves production method and enhances quality which in turn decreases customers' complaint. In other words, process innovation brings in better customer service and better service to suppliers and hence decreases in return cost and cost reduction effect. The positive relationship between process innovation and firm performance is also confirmed by Majimbo et al. (2020) and Kiilu & Kithae (2020). Majimbo et al. (2020), for example, found that process innovation has a positive and significant effect on the performance of oil marketing firms. This implies that continuous improvements in the firm processes lead to better organizational performance.

Likewise, Ayinaddis (2023) study on the effect of innovation on firm performance in Ethiopia found that process innovation has a positive effect on firm performance. Process innovation positively influences firm performance since it ensures efficiency of processes; thus avoiding wastage and hence enhancing performance (Ayinaddis, 2023; Majimbo et al., 2020; Ehiaguina et al., 2025). These findings imply that manufacturing firms can use process innovation strategies to increase efficiency and eventually control the production cost. According to Kimani et al. (2023), process innovation strategies positively affect firm performance as they help firms to have smooth processes and procedures which result in a smooth workflow of orders which in turn creates efficiency in the processes. Similar findings were observed in Adhaya et al. (2024) and Mboga et al., (2023).

Likewise Ekeh, (2023) study in North Central Nigeria found that process innovation positively and significantly affects the growth of medium enterprises through enhancing efficiency in the firms' daily operations and creation of products. Firms that are able to change the way of producing or developing products including new logistics, new raw materials, new production lines and new production processes/methods register a greater financial performance in terms of revenue and market share than firms which do not implement new production processes or methods (Ekeh, 2023). As such firms need to develop and deploy advanced production and manufacturing technologies and systems or processes that are efficient and effective in offering products in order to achieve sustained growth levels (Ekeh, 2023; Ehiaguina et al., 2025). This observation is supported by Peter, Munga, and Nzili, (2021) study which found that process innovation enables organizations to increase their productivity.

Thus, process innovations help firms not only to lower cost but also to increase productivity and quality. Process innovation positively influences firm performance as it enhances the quality of products, customer loyalty, market share and firm competitiveness (Gyadu, 2025; Ojenike, 2024; Kiarie & Lewa, 2019). It facilitates automation, standardization, and ultimately a significant reduction of human error thereby improving quality and reducing cost (Mutua, 2020). Improving manufacturing processes or methods and other systems can reduce the time it takes to complete tasks thereby increasing efficiency (Matitz et al. 2020). This observation is supported by Yego et al. (2021) study which was conducted in Kenya to determine how process innovations affect the performance of small and medium-sized manufacturing firms. The study set up that process innovation has a positive and significant impact on the performance of small and medium manufacturing firms in Kenya as it makes the firms more productive. These findings are echoed by Mugogo (2020) study which was conducted in Zimbabwe to investigate the effect of innovation on manufacturing SMEs and found that process innovation positively affects firm performance.

Although several previous studies found that positive relationship exists between process innovation and firm performance, findings of other studies show that process innovation does not have a positive and significant effect on firm performance. Oumayma and Imadi (2022) in their study in Morocco, for instance, found that process innovation negatively affects firm performance. Process innovation entails a change in the way a manufacturing firm produces products meaning that productivity may suffer when adapting to these new changes (Oumayma et al., 2022). Process innovation may also require the introduction of new machinery or equipment which has cost implications. In addition, workers must get used to the new way of working. Adaptation often requires several rounds of trial and error which negatively impact productivity and firm performance (Oumayma et al., 2022). The negative relationship between process innovation and firm performance may also be attributed to constraints on the application of resources such as lack of skilled labor. Similarly, Kenea (2020) investigated the role of innovation strategy in improving organizational performance and productivity in Ethiopia. The findings revealed that process innovation does not positively contribute to the firm productivity and performance. This is due to the ineffective systems and the high cost of implementing process innovations (Kenea, 2020).

