Influence of Customer Demand and Green Product Innovation on Firms’ Performance: A Case of Food Processing Firms in Tanzania

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Abstract
The study aimed at examining relationship between customer demand and green product innovation to firms’ performance as a way of creating wealth to the business. Lack of clear link between these variables and limited literature in Tanzanian context produced a research gap to study with the following research questions: a) Does customer demand influence green product innovation? b) Does green product innovation stimulate a firm’s performance?

Data were collected from 75 manufacturing firms in Dar es Salaam using questionnaire from the CEOs, technical and marketing directors of the selected companies. The collected data were analysed using descriptive statistics and Chi-square to establish the relationship between the variables of the study.

The study findings indicated relationship between customer demand and green product innovation, and between green product innovation as well as firm’s performance. It implies that managers have to study customer preferences and buying behaviours so as to develop flexible strategies to satisfy their demand. By so doing, managers will be in a

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position to develop new green products to meet customer needs that are likely to be priced high and ultimately may enhance business revenue that would lead to business performance.

**Keywords:** Customer demand, Green Innovation, firm’s performance and wealth creation

**Introduction**

Currently, there is an increased debate and interest on whether or not green product innovation can improve a firm’s performance. Pujari (2006) pointed out that green product innovation can present an opportunity for firms to utilize, while other researchers such as Porter and Linder (1995) consider a win to win situation between green product innovation and firms’ performance. However, the debate on about green product innovation and the manner it influences the firm’s performance is still on-going (see also Chein, 2001, Berchicci and Bodewes, 2005).

It is worth noting that the relationship between customer demand, green product innovation and firm’s performance is still controversial. Pujari (2006) argued that green product innovation cannot explicitly address problems of environmental concern, but it is not far from certain that green products can achieve market success. Additionally, customer demand is seen as an important element in stimulating green product innovation (Wei and Morgan, 2004) but by listening very closely to customer wants it may impair green product innovation process and its capabilities. Some empirical studies have shown a positive relationship between product innovation and firm’s performance while others show otherwise (Koellling, 2008) and this provided conflicting findings that presented a gap in green product innovation to research.

Following privatization, trade liberalization and regional integration in
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2000s, performance of Tanzania’s manufacturing firms is not impressive. Tanzania remains behind regional models both in terms of quantity and quality of commodities produced in the region. Also Tanzania continues to rely heavily on unproductive agriculture sector, extraction of raw minerals and low value adding manufacturing products, a pattern, which has resulted into a low and stagnated share of Gross Domestic Product (GDP) of 9.5 percent between 2000 and 2010, making Tanzania be below regional average and the least industrialized economy in the world.

The importance of sustainable growth and performance of Industrial sector in Tanzania cannot be ignored because it contributes a GDP of 9.5 percent of the whole economy between 2000 as well as 2010 employs 36 percent of all manufacturing labour. However, such employment level is still low that calls for further investment into manufacturing through green product innovation in order to create additional jobs. Additionally, development and growth of manufacturing sector in Tanzania are taken as key elements in attaining 2025 National Development Vision by shifting focus from agricultural economy to a self-sustaining semi-industrialized economy that will transform the nation from the least developed country to a middle income country by 2025 through transformation from an agricultural economy to an industrial economy.

Analysis of Industrial performance in Tanzania and compare with other countries such as Kenya, Uganda, Malawi, Botswana, Mozambique, and Zambia that share the same geographical advantage, factors such as endowments and competitive pressure rank Tanzania’s Industrial performance the lowest thereby suggesting a room for industrial performance improvement (Tanzania Industrial Competitiveness Report, 2012). Therefore, the key question to be answered is, ‘does customer demand has an association with a firm’s performance though green product innovation as a catalyst?’ The argument posed by this study is that firm’s performance can be improved by
understanding the relationship between customer demand and its performance through green product innovation processes.

The motive behind this study was from conflicting findings of the existing relationship between customer demand and firms’ performance (Koellling, 2008), limited literature in Tanzania compared with other countries that share the same geographical advantage, product structure, factors endowment and the same future competition. Sufficient knowledge on green product and process will help firms establish new or improve existing operations and develop new strategies for attaining competitive position in the market place.

