

Relationship between Product Remodeling and Performance of Manufacturing Enterprises in Kenya

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Abstract: For any ground-breaking process to have any successful contribution in an organization, it needs to have a positive effect on the performance of an organization. Hence, the inventiveness of an organization is the overall combination of the firm's achievements due to transformation and effective upgrading carried out after considering various aspects of the firm's inventive capacity. The study utilized the Diffusion Theory of Innovation. The target population was senior managers of all the 710 manufacturing companies in Nairobi and the surrounding areas. To determine the sample size, the statistical formula suggested by Mugenda and Mugenda (2003) and Saunders *et al.* (2009) was used to arrive at a sample size of 274. The researcher employed stratified simple random sampling technique based on sub-sector of manufacturing enterprises. Data collection was done through a structured open and closed ended questionnaire. Before embarking on data collection, the instruments were piloted to ensure they are valid and reliable. The study established a negative relationship between product remodeling and performance ($\beta = -0.125$, p -value = $0.038 < 0.05$). The study recommended that the management of manufacturing enterprises in Kenya should endeavor to carry out thorough market research to determine the effect of product remodeling a product on the overall performance of the enterprise. Government institutions in Kenya such as Kenya Industrial Research Institute should assist manufacturing enterprises in terms of research and development of new products or improvement of existing ones. Such institutions should enhance industrial research especially in the field of strategic innovation techniques so as to improve performance in the manufacturing sub sector.

Keywords: *Product remodeling, performance of manufacturing enterprises, customers' satisfaction, new product development.*

I. Introduction

As noted by Gunday, Ulusoy, Kilic and Alpan (2011), for any ground-breaking process to have any successful contribution in an organization, it needs to have a positive effect on the performance of an organization. Hence, the inventiveness of an organization is the overall combination of the firm's achievements due to transformation and effective upgrading carried out after considering various aspects of the firm's inventive capacity. That includes process, products, management structure and marketing.

Companies in vibrant industries use techniques differently that are brought about by global changes. Whilst some improve their current products, others utilize strategies geared towards efficiency in operations. In an effort to attain a competitive edge, there is need to focus on distinctive activities. Efficiency in operational activities is important but not enough to maintain competitive advantage (Porter, 1990). Undeniably, albeit with mixed results, a considerable number of MEs were initiating quality programs in the 1990s (Craig & Douglas, 2000). While USA enterprises were examining the process of invention of manufacturing enterprises, it was observed that economic incentives, technical and organization competencies, and internal resources have developed over time (Bhhatia-Panthaki, 2007). Consequently, an enterprise's communication to sources of external expertise of new Technological adoption was the key sources of motivation to adopt new inventions. As suggested by Onyango and Tomecko (2008), the new product development perspective comprises of assembling two key components: technology and market. They further argue that product

invention needs the organization to have expertise and competencies relating to customers, which allow the enterprise to serve target customers as well as make unique products (Naude & Szirmai, 2013).

Kenya Bureau of Statistics describes the Kenyan formal sector today is made up for 62% of all businesses in the nation (Mbugua, Mbugua, Wangui, & Kariuki, 2013). Enterprises in the country absorb more than 50% of new graduates and job seekers. Besides, the sector has an employment growth rate of 12% to 14% annually and contributes approximately 30% of total employment (Kiveu&Ofafa, 2014). A study conducted by Mbugua *et al.* (2013), manufacturing enterprises contributed 50% of new jobs created in 2005. Besides, the survey noted that the important role the sector plays in creating new jobs contributes in excess of 33% of the value-added in retail and manufacturing trade in Kenya. Based on the Vision 2030, Kenya hopes to be a medium income country, industrialize fast and be competitive internationally. To realize this vision, the country must grow its GDP by between US\$ 4 to 6 billion annually which translates to a growth rate of approximately ten per cent per year. To achieve the envisaged growth rate of ten per cent presents a significant challenge for the country since Kenya has grown at close to 5% annually for the last few years (Government of the Republic of Kenya, 2013). This study hence was triggered to explore the progress achieved so far towards solving the challenges. Government of Republic of Kenya appreciates that the major driver for economic growth and development is the manufacturing sector. Indeed, industrial initiatives generate jobs, improve GDP and contribute to wealth accumulation. As such, Kenya aims to have a robust, diversified, and competitive manufacturing sector.

