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OPERATIONAL INNOVATION PRACTICES EFFECT ON PERFORMANCE OF MANUFACTURING FIRMS: EMPIRICAL EVIDENCE FROM FIRMS IN KENYA

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Abstract

The concept of firm performance was premised on operational innovations. The interplay of these factor's dimensions contributes towards the firm's performance outcome. The factors, which include innovations in the marketplace, products, processes, and technologies, make up operational innovation. Thus, achieving ultimate performance requires that the manufacturing firm remains at the market's competitive edge by applying innovative technology manifested through markets, processes, and products. This study focused on the performance of Kenyan manufacturing firms and operational innovational practices relationship. Positivism criteria are used because it revolves around scientific laws and principles that increase the reliability of the investigation's findings for generalization. A descriptive research design was adopted, which entailed collecting data from many firms, and therefore was the best approach to increase the survey reliability. The number of firms involved in the study was 182, all with active Kenya Association of Manufacturers (KAM) affiliation. The firms were put into 14 subcategories of manufacturing based on the product they manufacture. Statistical Package for the Social Sciences (SPSS) and smart PLS4 tools were used for data analysis. Also, using regression analysis, the results revealed that operational innovation practices significantly influences manufacturing firms' performance in Kenya. While looking at the effects of the dimensions of operational innovation on firm performance, the results indicated that process innovation had the most significant impact while technological innovation had the least. The outcome revealed which operational innovation is significant and should be focused by the operation managers during product design to gain competitive edge in the industry.

***Keywords**: Firm Performance, Market Innovation, Operational Innovation, Process Innovation, Product Innovation.*

Introduction

The concept of firm performance was premised on the level of innovation linked to the company. Operational innovation can be demonstrated through process, product, market, and technological innovations. Achieving ultimate firm performance requires that the manufacturing firm remains at the competitive edge of the market by applying innovative technology manifested through markets, processes, and products (Azar, & Ciabuschi, 2017)

The idea of innovation sprung out during the industrial revolution through the 1950s, with its origin being Schumpeter in 1939, who invented entrepreneurship and gained prominence after the 1980s. Gifford, McKelvey, and Saemundsson (2021) observed innovation as a decisive and focused effort to realize an organization's economic or social potential. It has consequently emerged as a crucial concern at all levels of every industry, establishment, and government entity. Due to this, scholars have been motivated to identify the driving forces behind its uniqueness. According to Lee and Tang (2018) innovation is the development, acceptance, or acceptance of novel concepts, operations, goods, or services.

Researchers have explored innovation using numerous approaches. This has been considered a single construct (Barasa et al., 2019; Das, Verburg, Verbraek, & Bonebakker, 2018). Others have considered its aspects like product innovation and process innovation (Kogabayev & Maziliauskas, 2017). Operational innovation has equally been studied under the aspects of destructive and radical innovation. However, due to a lack of congruency in their findings, four dimensions of marketing, product, technology, and process innovations were applied in the present investigation as they relate to many areas of firm innovation .This is because innovation relates to many aspects of the firm's competitive advantage.

Manufacturing firms, particularly from developing countries like Kenya, are integral to unemployment reduction, economic expansion for an extended period, and earnings in foreign currencies (Kenya National Bureau Statistics, 2019). Due to high tariffs and operational costs, Kenya's manufacturing output has significantly decreased by almost 900 per cent throughout the previous 30 years (World Bank, 2019). In spite of this, a large number of Kenyans remain employed by it, and it serves as a primary market for the product of agriculture and several other products from the industry. The sector's rehabilitation received top agenda from the last government administrations. This is manifested by the increase of credit value in billions of Kenya shillings, 275.8, 315.8, 335.8, and 366.9 in 2016, 2017, 2018, and 2019, respectively. It gives a depiction of an upward trend. The impact expected from the proportion of credit the government facilitates to manufacturing performance frequently never meets expectations. This greatly influences the Kenyan economy, making it incomparable to those of other similar countries (KNBS, 2019). Even though Kenya's manufacturing industry has been one of the fast-growing industries in the East African region, other East African states have expanded their economies relatively rapidly (see Appendix I). With food processing making up the majority of the industry, several other industries, such as agronomy, which has a significant opportunity for more remarkable employment development, benefit significantly from this synergy (KNBS, 2014). The manufacturing industry should contribute twenty per cent (20%) of the gross domestic product, according to Kenya Vision 2030 (KNBS, 2015). Instead, the manufacturing sector's contribution to the

GDP has been on a downward trend since 2011 (see Appendix II). The majority of manufacturing firms have not been doing well; they face many hurdles, which scuttles service delivery and long-term goals. A few challenges hampering their development include operational efficiency, political dynamism, and scarcity of business information. As mentioned previously, government administrations have approved credit facilities, but the manufacturing firm's products are not competitive globally. Operational efficiency, which is responsible for product processes, product design, and market penetration, is implemented and realized by a deeper focus on the firm's innovations and their dimensions. This points to the necessity of this current investigation.