Objectives of the Study
Main Objective
Specific Objectives

Hypothesis Development

In today’s world, customers have increased demand for green and efficient products and even ready to pay for high prices (Meyer and Clavel, 2006). For a quick response, firms have embarked on green technology investments to innovate production process and products consistent to the best environment management practices in the world. In a summarised way, it can be said that green product innovation stimulates customer demand. Therefore, the following hypotheses were formulated:

H1a: Customer demand does not influence green product innovation
H1b: Customer demand influences product innovation

Green product innovation aimed at minimizing damages to the environment such as emission of carbon dioxide, poor waste management as well as avoid environmental damages penalties, increased productivity, increased
market share as reflected to an overall increase of the total sales volume, increased reputation and image of the business as well as enhanced revenues and profitability (Porter and Van der Linde, 1995). Bonini and Oppenheim (2008) argued that firms that practice eco-innovation on energy efficient products have stimulated market share and new business opportunities as seen in the Toyota Prius hybrid cars. Hence, the following Hypotheses were formulated:

H2a: Green product innovation does not influence market share  
H2b: Green product innovation influences market share  
H3a: Green product innovation does not enhance revenue  
H3b: Green product innovation enhances revenue

**Literature Review**

The word ‘Green’ is often interchanged with the term sustainability (Liu, Chen, et. al., 2005; Industrial Engineer, 2007; Polcari 2007; Zhang and Wang, 2005). In principle, the word sustainability means an ability of the present generation meeting its needs without impairing the future generation to meet its needs (WCED, 1987). Melnyk and Smith (1996) defined green production as an integrated system of product design and process issues with aspects of manufacturing planning and control in a manner geared to identify, quantify, asses and manage flow of environmental waste with the goal of reducing as well as ultimately minimizing environmental impacts while also maximizing resources efficiently. Sustainability requires manufacturing firms to increase their commitment towards future environment and takes responsibility of their present activities in the environment.

Green production refers to manufacturing firms adopting the best practices in the design and production process of their products that are consistent with demand of customers as well as nature at large (Yang, et. al., 2005).
al., 2003). Such practices link to sustainability with manufacturing firms having ability to meet present customers’ needs without infringing the needs of the future generation.

Agency theory explains the behaviour and performance of a firm’s performance (Boychenko, 2013). Most businesses suffer from recognized gap between their mandates and their performance. Agency theory assumes that performance problems arise when a principal delegates authority to the agent to act on his/her interest(s). Divergence of interests between the two parties may result in the agent’s action differing from the principal’s intention.

Focus of agency theory is on finding solutions to problems happening within agency relationship. In the context of seller-buyer relationship, customers cannot verify exactly that the selling firm has performed its delegated work appropriately with no violation such as no extra pollution or no harsh chemicals used in manufacturing (Boychenko, 2013). Such violation can cause serious threat(s) to the firm’s performance.

The firm’s performance in this study was measured by market share, sales volume and revenue. These elements are important factors for firms to compete in the markets place (Chen, 2008; Oltra and Saint, 2009).

Many firms take market share as a way to push sales volume and satisfy customer needs (Rex and Baumann, 2007). A relationship between market share, firms’ performance and green production has been noted (Iwu, 2010; Rubik, et. al., 2005). They (ibid.) argued that firms that have adopted green production have successfully pushed a big volume to the market place.

On the other hand, reputation is one of the intangible asset used by firms to differentiate each other in the market place (Juma and Payne, 2004). In today’s world, many customers are using reputation as a tool to evaluate quality of products they buy and, in turn, it has enhanced the market value of firms (Kwansa, et. al., 2008), corporate image and sustainability of the
manufacturing firms that have adopted the green innovation technologies.

To answer the research question, this study aimed at examining the relationship between customers demand on firm’s performance through green product innovation. The empirical literature review discusses customers’ demand, green product innovations, firm’s performance and other related issues.

Customer demand is a driving force for manufacturing firms to adopt or improve green product manufacturing with a motive to satisfy customer needs (Lunghwa, et. al, 2013). Nowadays, many customers are becoming aware of environmental protection issues along with trends of becoming green. Such awareness has changed their preferences and buying behaviours by highly focusing on buying products that limit or reduce environmental damages and they are even ready to pay for high prices for products that are eco-friendly. In order for firms to meet the changing customer preferences and needs, they need to change or invest into green technologies that will enable them manufacture eco-products to satisfy customers’ demand(s). Hence customer demand is assumed to be a key driving force for firms to adopt green innovation so as to stimulate future sales and performance. Lunghwa and colleagues (2013) on their study of green innovation to Vietnamese motorcycle manufacturers found a positive relationship between customers’ demand on green motorcycle to firms that have adopted green technology. However, the study was limited only to the motorbike manufacturers such that there was a gap in Tanzania to study the same relationship to other firms and other geographical areas.