II. Literature Review

2.1 Theory Informing the Study

This study utilized the Diffusion Theory of Innovation that is based on the idea that adoption of an invention concerns the impulsive or planned spread of new ideas. According to Rogers (1995), the idea of making changes that are vital where the idea seems new to the adopter, then it should be considered to be an invention. The theory posits that where there exists an invention it is thought to cause uncertainty in the minds of the adopters and that the uncertainty suggests lack of predictability and of information.

The theory explains how over time, an idea or product increases and diffuses or spreads within a particular population or society. Eventually, this diffusion means that people as part of a social system adopt a new concept, demeanor, or product. Adoption suggests that a person will do something in a different way than he previously did in terms of purchase preferences or use a new product, acquire and or behave in a different way. The main feature in adoption is that a person should see the idea, behavior, or product as a new or innovative. It is utilizing this feature that diffusion is possible. Adopting a new idea, behavior or even product remodeling does not occur instantaneously in a society but rather it is a procedure whereby certain individuals are better fitted to adopt the invention than others. Studies have found that individuals who adopt an innovation at its initial stages have distinct features than those that adopt at its later stages (Hager, 2006).

2.2 Empirical Review

A product remodel can easily be known by stakeholders of an organization. It normally needs continued research and development so as to provide competition in the market. According to Roberts (2012), product remodeling is one of the major features that contribute to the success of an organization. Product remodeling involves the introduction of new products or services or even introducing tangible advancement in the existing products or service. In product remodeling, the product needs to either be new or significantly advanced in terms of its characteristics, how it is intended to be used, or user-friendly in terms of components and materials (Polder, Leeuwen, Mohnen& Raymond, 2010). The evaluation of innovation at the organizational level involves efficiency in finances, efficiency in process, influence and motivation of the employees including the advantages of the customers. The values measured will differ between organizations for instance in form of new product revenue, cost of research and development, time it takes for the new product to be introduced in the market, customer and employees' response and satisfaction, number of patents required and additional revenue from previous advancements (Frankelius, 2012).

The sentiments of Lo (2014) reveal that for a business to be capable of producing continuous flow product remodeling it is imperative for the business to improve performance of the business and that product remodeling is vital for an organization to be able to survive in a competitive market since competition increases on a regular basis. There are two different types of innovations; incremental and radical innovation. Incremental innovation stresses on characteristics or cost reduction of previous products or services in terms of the product or process. Conversely, radical innovation stresses the services, process and product with unique performance characteristics Shqipe, Gadaf and Veland (2013).

De Faria and Mendonça (2011) assert that several studies have revealed that product remodeling has a positive effect on financial performance. The study by Atalay, Anafarta and Sarvan (2013) that surveyed the top management of 113 top management firms in the automotive sector of Turkey revealed that product remodeling has a positive and significant impact on firm performance. In Malaysia, Rosli and Sidek (2013) study on the impact of innovation on small and