Operational Innovation Practices

Operational innovation is a complex undertaking with several dimensions; product, process, market, and technology. Product innovation means the objective supply of new or better services to customers by commercializing them with improved performance attributes. Adopting revolutionary or substantially enhanced methods of production reflects process innovation. Equipment alterations, Human Resource Management (HRM), ways of operations, alternatively, a mix of all of these may be required. Marketing innovation reflects the creative mixing of the market's promotion, price, place and product, 4Ps with the focus on publicizing and selling products determined by the customer's prerequisites (OECD, 2005). Lastly, technological innovation entails adopting an innovative organizational approach in the company's activities, structure, or interactions involving the outside world. It aims at cutting down administrative expenses or transactional costs, improving labor, improving production, getting access to additional trade assets, or bringing down the price of inventory (Swink & Schoenherr, 2015). However, no single approach ensures the success of innovation and its management. Its success depends on many factors; hence, it remains complex (Fellnhofer, 2019).

Firm Performance

It reflects the firms' successes in achieving preset goals intermittently (Duran, Kammerlander & Essen, 2016). The preset goals never remain constant; therefore, there is a need for frequent review. More so, the degree of variation of approaches used to view performance in most organizations is enormous. Nevertheless, the elements can be broken down into financial and non-financial categories. A wide range of considerations, including the leadership of the board and the kind of business organizations, can choose to utilize any of the ways (Wickert, Post, Doh, Prescott & Prencipe, 2021)

Rarely do the firm's legal environment address non-monetary performance. Non-financial success is usually challenging to evaluate, yet the most important things done by companies dependent upon it. As a result, companies regularly utilize pointers of fiscal performance (Kim, Kim, & Qian, 2018). The balanced scorecard remains particularly strongly advised (Namada, Aosa, Awino & Gituro, 2014). It increases the quantifiable and concreteness of the organization's plan. When it comes to performance measurement, the balanced scorecard's capacity to include trailing and leading metrics is its underlying and primary distinction grounded on a combination of the financial perspective with other important factors, including consumers and innovative views. The measurement's metrics consist of client satisfaction, progress, effectiveness, worker satisfaction, corporate investment responsibility level, price on the market, and environmental performance (Chang, Lin, Tsai, Wang & Huang, 2021). In the past, financial

performance has been employed to evaluate the effectiveness of a company's primary revenue-generating activities. The quantity of earnings or revenues generated after a given period served as the basis for the computation. Taking ratios of finances into account, Batrancea (2021) exhibited three financial performance criteria; levels of profitability, aggregate portfolio returns, and multiplier for securities. Nevertheless, it is susceptible to various drawbacks due to the presumptions of accuracy and impartiality triggered by the delay in the accounting period and the bulkiness of information. Given that financial performance metrics are not associated with the organizational functional divisions, this leads to detail discrepancies (Van Looy & Shafagatova, 2016). However, non-monetary performance indicators were used in this study. The management mainly controls the financial performance indicators. They are occasionally prepared to meet other environmental requirements and are therefore not suitable for testing the study's hypotheses.

Research Problem

Firms need an abundance of resources to be in a position to enhance their overall performance and build diverse internal environments and attributes. The firm's performance and capacity to sustain its strength in the marketplace depend on many factors. Similarly, the urge to maintain this strength also helps the firm to increase its propensity for adopting and implementing innovative practices. This is driven by integration, reconfiguration, and building both the external and internal capabilities and competencies to confront the rapidly changing environmental needs, including consumer needs (Day & Schoemaker, 2016). Any firm that does not observe these factors has no competitive advantage and therefore loses market share. Most manufacturing firms face challenges not only limited to resources at their disposal but also related to marketing coupled with the changing and dynamic competitive environment where the firm operates. Most manufacturing firms are knowledgeable about the constantly changing business environment characterized by dynamic customer needs, and thus the challenge is to remain afloat by creating customer value in their operations. Therefore, with the complexities of the market places coupled with the increased competition globally and the constant customer point of needs and wants, there is a need to adopt operational innovations while considering any mediating and moderating factors.