In the same vein, Ohida and Okeke (2023), in their study on the effect of innovation on the performance of confectionery firms in Nigeria, observed that process innovation does not have a positive significant effect on the firm performance. This is probably due to the nature of confectionary industry. The industry is characterized by standardized and well-established processes and therefore process innovation may not be a key driver of firm performance.

Likewise, other scholars have disputed that process innovation can be the major influencer of competitive advantage on the market. May and Schedelik (2019), for example, contend that process innovation in the face of poor

services or products cannot have a key influence on competitive advantage. Cassimon (2019) also contends that unless the costs of the new process indicate a positive change in profits, the new processes would remain a disadvantage to the firm due to high costs associated with process innovations.

Based on the main objective of the study and the literature reviewed, the following null research hypothesis was, therefore, tested:

H1: Process innovation strategies do not have a positive and significant effect on the financial performance of manufacturing firms in Malawi.

In summary, the previous studies on the relationship between process innovation and firm performance show inconsistent results. Some studies at both global level and regional level show that process innovation has positive and significant effect on firm performance through enhancing efficiency, customer satisfaction, quality, productivity, competitive advantage and cost reduction while the findings of other previous studies indicate that the impact of process innovation on firm performance is not significant. Thus, process innovation does not yield benefits for firms which have ineffective systems and resource constraints. In other words, lack of necessary resources such as technology, equipment and skilled personnel can hinder successful implementation of new processes in several firms, especially small firms. Most large firms, however, have systems and resources which enable them effectively implement process innovation strategies. Thus, firm size plays a part in the relationship between process innovation and firm performance.

Although several previous studies were conducted in other countries on the relationship between process innovation and firm performance, little attention has been paid to the effect of process innovation strategies on the performance of manufacturing firms with firm size as a moderating variable; hence the need for this study. In other words, most of the previous studies reviewed considered the effect of process innovation on firm performance, without taking into account the interaction effect of firm size. The current study introduced firm size as a moderating variable influencing the effect of process innovation on firm performance. This partly explains why previous studies on the relationship between process innovation and firm performance produced inconsistent findings. Inclusion of firm size as a moderator improves the research framework on the relationship between process innovation strategies and the performance of manufacturing firms.

D. CONCEPTUAL FRAMEWORK

The conceptual framework shows how the dependent variable is related to the independent variable. This relationship is depicted in Figure 1.

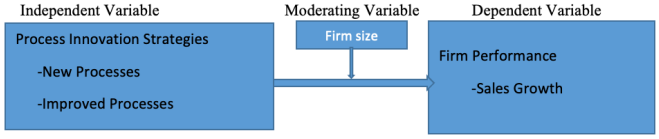

Figure 1: Conceptual Framework

The conceptual framework in Figure 1 consists of process innovation strategies as the independent variable, firm performance (sales growth) as the dependent variable and firm size as the moderating variable. This conceptual framework is different from the previous frameworks as it includes firm size as the moderator. The conceptual framework is based on the theory adopted in this study as well as the empirical literature reviewed. The Schumpeterian theory of Innovation informs this conceptual framework as it supports the independent variable (process innovation strategies).

In the current study, process innovation entails entirely new or significantly improved processes or manufacturing methods which manufacturing firms in Malawi implemented. Process innovation as a strategy was in this study measured as the number of process innovations (new machines or upgraded machines; new manufacturing methods or substantially improved manufacturing methods; new delivery methods or substantially improved delivery methods) a manufacturing firm has implemented in the five year period (2019-2024). Such measurement is based on OECD (2018) manual.

Firm size serves as a moderating variable in the framework. Firm size is an important factor that affects both innovation and firm performance. In the current study, firm size was measured by the total number of permanent employees a given manufacturing firm has. Accordingly, small firms have 5-20 employees; medium sized firms have 21-99 employees and large firms have 100 or more employees (Finscope, 2019).