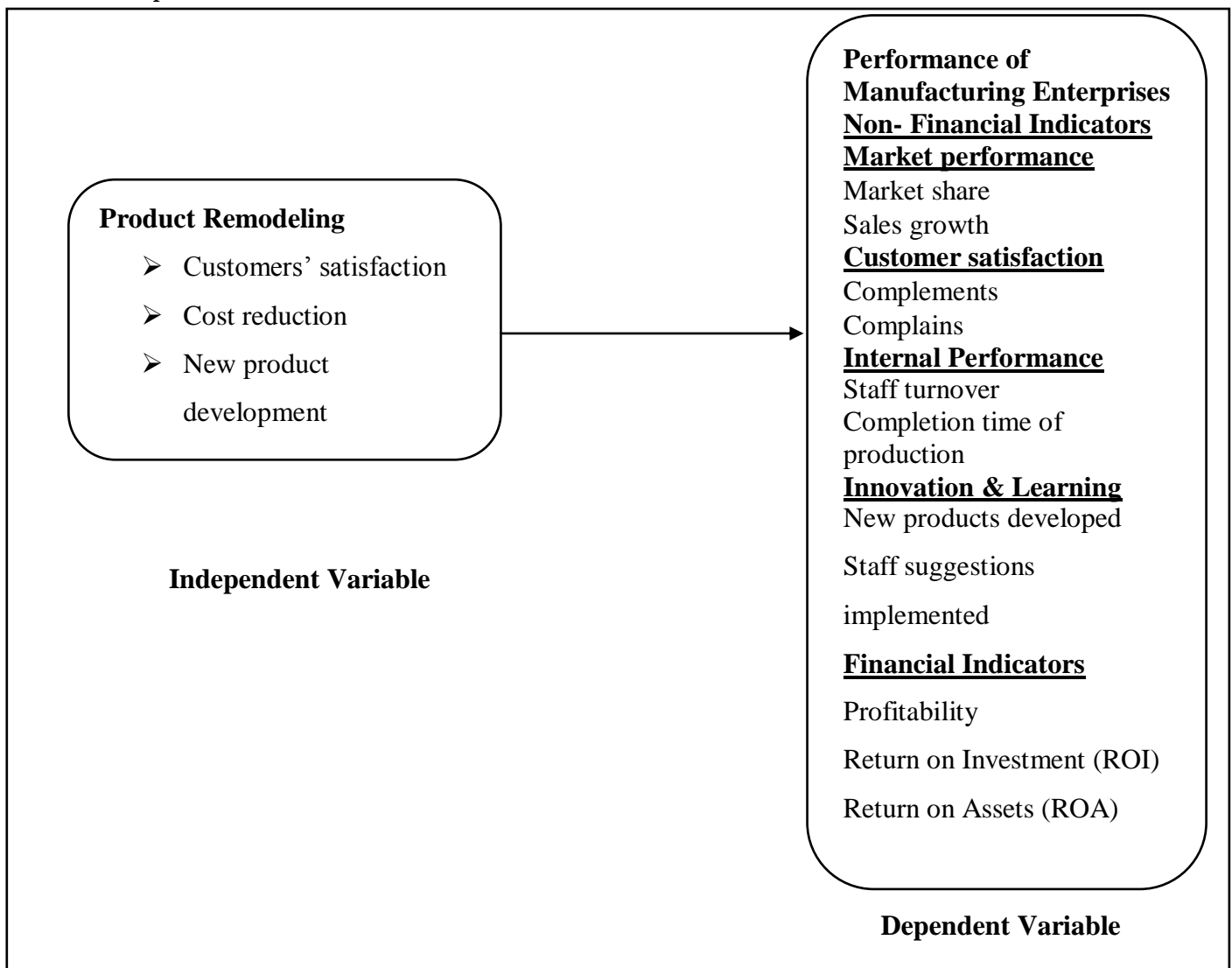
medium manufacturing enterprises found that the parameters of product remodeling that is, their importance and effectiveness contributed and increase firm performance.

A study by Oke, Prajogo and Jayaram (2013) on 207 firms in Australia concluded that product remodeling and product quality performance had a positive effect on organization performance. Similarly, Hall (2011) study revealed a positive correlation between product innovation and productivity. In another study by Augusto, Lisboa and Yasin (2014), the authors utilized regression and factor analysis techniques to determine the correlation between firm performance and various types of innovation. They concluded that product remodeling is the most important innovation in enhancing organization performance than other innovation types. By adopting hierarchical regression analysis, Mohamad and Sidek (2013) endorsed their hypothesis that product remodeling had a major effect on organization performance and Camison and Lopez (2010) made a similar conclusion by asserting that that product remodeling played an important role in maintaining competitive advantage of an organization.

The study by Suhag, Solangi, Larik, Lakho and Tagar (2017) on the relationship of innovation with organizational performance revealed that product innovation, process innovation and organizational innovation revealed that the three dimensions were positively correlated with organization performance. Whilst utilizing organizational culture as a moderating variable, the authors distributed 200 questionnaires to employees in the telecommunication sector of Pakistan in Islamabad and Rawalpindi cities.