Many manufacturing operations in the Asian nations (Vietnam, Cambodia, and Bangladesh) benefit significantly from the favorable subsidy serviced by their regimes, pushing their unit cost of production down. This posits a challenge to the products made in Kenya to remain competitive with them worldwide because they are much less expensive. Hence, Kenya's manufacturing output has stagnated between 1963 and the present day, at an average of 10 per cent of the GDP (gross domestic product) (Kenya Association of Manufacturers, 2018). In addition, the proportion of Kenya’s manufactured goods in the East Africa Community (EAC) market declined by two per cent during the period. Moreover, with the operationalization of the game-changing Standard Gauge Railway (SGR) project, transportation costs were reduced by 60 per cent prior to the COVID-19 pandemic. The distribution of goods to the remote parts of the country is now cheaper, causing a flood of less expensive products from Asian nations into the regional market, worsening the situation. Due to cheap imported goods, the manufacturing firms have been performing poorly in the local market. This, therefore, calls for Kenyan manufacturing

firms to take the necessary measures to address this gap. Despite manufacturing firms' rich advancements and considerable developments, there is still a void in the literature concerning their innovations, characteristics, and external environments. Specifically, there is a window span for further investigations into the characteristics of successful firms and institutions concerning the interaction of firm innovation, firm characteristics, and the external environment. How does operational innovation influence the performance of manufacturing companies in Kenya?

Literature Review and Research Focus

This covered the theoretical foundation which is grounded on the Schumpeterian theory of innovation, which was the key anchoring theory supported by agency theory and several empirical studies.

Theoretical foundation

Schumpeter initially coined the theory during the year 1934, and the proponents postulate that economic and market processes are continuous. Derived from a balanced economy, a requirement emerges that creates multiple impulses, which result in a few changes personified in the entrepreneur. Schumpeter demonstrated that an entrepreneur is a constructive and essential participant in organizational revolutions. Similarly, he holds the view that entrepreneurship generates innovation, in which new factors of production combination ratio are constantly tested. As a result, profound and abrupt shifts become the cornerstones of economic progress (Schumpeter, 1934).

In light of the fact that the current survey was intended to interrogate the relation of operational innovation, the concepts of Schumpeterian theory have been utilized. Through advocating a dramatic change in policy and suggesting creative reorganisation inside manufacturing and processing firms, the theory highlights the significance of transition in how manufacturing firms process their output. (Schumpeter, 1934). The theory advocates for the implementation of new technology innovation; it also emphasises the entrepreneurial opportunities that drive acts of innovation. Moreover, it details the role of the entrepreneurs by offering them a chance to explore new products and design superior services corresponding to the changing customers' and consumers' needs for effective economic development. This translates to a competitive advantage for firms and economic development. Market malfunction remains minimal with innovation, and the firm products and services remain competitive.

On the following points, different intellectuals and academicians have criticised the theory: it overemphasises the role and function of the innovator. It has since declared it as the fundamental force behind the economy. Therefore, Schumpeter's approach prioritised other thinkers' ideas over innovators' hero worship. Additionally, it was taken as a critical tool useful in capitalist development through the element of entrepreneurial innovation, which many consider favouring neocolonialism in the colonised nations (Schumpeter, 1934).

The agency theory concept explains how a principal and an agent are related. The principle grants the agent the right to act as his representative and conduct business with other legal entities. The affiliation creates complicated operation issues, resulting in business inefficiencies. This theory explains the circumstances that could cause this to persist in the manufacturing chain (Treiblmaier, 2018). The agency theory has two premises: the ability of an agent to select from a range of options and the agent's actions, thus influencing their development with that of the principal.

The principal finds monitoring the agent's conduct challenging because reporting by itself is insufficient (Ragasa, Ulimwengu, Randriamamonjy & Badibanga, 2016).Furthermore, the theory could give details affecting such an opportunity for firm development and investigate how manufacturing chain challenges could be avoided or minimised. The traditional approach was meant to address the conflict resolution of political masters and state officials.

Since the theory supports most aspects of the upstream and downstream portion of supply chain management, the current study connects well with it. The manufacturers and the final consumers are the principals, while the many stakeholders in the supply chain are their agents. A smooth relationship between the principal and agents needs innovative activities. This is because the type of relationship influences the type and quality of information flowing throughout the chain. Information flow in both directions is a crucial aspect of innovative activities. For the organisation to meet the performance goal, there must be mutual relations among the firm's stakeholders. This influences the level of resource commitment, which equally determines the innovation activities of the firm.