Firm performance is the dependent variable in the conceptual framework (shown in Figure 1). Firm performance was in this study measured by sales growth. Sales growth was measured as a percentage change in sales growth in the five year period (2019-2024) during which process innovation strategies were implemented. Thus, data on actual sales were collected and then percentage change was computed for each manufacturing firm.

III. METHODOLOGY

A positivism research paradigm was adopted in this study. In a positivism paradigm, the researchers establish knowledge by following a scientific procedure (Saunders, Lewis & Thornhill, 2019). Positivists think that a social phenomenon is measurable and that is why it is linked with the quantitative method and based on the study of quantitative data Positivists believe that reality is stable and can be observed and described from an objective viewpoint (Saunders et al., 2019). A positivistic approach was utilized in this study because this study investigated process innovation and firm performance variables which are observable and measurable. The study used quantitative methods. It employed an explanatory approach in order to get fresh insights into the relationship between process innovation and the performance of manufacturing firms in Malawi.

The target population was 388 manufacturing firms. In this study, Yamane (1967) formula, as cited in Adam (2020) was used to calculate sample size at 95% confidence level.

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

Where n is the sample size,
N is the population size,
e is the level of precision.

$$n = \frac{388}{1+ 388\ (0.05 \times 0.05)}$$

n= 197

Thus, the sample size was 197 manufacturing firms. This sample was distributed among various manufacturing subsectors. The sample was drawn from Mzuzu, Lilongwe and Blantyre. The study used stratified random sampling method to select manufacturing firms from the three cities. Stratification was necessary because manufacturing firms are heterogeneous in terms of size and the industrial activities they are involved in. Thus, manufacturing firms were stratified according to size and the nature of their industrial activities. The population was classified according to the various manufacturing sub-sectors. This was to ensure that each sector has a chance of being represented in the study. Manufacturing firms were then randomly selected from each stratum to eliminate bias. Stratified sampling was used in this study as it helps to yield a more representative sample (Saunders et al., 2019).

The study used a structured questionnaire as the main tool to collect primary data on the manufacturing firms in Malawi in terms of their bio-data, innovation strategies and firm performance. The questionnaire was self-administered. The choice of questionnaire in this study is informed by the positivism view. The questionnaire was chosen as it helped to reduce the researcher's bias as there was no researcher's influence on how respondents filled in the responses. The questionnaire consisted of closed ended questions which were mostly of the likert scale type.

In this study, the reliability of the questionnaire was calculated using the Cronbach's alpha coefficient (Adam, 2020). The study used 0.7 as a cut-off point of reliability since it is a recommended value (Sekaran, 2020). The Cronbach's alpha value for the process innovation strategies variable items was 0.772 and that of the firm performance variable items was 0.760. They were all above 0.7. To ensure content validity, the researcher got an expert opinion from the university supervisors. The questionnaire was pilot tested on 20 manufacturing firms. Pilot test was necessary as it helped to refine the questionnaire. It also enabled the researcher to obtain some assessment of the questions' validity and reliability of the data collected. After pilot-testing, the questionnaires were hand delivered to the respondents of the sampled manufacturing firms in Blantyre, Lilongwe and Mzuzu.

A total of 197 questionnaires were distributed to the owners and managers of the manufacturing firms in Malawi. Out of 197 questionnaires that were given out, 158 questionnaires were returned; representing a response rate of 80.2 %. The response rate of 80.2 % in this study was considered very good and adequate for the statistical analysis. According to Sekaran (2020) any response rate above 75 % is deemed as best and appropriate for any study.