In Africa, there is deficiency on studies that focus on manufacturing sector and those that do only concentrate on one manufacturing sub- sector. The empirical study by Hu, Danso, Mensah and Addai (2020) asked the question: Does innovation type influence firm performance? A dilemma of star-rated hotels in Ghana.

2.3 Conceptual Framework



III. Research Methodology

The researcher adopted a cross-sectional research design. This is because the objective was to collect data at one given time so as to determine the influences of the stated hypotheses on the chosen organization performance parameters. Additionally, a cross-sectional research design was preferable since the manufacturing enterprises are divided into different sectors based on what they manufacture.

The target population included all the 710 manufacturing companies in Nairobi and the surrounding areas (includes Thika, Kiambu, Athi River, Ruiru, Mlolongo and Kikuyu) as listed by Kenya Association of Manufacturers and Exporters (KAM) 2017 directory. The researcher established that KAM maintains the most update coverage of manufacturing enterprises in Kenya. The KAM (2017) directory classifies enterprises into 13 sub-sectors of manufacturing based on the products they manufacture. The sub-sectors are Building, Mining and Construction; Chemical & Allied; Energy, Electrical and Electronics; Food & Beverages; Fresh Produce; Leather and Footwear; Metal and Allied; Motor Vehicle Assemblers and Accessories; Paper & Board; Pharmaceutical & Medical Equipment; Plastic & Rubber; Textile & Apparels; and Timber, Wood & Furniture sector. The researcher employed stratified simple random sampling technique based on each sub-sector.

To determine the sample size, the statistical formula suggested by Mugenda and Mugenda (2003) and Saunders *et al.* (2009) was used. They observe that sample size depends on how confident the researcher wants to be that the estimate is accurate (the level of confidence in the estimate), how accurate the estimate needs to be (the margin of error), and the proportion of responses expected to have some particular characteristic.

Hence, sample size (Mugenda & Mugenda, 2003; Saunders *et al.* 2009) was computed as follows:

$$n = (z^2 \cdot p \cdot q) / e^2$$

Where:

n is the minimum sample size required

z the standard normal deviate that is, 1.96 for 95% confidence level

p is the proportion in the target population estimated to have the characteristic, recommended to be 50% if there is no estimate available of the proportion in the target population assumed to have the characteristic of interest.

q is the proportion not having the characteristic (that is, $1-p$)

e is the level of significance or margin of error (set at 5% in this study).

Substituting the data in the formula gave a sample size of 384.

Saunders *et al.* (2009) suggest that where the population is less than 10,000, as was the case in this study, smaller sample size called adjusted minimum sample size can be used without affecting the accuracy of the study. This is calculated using the following formula (Mugenda & Mugenda, 2003; Saunders *et al.* 2009):

$$n' = n / (1 + n/N)$$

Where:

n' is the adjusted minimum sample size

n is the minimum sample size, as calculated above, that is, 384

N is the total population, that is, 710

Substituting these figures into the formula gave a minimum sample size of 249. Bryman and Bell (2007) advise that in sample size determination, the problem of non-responses should be borne in mind. In this study, it was expected that there could be a 10 per cent rate of non-response. Thus, an additional 10 per cent of the desired sample that is 25 enterprises were included in the study. Hence, the target sample size was 274 enterprises.

IV. Findings

4.1 Response Rate

The unit of analysis in this study was the enterprise as each enterprise has unique sets of product remodeling and different level of performance. Questionnaires were distributed to 274 enterprises in Nairobi and surrounding areas. After follow-ups, questionnaires from 193 enterprises were completed and returned in a form usable for analysis, which constituted a response rate of 70.44 percent. This response rate was considered good as suggested by Bryman and Bell (2015) who postulated that 60% is sufficient sample size. Table 1 shown below represented the response rate after stratification of each sub-sector and later simple random sampling.