One drawback of this theory is that it emphasises situations involving two entities that have an association as a result of working together and employ reciprocal connection with one individual regarded as the sole representative of the decision-making process and responsibility, the named agent. The theory concludes that there are conflicting interests among the agents and the principals in a relationship, and each one prioritises their interests first (Bendickson, Muldoon, Liguori, & Davis, 2016). As a result, an agency setback occurs when the agents' goals deviate from the principals', and it is difficult to evaluate the proper fullness of the performance. However, this assertion may not be applicable in all firms due to varied amounts and forms of information determined by organisation structure.

Effect of Operational Innovation and Firm Performance

Performance and innovation evaluation of manufacturing firms considered Schumpeterian theory of innovation and entrepreneurship. In order to reduce or eliminate firm problems, firms must improve in all areas of their operations, like production and marketing, by venturing into new ideas. The new ideas improve the connectivity with shareholders, marketing processes, and good quality. This outcome considerably affects firm performance (Ombaka et al., 2015).

Herna'ndez-Espallardo et al. (2009) examined product innovation in small manufacturer market inclination and five industry competition fronts in Spain to determine the benefits of innovation on the firm's productivity in distinct competitive environments. This study involved 218 respondents as a sample size, which was analysed using structural equation modelling (SEM). The sample size is higher than the current study. They asserted that investment in innovation was higher in firms operating in higher competitive forces. Product design, remodelling, and product packaging highly depended on process innovation. Process innovation requires heavy investment; new machines and personnel skills involve large sums of money. The study narrowed its frame to product innovation which is different from the current study that considers product innovation along with technology, process, and market innovation and employs a smaller sample size for effectiveness.

Barasa et al. (2019) opine that research development and foreign technology have less impact on technical efficiency innovation, while the influence of the combined impact of foreign technology and internal research development on technical efficiency is positive. This study had a sample size of 418 and covered the whole of Africa. This was a cross-sectional study, and with a sample size of 418, it was unrealistic to cover the whole of Africa in one study and draw valid conclusions. Furthermore, they used secondary data that must have had hidden errors. This current study uses primary data with a smaller sample size (182) and only covers one country, Kenya. The research focused on foreign technology as implemented in the local environment. This study focuses on innovation irrespective of whether foreign or local. This is because a firm grip on the local environment through the right innovation enables the firm to effectively exploit the locally available resources. This propels the firm to lower per unit cost of production, thereby gaining a competitive advantage in the marketplace.

Further, a study by Zainurossalamia et al. (2016) with a sample size of 164 which investigated the influence of innovation on the performance of Small and Medium Enterprises (SME) in Indonesia, established that innovation determines the level of firm competitive advantage gained from superior customer value at low cost. However, the investigation only factored in mediating variables neglecting moderating variables using structural equation modelling and the least square approach on data obtained in Indonesia. This study extended the approach by examining individual innovation sub-variable effects on performance using a bigger sample size and comparing the results. The analysis uses both SPSS and smartPLS4 for graphical presentation.

Research Methodology

General background

This investigation implemented a descriptive cross-sectional assessment plan. The cross-sectional survey design suitability enhances uniform data collection and analyses several respondents simultaneously. Consequently, the researcher also gets the chance to evaluate population characteristics and test quantitative and qualitative hypotheses (Christine et al., 2016). A cross-sectional orientation focuses on the credibility of the outcome by simultaneously stating conclusions based on data. Then again, descriptive investigation design is proper for this inquiry; it detaches the researcher from the study's outcome (Harrison, Reilly, & Creswell 2020). The population of this work comprises all firms registered with KAM with active membership in Kenya 2018. The association keeps the most updated data on manufacturers in Kenya. It indicated that there were 1,313 members in the country. The target population encompasses all these small, medium, and large manufacturing firms in Kenya. These firms cut across the entire sector within Kenya and form the study population.

Research Sample

The investigation used a random sampling approach to configure 298 firms out of 1313 available. The sample size for the study was determined following Krejcie Morgan's (1970) table. Based on the table population size 1,313, the sample magnitude of 298 is adequate. This was determined by interpolation, that is 297 + ((1,313 – 1,300))/ ((1,400 – 1,300)) * (302 – 297), which was further re- distributed proportionately to the selected subsectors. This was further weighted on 14 manufacturing sector categories to know precisely how many firms were to be involved in the investigation from each sub-group as presented in Table 1.