Data were analyzed using descriptive statistics and inferential statistics. The study used descriptive statistics such as frequencies, percentages, sample means and frequency tables. Inferential statistics were used to examine the effect of process innovation strategies on firm performance. Data analysis was done using the Statistical Package for Social Sciences (SPSS –Version 28.0). A direct linear regression model was used to test the effect of process innovation strategies on the firm performance. A two stage hierarchical regression was also used to analyze the moderating effect of firm size on the relationship between process innovation strategies (independent variable) and firm performance (dependent variable). In the first stage of the hierarchical regression, process innovation variable and firm performance variable were entered. In the second stage, the interaction variable (interaction between process innovation and firm size) was created and entered. In the regression model, firm performance, which is the dependent variable, is represented by 'Y' while the process innovation strategies (the independent variable) are represented by 'X' and firm size (moderating variable) is represented by Z1

The regression model for the study is given by;

$$Y = \beta 0 + \beta 1X1 + \beta 1X1*Z1 + \varepsilon$$

Where Y = Firm performance
β0 = Constant of the equation
β1= Respective Regression Coefficient
X1 = Process innovation strategies
Z1 =Firm size
X1*Z1=Interaction variable (interaction between process innovation and firm size)
ε = Error term

The desired level of precision was +/– 5% and a confidence level of 95%. The decision level was 'reject null hypothesis if $P<0.05$.'

IV. RESULTS AND DISCUSSION

A. FIRM SIZE

The descriptive results indicated that 41.8 % of the manufacturing firms were small firms with 5-20 employees. 36.1 % of the manufacturing firms were medium sized (with 21-99 employees) while 22.2 % were the large manufacturing firms (with 100 employees and more).

B. NATURE OF PROCESS INNOVATION

Respondents were asked to indicate the nature of process innovation in their manufacturing firm in terms of whether their firm significantly improved the process or introduced a new process in the five year period (2019-2024). The descriptive results (Table 1) indicate that 31.6 % (50 firms) of the manufacturing firms were not at all involved in any process innovation. That is, they did not significantly improve any process or introduce new processes. Table 1 further shows that 45.6 % of the manufacturing firms significantly improved their processes while 1.3 % of the manufacturing firms introduced a new process. Thus, a relatively high percentage of the firms embarked on improving their processes rather than introducing new processes.

85.1 % (92 firms) of the manufacturing firms that embarked on process innovation strategies also indicated that they had implemented process innovations that were new to the firm. 13.0 % (14 firms) indicated that the process innovations that they embarked on were new to the Malawian market while the remaining 1.9 % (2 firms) of the manufacturing companies indicated that their process innovations were new to the country. This means that a greater proportion of the manufacturing firms embarked on process innovations which are new to their firms rather than the market or the country. Thus, most manufacturing firms implement process innovations which are at the minimum level.

Nature of Process Innovation	Frequency	Percentage
No any process innovation	50	31.6
significantly improved a process	72	45.6
introduced a new process	2	1.3
significantly improved a process and introduced a new process	34	21.5
Total	158	100.0

Table 1: Nature of Process Innovation

C. INTENSITY OF PROCESS INNOVATION

Respondents were equally asked to indicate the number of process innovations their manufacturing firm had implemented. The descriptive results (Table 2) show that 39.2 % of the manufacturing firms implemented one process innovation while 21.6 % of the manufacturing firms embarked on two new processes or significantly improved processes. 31.6 % (50 firms) of the manufacturing firms were not involved in any process innovation. Thus, most manufacturing firms in Malawi operate at low intensity of process innovation.

Number of Process Innovations	Frequency	Percentage
No new or significantly improved process	50	31.6
One new or significantly improved process	62	39.2
Two new or significantly improved processes	34	21.6
Three new or significantly improved processes	12	7.6
Total	158	100.0

Table 2: Intensity of Process Innovations

D. PROCESS INNOVATION STRATEGIES AND FIRM PERFORMANCE

The descriptive results showing the extent to which process innovation strategies contribute to firm's sales growth are shown in Table 3. According to Table 3, the majority (64 %) of the manufacturing firms that did not implement process innovation strategies did not register any increase in sales growth in the five year period (2019-2024) (28 % of these firms indicated that their sales growth declined while 36 % of these firms indicated that their sales growth remained constant). Thus, the performance of the relatively large proportion of manufacturing firms that did not implement process innovation strategies declined or remained constant.