Table 1: Questionnaire Response Rate

Manufacturing Sub- Sector	No. of questionnaires given out	Questionnaires returned	Percentage response (%)
Building, Mining and Construction	8	6	75.00
Chemical & Allied	30	21	70.00
Energy, Electrical and Electronics	18	13	72.22
Food & Beverages	55	40	72.73
Fresh Produce	3	2	66.67
Leather and Footwear	3	2	66.67
Metal and Allied	38	27	71.05
Motor Vehicle Assemblers and Accessories	22	15	68.18
Paper & Board	29	20	68.97
Pharmaceutical & Medical Equipment	10	7	70.00
Plastics & Rubber	29	20	68.97
Textile & Apparels	20	14	70.00
Timber, Wood & Furniture	9	6	66.67
Total	274	193	70.44

4.1 Results of Descriptive Statistics

This section presents the findings of the descriptive statistics on product remodeling. The respondents were asked to indicate the extent to which they agreed on the items of the statements relating to marketing advancement of their enterprises. Each item had a 5-point Likert-type scale ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (5). The responses were analysed using mean scores, standard deviations and coefficient of variation. Higher mean scores indicated strong agreement on an item whereas lower mean scores indicated strong disagreement with the statements.

Table 2: Descriptive Statistics of Product Remodeling

Product Remodeling Items	N	Mean	Std.Deviation	CV (%)
The enterprise remodels new products based on customers feedback	193	4.27	0.783	18.33
The enterprise remodels new products in response to competition	193	4.02	0.878	21.84
New products are remodelled to reduce cost of production	193	4.00	0.851	21.27
New products are remodelled to reduce cost of production	193	4.26	0.794	18.63
Our enterprise develops new products to improve customer satisfaction	193	3.85	0.943	24.49
Overall Mean		4.08	0.85	20.91

As indicated in Table 2, the item with the highest mean score was “The enterprise remodels new products based on customers’ feedback” ($M= 4.27, SD= 0.783$) while the item with the lowest mean score was “New products are remodelled to reduce cost of production” ($M= 4.00, SD= 0.851$). On further inspection of the results revealed that the item with the highest variability was “Our enterprise develops new products to improve customer satisfaction” ($CV= 24.49\%$) while the item that had the lowest variability was “The enterprise remodels new products based on customers’ feedback” ($CV= 18.33\%$) which implies that the mean score of the item with the highest C.V Our enterprise develops new products to improve customer satisfaction”) is more likely to change than that with the lowest C.V (“The enterprise remodels new products based on customers’ feedback”). The CV revealed that the variability is likely to disperse at 21% from the mean. This is interpreted to imply that the mean will not be likely to deviate from the current results ($CV=20.91\%$).

The overall mean score on product remodelling was 4.08 which were interpreted to imply that the manufacturing enterprises do regularly remodel their products. The results of the current study are consistent with the Malaysian study

of Rosli and Sidek (2013) study on the impact of innovation on small and medium manufacturing enterprises found that the parameters of product remodeling that is, their importance and effectiveness contributed and increase firm performance.

4.2 Relationship between Product Remodeling and Performance

The study sought to assess the effect of product remodelling on the performance of manufacturing enterprises in Kenya. To assess the effect, the hypothesis was formulated as follows:

H₀: Product remodeling has no significant influence on the performance of manufacturing enterprises in Kenya.

The analysis was done using simple regression. Product remodeling was entered as the independent variable in the regression model while performance parameter was entered as the dependent variable.

Table 3: Model Summary for Goodness of Fit of the Effect of Product Remodeling on Performance

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.150 ^a	.022	.017	1.100	

a. Predictors: (Constant), product remodeling

The Table 3 revealed that product remodeling only explained 2.2% of the variation in the performance of enterprises (R² =0.022). This meant that 98% of the variance in performance was explained by other factors.

Table 4: ANOVA for the Significance of the Effect of Product Remodeling on Performance

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.288	1	5.288	4.370	.038 ^b
	Residual	231.147	191	1.210		
	Total	236.435	192			

a. Dependent Variable: performance
b. Predictors: (Constant), product remodeling

The ANOVA results in Table 4 indicated that the dimension of product remodeling on performance was statistically significant in predicting performance under the model (F=4.370 p=0.038 < 0.05)

Table 5: Regression results for the Effect of Product Remodeling on Performance

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
		B	Std. Error			
1	(Constant)	4.151	.242		17.165	.000
	product remodeling	-.125	.060	-.150	-2.090	.038

a. Dependent Variable: performance

The result in the model Table 5 revealed a statistically significant regression coefficient for product remodeling (β = -0.125, p-value=0.038 < 0.05) indicating that there is linear dependence of Performance of enterprises on product remodeling hence one-unit increase of product remodeling, performance would decrease by 0.125 implying a negative correlation between product remodeling and Performance of enterprises. The implication is that product remodeling has a negative effect on manufacturing enterprises in Kenya. Hence we reject the null hypothesis that; H₀: Product remodeling has no significant influence on the performance of manufacturing enterprises in Kenya.