Table 1: Population of Study

Manufacturing Firm Categories	Population	Sample Size
Building, construction and mining sector	58	13
Chemical and allied sector	113	26
Energy, electrical and electronics	67	15
Food and beverage sector	262	59
Fresh produce/agriculture	21	5
Leather industry	19	4
Metal and allied sector	113	26
Motor vehicle and accessories	77	17
Paper and board sector	89	20
Pharmaceutical and medical equipment	36	8
Plastic and rubber sector	107	24
Services and consultancy	226	51
Textiles and apparel	85	19
Timber, wood and furniture sector	40	9
Total	1,313	298

Source: KAM 2018

Instrument and procedure

Drop, pick, and interview using a structured questionnaire approach guided information gathering from middle to top-level managers this ensured flexibility during the data collection stage. One respondent per firm was the target. This involved the researcher and specialised research assistants. These respondents were regarded as wealthy with strategic and tactical information on innovation and successes of their firm. The pilot survey approach ensured the respondents interpreted questions similarly and minimised ambiguity and compound questions. Each variable examination was interpreted using a five-point Likert scale. The close involvement of the lead personnel in the investigation was to safeguard data accuracy and enhance the response rate.

Data Analysis

Scrutiny of the returned questionnaire for completeness, the number reduced to 182. This reflected a response rate of 62%, regarded as adequate (Vasileiou, Bernett, Thorpe, & Young, 2018). The data examination approaches included Statistical Package for the Social Sciences (SPSS) software, coding, inferential and descriptive statistics as indicated in Table 2

Table 2: Descriptive Statistics of Operational Innovation Practices, and Firm Performance

Study Variables	Sample Size	Minimum	Maximum	Mean	Standard Deviation
Product	182	2	5	3.50	0.620
Process	182	1	5	3.36	1.174
Market	182	2	5	3.67	0.536
Technology	182	2.33	5.00	3.66	0.596
Innovation practices	182	2.25	4.58	3.49	0.559
Performance	182	1.64	4.82	3.33	0.839
Valid N (listwise)	182				

Source: Research Data, 2022

Product innovation scored 3.50 and 0.620 as mean and standard deviation respectively, which reflects the ability to enhance the user experience with the product while also addressing the design and quality of raw materials of the product. Process innovation, scored 3.36 as mean and 1.174 for standard deviation, deals with improved methods of product delivery. This has a great effect on the production. It is intended to reduce the cost of production, which, if low, leads to a competitive advantage for the firm. Additionally, score of 3.670 as mean and 0.536 standard deviation for market innovation, which focused on the satisfaction of the final consumer by addressing the design, product introduction, pricing, and products packs design Lastly, average score and standard deviation relating to technical innovation were 3.73 and 0.5962, respectively., which largely emphasized the application of emerging organizational techniques within business practices of the organization. Overall, the mean score indicated that most of the respondent rated their firm as 3.50 equivalent to concurring that innovation activity is prevalent in most firms. This led to the conclusion that innovation is common in most manufacturing firms within Kenya

Further analysis to ensure scientific rigour, reliability and validity test was done. Based on the Kaiser Olkin and Bartlet test of sphericity, all the items met the minimum threshold of 0.3 (Hariyati & Zulpan, 2018) and were subjected to other tests. Construct validity examination reflected that most items scored a minimum threshold of 0.4 (Stephenson, 2002). The model error term of normality was more than 0.05, reflecting that the model was acceptable. Multicollinearrity assessment based on Variance Inflation Factor (VIF) to indicate the level of correlation among the independent variable with an acceptable value pegged at below 10 (Hair, Black, Babin & Anderson, 2019). Most items scored below 10; hence collinearity was confirmed, minimum and within acceptable levels. Again, the regression analysis approach was used to draw conclusions from the data further.

One hundred eighty-two (182) of the returned administered questionnaires qualified for further analysis. This represented a 60% response rate closely explained by the close

involvement of the lead researcher and trained research assistants who could convince the respondents of the security of their information and other confidential data.

SPSS application software aided the analysis based on regression, which covered the summary model, Goodness of fit ANOVA, and coefficient of determination (R^2) involving standardised and unstandardised coefficients. The coefficient values ranged between 0 and 1, where a figure near 1 indicates a stronger relationship while one closer to 0 indicates a weak one. SPSS was preferred since it can be used in qualitative and quantitative data analysis (Eyisi, 2016).