Sales Growth in the last Five years	**Nature of Process Innovation**		
	No any process innovation	**Introduced a new process or Significantly improved a process**	Total
Decline	14 (28%)	3 (2.7%)	17
Stayed the same	18 (36%)	6 (5.6%)	24
1-10%	11 (22%)	36 (33.3%)	47
11-20%	5 (10%)	22 (20.4%)	27
21-30%	2 (4%)	23 (21.3%)	25
31-40%	0	12 (11.1%)	12
Above 40%	0	6 (5.6%)	6
Total	50	108(100%)	158

Table 3: Process Innovation Strategies and Sales Growth

In contrast, the majority (a total of 91.7 %) of the manufacturing firms that significantly improved their processes or introduced new ones registered an increase in sales growth in the five year period (2019-2024). Thus, most of the manufacturing firms that implemented process innovation strategies registered an increase in sales growth. This means that manufacturing firms that implemented process innovation strategies performed better than those that did not.

E. CONTRIBUTION OF PROCESS INNOVATION STRATEGIES TO SALES GROWTH

The respondents were asked to indicate whether they agree or not with the statement that 'process innovation strategies have helped to increase sales growth of their firms in the five year period (2019-2024). The results are shown in Table 4. A total of 53.7 % of the respondents from manufacturing firms that implemented process innovation strategies agreed with the statement that process innovation strategies have helped to increase their sales growth. 35.2 % of the respondents were neutral while 11.1 % disagreed with the statement that process innovation strategies have helped to increase sales growth.

Process Innovation strategies Statement	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Process innovation strategies have helped to increase sales growth in the past five years	0%	11.1%	35.2%	33.3%	20.4%

Table 4: Contribution of Process Innovation Strategies to Sales Growth

Furthermore, the respondents were asked to indicate whether they agree or disagree with various process innovation strategy statements regarding how process innovation strategies contribute to sales growth, as shown in Table 5. The first process innovation strategy statement was that 'process innovation helps to increase productivity or efficiency of our firm.' According to Table 5, the majority (a total of 59.2%) of the respondents of manufacturing firms that implemented process innovation strategies indicated that

process innovation has helped to increase efficiency of their firms; implying that manufacturing firms that implemented process innovation strategies were more efficient than those which did not .

The second process innovation strategy statement was that 'process innovation helps to improve the quality of our products.' The majority (a total of 63.9%) of the respondents of manufacturing firms that implemented process innovation strategies indicated that process innovation has helped to improve the quality of their products. The third process innovation strategy statement was that 'process innovation helps to reduce the cost of production or delivery.' The majority (a total of 94.3%) of the respondents of manufacturing firms that implemented process innovation strategies indicated that process innovation has helped to reduce the cost of production in the five year period (2019-2024).

Process Innovation strategy Statement	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard Deviation
Process innovation helps to increase productivity/efficiency of our firm	1.9 %	38.9 %	51.8 %	7.4 %	3.6	0.65
Process innovation helps to improve the quality of our products	0.9 %	35.2 %	57.4 %	6.5 %	3.7	0.6
Process innovation helps to reduce the cost of production/delivery	0%	5.7 %	82.3 %	12 %	4.1	0.42
Process innovation helps to increase customer satisfaction	0%	48.1 %	45.4 %	6.5 %	3.58	0.61
Process innovation helps to achieve competitive advantage	3.7 %	62 %	25 %	9.3 %	3.4	0.71

Table 5: How Process Innovation Strategies contribute to sales growth

The fourth process innovation strategy statement was that 'process innovation helps to increase customer satisfaction.' A total of 51.9% of the respondents of manufacturing firms that implemented process innovation strategies indicated that process innovation has helped to increase customer satisfaction.

In short, these results imply that process innovation strategies can help manufacturing firms to improve their performance through not only increasing efficiency, improving product quality and reducing cost of production and delivery but also through increasing customer satisfaction.