These results indicate that manufacturing enterprises should be vigilant while remodeling their existing or introducing new products in the market. As noted in the empirical literature, a product remodel usually needs constant research and development so as to provide competition in the market. According to Roberts (2012), product remodeling involves the introduction of new products or services or introduction of tangible advancement in the existing products or service. He notes that product remodeling is one of the major features that contribute to the success of an organization. There is need for a product to either be new or significantly advanced in terms of its features, the intention of its use or user-friendly in terms of components and materials (Polder *et al.*, 2010).

The results of the current study are inconsistent several global studies. For instance, the study by Atalay, Anafarta and Sarvan (2013) that surveyed the top management of 113 top management firms in the automotive sector of Turkey revealed that product remodeling has a positive and significant impact on firm performance. Similarly, in Malaysia, Rosli and Sidek (2013) study on the impact of innovation on small and medium manufacturing enterprises found that the parameter of product remodeling was important and effective in contributing to increase in firm performance.

A study by Oke, Prajogo and Jayaram (2013) on 207 firms in Australia concluded that product remodeling and product quality performance had a positive effect on organization performance. Similarly, Hall (2011) study revealed a positive correlation between product innovation and productivity. In another study by Augusto, Lisboa and Yasin (2014), the authors utilized regression and factor analysis techniques to determine the correlation between firm performance and various types of innovation. They concluded that product remodeling is the most important innovation in enhancing organization performance than other innovation types. By adopting hierarchical regression analysis, Mohamad and Sidek (2013) endorsed their hypothesis that product remodeling had a major effect on organization performance

V. Conclusions and Recommendations

5.1 Conclusions

To support the empirical findings of this study, the study sought to examine the effect of product remodeling on performance of manufacturing enterprises in Kenya. Primary data was used in the study of 193 managers of the 274 different manufacturing enterprises that were sampled.

The objective of the study was to analyze the relationship between product remodeling and performance of manufacturing enterprises in Kenya. In order to answer this objective, the null hypothesis formulated was: H_0 : Product remodeling has no significant influence on the performance of manufacturing enterprises in Kenya. According to the results of the study, there was a negative statistically significant relationship between product remodeling and performance ($\beta = -0.125$, $p\text{-value} = 0.038 < 0.05$). The null hypothesis was therefore rejected. The researcher hence concluded that based on the current study, there is evidence to suggest that product remodeling negatively influences performance of manufacturing enterprises in Kenya. It was further concluded that manufacturing enterprises ought to be careful when introducing new products or remodeling existing ones since they may have a negative effect on performance.

5.2 Recommendations

Based on the results of the current findings and the conclusions, the researcher made the following recommendations:

1. The management of manufacturing enterprises in Kenya should endeavor to carry out thorough market research to determine the effect of product remodeling a product on the overall performance of the enterprise.
2. The policy makers through the various governmental institutions such as Kenya Industrial Research Institute (KIRDI) should enhance industrial research especially in the field of strategic innovation techniques so as to improve performance in the manufacturing sub sector. Such institutions should also assist manufacturing enterprises in terms of research and development of new products or improvement of existing ones.

6.0 Areas for Further Research

The current study sought to determine the relationship between product remodeling and performance of manufacturing enterprises in Kenya. This research utilized a specific dimension of strategic management and as such there is need to focus on other dimensions of strategic management. In addition, the current research concentrated on determining the relationship between product remodeling and performance of manufacturing enterprises in Kenya. A comparative study should be done in other sectors. This will be to ensure whether they will achieve similar or contrary results.

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