This investigation purposed to determine the effect of operational innovation on the performance of manufacturing firms in Kenya. Operationalisation of operational innovation factored four dimensions; product, process, market and technological innovation. However, firm performance similarly was operationalised based on operations: the resolution of customer's complaints, lead time, the accuracy of orders, producing goods of value to customers, differentiated value, customer relationship management, high human resource retention, improved internal processes, clear understanding of external factors. From the literature review, there is a sufficient threshold that operational innovation practices and manufacturing firms in developing countries like Kenya require unprecedented scrutiny. This is because various government regimes have continued providing credit facilities but still perform poorly. Consequently, the hypotheses listed below were tested:

$H_{0:}$ Operational innovation does not have a significant impact on the performance of manufacturing firms.

$H_{01:}$ Product innovation does not have a significant impact on the performance of manufacturing firms.

$H_{02:}$ Process innovation does not have a significant impact on the performance of manufacturing firms.

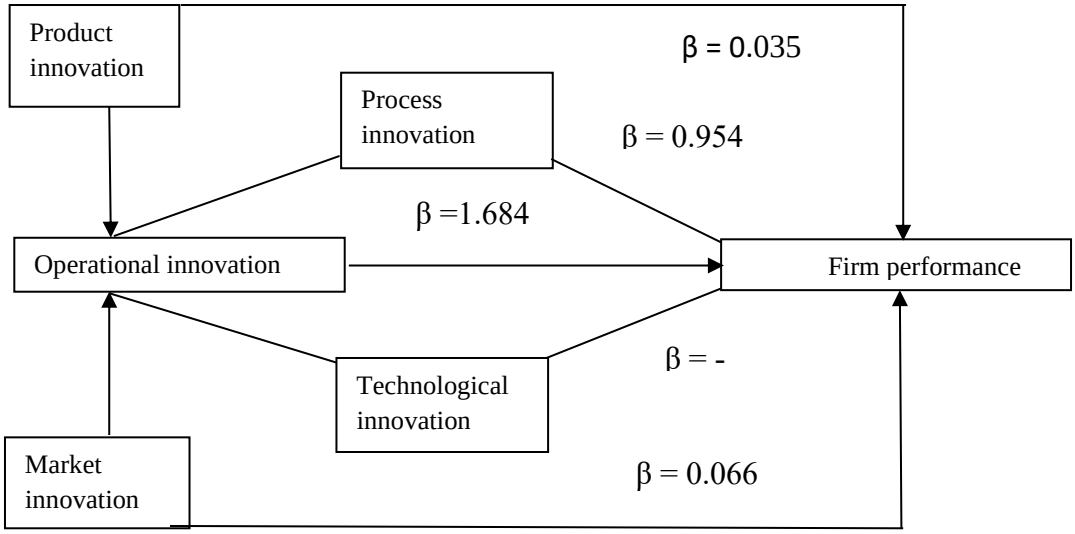
$H_{03:}$ Market innovation does not have a significant impact on the performance of manufacturing firms.

$H_{04:}$ Operational innovation does not have a significant impact on the performance of manufacturing firms.

Results of Research

The simple regression analysis model was adopted to examine the nature of the effect of operational innovation practices on manufacturing firms' performance by determining the magnitude of the coefficients. This was done guided by the following model: Firm performance (FP) = Constant ($\beta 0$) + Coefficient of Innovation (β_1INN) + Stochastic factors (ε.). This was similarly done considering the individual sub-variables of innovation and magnitude in terms β results are indicated in Figure 1.

Figure 1: Effect of operational innovation on the Performance of Manufacturing Firms in Kenya



Source: Research data 2022

Figure 1 indicates a significant positive correlation between the study variables- the firm's operational innovation and performance.

From Table 1, since R was 0.922, firm innovation practices (FirmInnoPract) consisting of technological innovation (TechInn), market innovation (MktInn), process innovation (Procinn), and product innovation (ProdInn)) correlated well with firm performance and accounted for 85.1 per cent of all variation in firm performance since R square was 0.851. This is an indication of a model with high explanatory power. Target variables in the examination accounted for 14.9 per cent of all the variations in performance. To evaluate the relevance of the linear regression model, an analysis of variance (ANOVA) test was performed. Since the p figure of (0.000) was below the level of significance (0.05), the model was significant overall, indicating that company innovation had an enormous impact on Kenya's manufacturing firms' performance and that the null hypothesis (H_0) was disregarded. Regarding each significance, both the constant-value and firm innovation value were vital as their p-figures were below 0.05 (see Table 1.1). So, the predictive equation was FP = -2.613 + 1.684 INN implying that if firm innovation were increased marginally, the performance of manufacturing firms would, on average, go up by 1.684 units holding other factors constant. Table 3 presents the effects of operational practices on the performance of the firm.