F. INFERENTIAL ANALYSIS

a. COEFFICIENT OF DETERMINATION

Table 6 shows the findings on coefficient of determination. According to Table 6, R-square is .0790. Thus, process innovation strategies accounted for 7.9 % of the variation in the performance of manufacturing firms in Malawi. The finding therefore confirmed that process innovation strategies significantly affect the performance of manufacturing firms in Malawi. Although process innovation has a significant effect on sales growth, its explanatory power (7.9 %) is low.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.281[a]	.0790	.0731	1.2530	.0790	13.38	1	156	.000

a. Predictors: (Constant), process innovation strategies

The low explanatory power of process innovation means that process innovation is just one of the factors that contribute to the performance of manufacturing firms. Other factors include firm size and institutional resources. The low explanatory power of innovation is also due to the nature of process innovation. Most manufacturing firms in Malawi, according to the current study, implement incremental process innovations. Incremental innovation involves making small changes. Manufacturing firms in Malawi just improve their processes instead of introducing new ones. Such innovations have a small effect on firm performance, hence low explanatory power.

b. REGRESSION RESULTS AND DISCUSSION

A linear regression was used to test the effect of process innovation strategies on the performance of manufacturing firms in Malawi. The regression was conducted at 95 percent confidence level (α =0.05). The research null hypothesis was that process innovation strategies do not have a positive significant effect on the performance of manufacturing firms in Malawi. The results (Table 7) show that process innovation strategies have a statistically significant positive effect on sales growth of manufacturing firms at 5 % significance level (β= 0.281, p=0.000 < 0.05). Thus, an increase in one unit of process innovation will result in 0.281 increase in sales growth.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.346	.158		14.848	.000
	Process innovation strategies	1.154	.123	.281	9.382	.000

a. Dependent Variable: Sales growth in the last five years

Table 7: Regression Coefficients: Process Innovation strategies and Firm's sales growth

The null hypothesis is rejected at α =0.05 as the p-value (0.000) is less than 0.05 and the alternative hypothesis is supported. Thus, process innovation strategies have a positive significant effect on the financial performance of manufacturing firms in Malawi. The results imply that manufacturing firms which invest in process innovations or implement process innovation strategies perform better than the manufacturing firms which do not embark on process innovations.

A two-stage hierarchical regression model was also used to test the moderating effect of firm size on the process

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innovation and firm performance relationship. The results on firm size as a moderator (see Table 8) show that firm size has a statistically significant positive moderating effect on the relationship between process innovation and firm performance (sales growth) at 5 % significance level (β= 0.485, p=0.000 < 0.05). The p-value (0.000) is less than 0.05, meaning that the effect of the interaction term (interaction between firm size and process innovation) on firm performance is statistically significant. The beta value (β= 0.485) is positive.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.338	.134		17.488	.000
	Process innovation	.456	.247	.267	1.845	.007
	interaction	.293	.087	.485	3.349	.000

a. Dependent Variable: Sales growth in the last five years

Table 8: Moderating Effect of firm size on Process Innovation strategies and firm performance relationship

This suggests that the relationship between process innovation strategies and firm performance is stronger for larger manufacturing firms. It also implies that for every one-unit increase in firm size, the relationship between process innovation and firm performance increases by 0.485. This effect of the interaction term (interaction between firm size and process innovation) is greater than the effect of process innovation strategies variable alone (0.281).