Table 3: Regression Model Summary for Operational Innovation Practices against Firm Performance

Model Summary			
Model	R	R Square	Adjusted R Square
1	.922	.851	.850

Goodness of Fit ANOVA						
Model		Sum of Squares	df	Mean-Square	F	Sig
1	Regression	215.249	1	215.249	1027.621	.000[b]
	Residual	37.703	180	.209		
	Total	252.952	181			

a. Dependent Variable : Performance

b. Predictors : (Constant), Innovation Practices

Coefficients[a]					
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std Error	Beta		
1	(Constant)	-2.613	186		-14.052	.000
	FirmInnoPract	1.684	.053	.922	32.057	.000

a. Dependent Variable: FirmPerf

Source: Research Data 2022

Furthermore, this study had four sub-variables of innovation; product, process, market and technological. Multiple regression was implemented to determine the magnitude of the contribution of each of them to the link between innovation and firm performance. Table 4 reflects individual subcontracts' contribution to the link between innovation practices and firm performance.

Table 4: Regression Model Summary for Individual Firm Innovation Practices against Firm Performance

		Model Summaryb					
Model	R	R Square	Adjusted R Square				
1	.955	.990	.990				
		Goodness of Fit ANOVA [a]					
Model		Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	250.391	4	62.598	4326.590	.000[b]	
	Residual	2.561	177	.014			
	Total	252.952	181				
		a. Dependent Variable : Performance					
		b. Predictors : (Constant), Techinn, MktInn, ProdInn, ProcInn					
		Coefficients[a]					
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
		B	Std Error	Beta			
1	(Constant)	-.283	.070		-4.061	.000	
	Product Innovation (ProdInn)	.035	.018	.019	1.955	.052	
	Process Innovation (ProcInn)	.954	.014	.947	70.501	.000	

	Market Innovation (MktInn)	.066	.018	.047	3.656	.000
	Technological Innovation(Tec Inn)	-.005	.014	.003	-.382	.703
		a. Dependent Variable: FirmPerf				

Source: Research Data 2022

The four sub-constructs correlated positively with the firm performance since R-values were at .995. They accounted for 99 % of the variation in firm performance since R square was .990. High independent variable explanatory power on the dependent variable; business performance was disclosed

To evaluate the significance associated with the regression model, an analysis of variance (ANOVA) was performed. Except for product innovation, which had a p-figure of 0.052 larger than 0.05 and was therefore marginally insignificant, all of the sub-components were significant since their p-figure (0.000) was below the acceptable level of significance (0.05). Individual contribution to the firm performance was -.283.035, .954, .066, -.005 for constant, product, process, market and technological innovation, respectively. Process innovation had the highest contribution, while technological innovation came last (see Table 4.25 above). So, the predictive equation was FP = -.283 + .035 ProdInn + .954 ProcInn + .066 MktInn + -.005 TechInn, implying that if product innovation was increased marginally, the performance of manufacturing firms will, on average, go up by .035 units holding other factors constant while increasing process innovation by one unit, firm performance increases by .954 holding other factors constant. Technological innovation is the worst; while holding other factors constant, the same action reduces firm performance by 0.005. Based on the results, hypotheses H_{01}, H_{02}, H_{03}, and H_{04} were rejected, and failed to reject H_{04}, $p > 0.05$

The investigation findings established a reasonable positive link between operational innovation and firm performance. Product, process and market innovation are also positively linked to firm performance. Technological innovation, through adopting new information and communication technology, adopting systems like ERP, using 4G technologies and block chain technology, revealed a negative relationship with firm performance.

Conclusion and Recommendations

Key players in the manufacturing sector, for instance, should be aware that not all strategic operational innovation components lead to improved results and instead should work to acquire a combination of factors by carrying out many consultative meetings to agree on the right innovation frontier that can boost organizations' success.

Firm innovation influences the performance of most manufacturing firms in Kenya. The firms attain this through the frequent remodelling of the products, interacting with consumers cleverly, reviewing operational processes and redesigning products. Firms that invest so much in adopting new information technology automate routine task performance rarely improves. This is because they are expensive and require vast sums of money for their implementations. They also affect unit cost of production,

translating to expensive products in the market.