The results of this study, which show the positive significant effect of process innovation strategies on firm performance, are consistent with the findings of previous studies such as Gyadu (2025), Wanyoike (2025), Ehiaguina et al. (2025), Kumera et al. (2024), Kachisa et al. (2024), Ojenike (2024), Kihiko et al. (2024), Adhaya et al. (2024), Ekeh (2023), Faturachman (2023), Seclen-Luna et al. (2023), Mboga et al. (2023), Ayinaddis (2023); Kimani et al. (2023), Kithinji et al. (2022), Yego et al. (2021), Majimbo et al. (2020), Ireri et al. (2020), Hongbo et al. (2020), Hu et al. (2020), Yusheng et al. (2020) and Herlinawatti et al. (2020). These previous studies found that process innovation strategies significantly and positively affect firm performance. For instance, Herlinawati et al. (2020) study which examined the effect of innovation on business performance found that process innovation positively affects the firm performance through enhancing firm efficiency and productivity. Continuous innovation in processes helps firms to survive and operate more efficiently and more profitably (Herlinawatti et al., 2020). Process innovation helps the firms to achieve efficiency in their operations and this in turn spur the firm performance (Najafi-Tavan, 2020).

The findings of the current study are also in line with Ayinaddis (2023). Ayinaddis (2023) examined the effect of innovation on firm performance and found that process innovation has a positive effect on firm performance as it ensures efficiency of processes; thus avoiding wastage (Ayinaddis, 2023). This means that manufacturing firms can use process innovation strategies to increase efficiency and eventually control the production cost. Similarly, Kimani et al. (2023) observed that process innovation strategies positively affects firm performance as they help firms to have smooth processes and procedures which result in a smooth workflow of orders.

The findings of the current study are also consistent with Seclen-Luna et al. (2023 and Ekeh (2023) observations. Seclen-Luna et al. (2023), for example, observed that process innovation positively influences the performance of manufacturing firms in Peru as it increases the firms' productivity through increasing efficiency. Likewise Ekeh, (2023) study in North Central Nigeria found that process innovation positively and significantly affects the growth of medium enterprises through enhancing efficiency in the firms' daily operations and creation of products. Firms that are able to change the way of producing or developing products including new logistics, new raw materials, new production lines and new production processes/methods register a greater financial performance than firms that do not implement new production processes or methods (Ekeh, 2023).

In short, the findings of the current study suggest that managers of manufacturing firms can use the process innovation strategies to increase their efficiency, effectiveness and profitability. Thus, new processes or improved procedures result in effective and efficient operations. Improvement in efficiency implies lower cost and hence higher firm returns. Likewise, Hongbo et al. (2020) investigated the effect of innovation on the firm performance and competitiveness and the findings revealed that process innovation has a positive and significant impact on firm performance as it enhances profitability and reduces production cost and delivery cost. This means that the more innovative process engaged in by the firms, the better the performance would be in terms of low production cost, increased and enhanced growth and profitability for the firms.

Thus, process innovation increases efficiency and this in turn implies an increase in customer satisfaction and hence higher firm performance. This means that process innovation as a strategy drives performance of firms and should therefore be executed as an integral part of business strategy in boosting operational and financial performance of manufacturing firms. Process innovation is, thus, a catalyst that propels firm performance. Thus, the results of the current study show that process innovation strategies help manufacturing firms to increase their performance through reduction of production cost as well as enhancing efficiency, quality and customer satisfaction. In other words, process innovation strategies positively and significantly affect the performance of manufacturing firms.

The findings of the current study on process innovation and firm performance are, however, not consistent with the findings of other previous studies such as Maseru et al. (2023), Oumayma et al. (2022) and Kenea (2020). For instance, Oumayma et al. (2022) found that process innovation negatively affects firm performance. Process innovation entails a change in the way a manufacturing firm produces products meaning that productivity may suffer when adapting to these new changes (Oumayma et al., 2022). Process

innovation may also require the introduction of new machinery or equipment which has cost implications. In addition, workers must get used to the new way of working. Adaptation often requires several rounds of trial and error which negatively impact productivity and firm performance (Oumayma et al., 2022). In the same vein, Mahmutaj et al. (2020) found that process innovation is not significantly related with firm growth due to the fact that process innovations have disruptive effects on the firm in the short run owing to the inefficient production.

The results on the firm size as the moderator for the process innovation and firm performance relationship help to reduce this inconsistency in the findings on the process innovation and firm performance relationship. The current study found that firm size has statistically significant effect on the relationship between process innovation strategies and firm performance. The study observed that the relationship between process innovation strategies and firm performance is stronger for larger manufacturing firms. Firm size has an important influence on both innovation and firm performance. For example, large firms exploit greater economies of scale and a large market (Oyelade, 2020). By exploiting economies of scale, large firms can increase productivity and performance compared to small firms (Liu, 2018). Thus, based on the economies of scale, large firms often work more efficiently and register greater performance than small firms.

Similarly, large firms have superior resources and capabilities in product development, technology development, and implementation of business strategy, marketing, and e-commerce (Liu, 2018). Therefore, large firms can be more innovative and operate more efficiently because they have good resources with more efficient use of inputs. Large firms are capable of enhancing the investment opportunities, which bring larger profit rates, but the smaller firms cannot take them because of financial difficulties (Oyelade, 2020). Besides, large firms have an advantage over smaller firms as they can enter in varieties of product lines, which gives them the benefits of both the scale and the size. As such, large firms are in a position to take full advantage of technical economies of scale in manufacturing, marketing and in raising capital. This in turn enhances their innovation capacity and performance.

In brief, the current study observed that process innovation enhances firm profitability through reducing production costs as well as increasing product quality, firm efficiency and customer satisfaction. These results support the Schumpeterian theory. According to Schumpeterian theory, innovation is the driver of competitiveness, profitability and firm growth. The theory posits that only innovation can help firms achieve superior performance, better results and keep the business firms at a competitive position (Langroodi, 2021).

V. CONCLUSION AND RECOMMENDATIONS

A. CONCLUSION

The aim of the study was to investigate the effect of process innovation strategies on the performance of manufacturing firms in Malawi, with firm size as the moderator. The study found that process innovation strategies positively and significantly affect the performance of manufacturing firms in Malawi. This implies that manufacturing firms which implement process innovation strategies perform better than non-innovators. In other words, manufacturing firms which introduce new processes or significantly improve their existing processes or manufacturing methods register a greater firm performance than the manufacturing firms that do not invest in process innovations. Process innovations help manufacturing firms not only to reduce production costs but also to increase efficiency, product quality and customer satisfaction. The study also found that firm size has significant moderating effect on the relationship between process innovation strategies and firm performance. Thus, although the process innovations yield benefits for manufacturing firms, these benefits are greater for large manufacturing firms than small ones.

B. THEORETICAL AND PRACTICAL CONTRIBUTIONS

The contribution this study makes to the existing literature is that it provides the comprehensive framework on the process innovation strategies and firm performance relationship. Many previous studies simply investigated the relationship between process innovation and firm performance. The current study, on the contrary, has included firm size as the moderator in this relationship. The study vividly paints the picture on how process innovation strategies positively affect the performance of manufacturing firms, with firm size as the moderating variable. It provides fresh insights for the Strategic Management field as it demonstrates that the benefits for process innovation are greater in large manufacturing firms than small ones. The study also provides invaluable empirical information to managers and owners of manufacturing firms as they can use this information to formulate and implement process innovation strategies to spur firm performance.

C. RECOMMENDATIONS

The study recommends that manufacturing firms should embark on process innovation strategies to increase their performance. They should invest in various process innovations as such innovations help the firms to reduce costs and to increase efficiency, product quality, customer satisfaction and firm competitiveness.

D. LIMITATIONS AND FUTURE RESEARCH

This study investigated the effect of process innovation strategies on the performance of firms in the manufacturing sector, with firm size as the moderator. The study focused on small, medium and large manufacturing firms. Thus, micro businesses in the manufacturing sector were not included. Furthermore, the study did not investigate the effect of process innovation strategies on the performance of firms in the other sectors such as service sector. So future research need to examine the effect of process innovation strategies or other strategies on the performance of firms in the other sectors.

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