Areas of Further Research

The manufacturing firms of Kenya distributed throughout the country were the focus of this study, and the majority of them were small, medium-sized, and continuing to gain experience and covered the period of Covid 19. Conducting a similar study to assess the Covid-19 impact on the relationship between innovation and firm performance is of concern. In terms of years of experience in manufacturing, a similar study is required to cover only firms with over 20 years in manufacturing. This is critical because such firms are regarded as mature enough and have experienced many different economic conditions.

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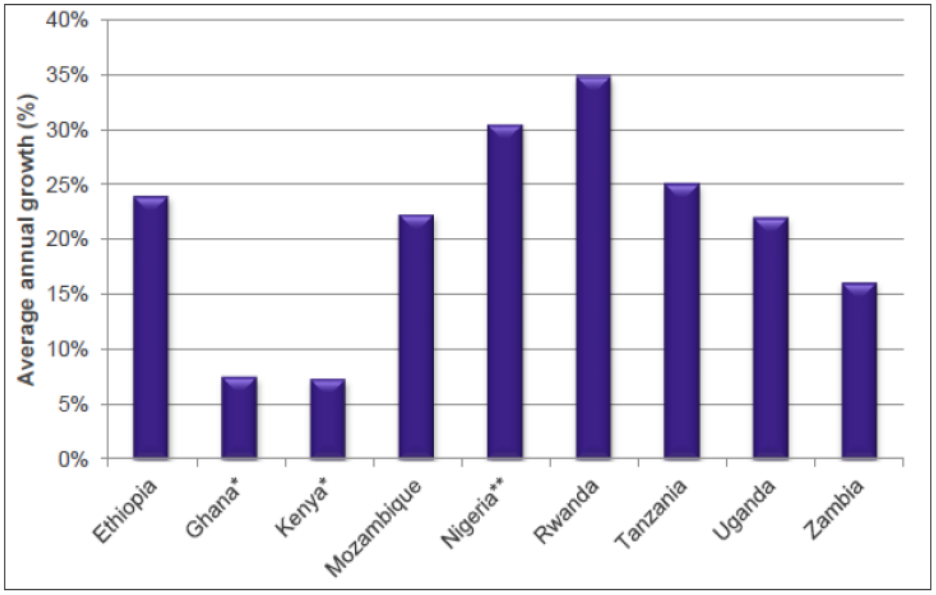
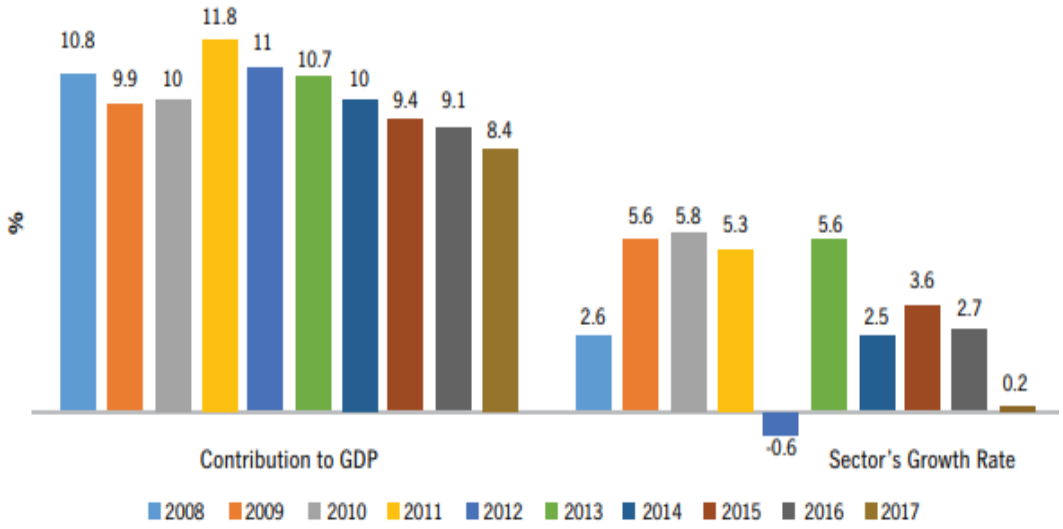
APPENDICES

APPENDIX I: Average Annual Growth in the Value of Manufacturing Exports to the World 2005- 2014



Source: ODI (2016).

APPENDIX II: Manufacturing Sector as Percentage of Gross Domestic Product and its Contribution to the Economic Growth in Kenya



Data source: KNBS-Economic surveys, various issues