Many nations are increasing string regulations to manufacturing firms towards becoming green. In Europe, for example, there is an increasing body of regulations that requires companies to reduce energy usage, institute waste management (ELV, 2000; REACH, 2007; PPW, 2004) and observe ISO9001, ISO14000 as well as OHSAS0000. For firms to satisfy the regulations, they are forced to manufacture products that are green (Huang
and Wu, 2010) by introducing green designs and processes to their plants.

Early adoption of green innovation will act as a competing tool that will differentiate non-eco and eco-friendly manufacturing firms. To support this, Bell co-workers (2013) in their study on green production and its role within competitive strategy in Europe, mentioned that the importance of regulation is one of the major reasons to manufacturing firms to adopt the green technologies. However, the researchers did not explain reasons other firms voluntarily adopt the green technologies without being pushed by existing regulations or bodies.

In recent years, product innovation has become a competing tool for firms to survive, win market share and attain a competitive position (Gronhaug and Kaufmann, 1988). In practice, a good product will help firms to improve market share, sales volume, and corporate image as well as attract more customers. Wagner (2005) found that firms that have increased focus in producing green products that reduce the extent of environmental damages have experienced a positive performance beyond firms that are not producing green products. But the debate is on-going whether or not green innovation can economically improve firm’s performance and create wealth.

Hoffmann (2007) mentioned that poor product design and process in developing countries could result into serious waste management problems. In due regard, many firms in Tanzania are trying to turn into green technologies so as to minimize the impact of waste management on the environment, differentiate from their competitors and maintain their market position. Here, green product innovation will mean to maintain sustainability and firm’s performance in future.

Customer demand is an important element to the firm’s performance. Such performance is measured by sales revenue. Gima and colleagues (2005) argued that firms that listen closely to customers may uncover needs of their customers. Therefore, demand plays a good role in stimulating
performance, and manufacturing firms that embarked on green production will be considered as the first movers to experience competitive advantage. To support this, Meyer and Clavel (2006) pointed out that customers are even ready to pay for high prices for products from firms that embarked on production of eco-friendly products. However, the weakness of this argument was one pointed by Berthon and co-authors (1999) that there were conflicting results between customer demand and firms’ performance.

**Research Methodology**

To answer the research questions, food processing firms in Dar es Salaam were studied. In Tanzania, Dar es Salaam is the city that is more industrialized than others with a huge number and variety of food processing firms. In addition, the city is experiencing high environmental damages. Then, 75 firms were purposively sampled to narrow down the study population.

In this study, green product innovation was measured by number of new or redesign process, new products or improved existing products introduced to the market. Market share is measure as percentage of firm’s specific market to total market share and sales revenue is measured in units.

Before data collection a questionnaire was designed with four parts: respondents’ profile, customer demand, green product innovation and firms’ performance with five Likert scale. The questionnaire was pre-tested in two stages. First, it was given to experienced researches to review on clarity, ambiguity and comment on appropriateness of items to operationalize the constructs. In the second test, the questionnaire was sent to three marketing and technical directors in the industry to give their opinions on readability, ambiguity, accuracy and completeness of the instrument. The received feedback was incorporated to the final version to produce an instrument that yielded data with high validity.
Data were collected through field study from 75 firms from marketing directors, technical directors and finance directors. The marketing, technical and finance directors are considered to be reliable sources of information concerning customer demand, green product innovation and firms’ performance.

**Empirical Results and Interpretation**

Descriptive analysis was used to analyse the data. Cross-tabulation and Chi-square were used to demonstrate the association between the variables. Data about demographic characteristics were collected to summarize and indicate participating firms’ background features. Results showed that more than 61 percent of all responding firms had more than ten years of operations, 53.6 percent with a turnover between Tanzanian shillings (Tshs) 50 billion and 450 billion per annum. Then 43.1 percent had capital of more than Tshs 1 billion and more than 150 employees.

The mean and standard deviation were calculated to explain the situation on customer demand, green product innovation and firms’ performance. Table 1 shows summary of results ranging from 3.0 to 4.5. The results indicate that many firms in Tanzania have started or have an intention to engage into green product innovation. Customer demand (4.1) has pressured green product innovation, green product innovation (4.26) stimulated performance with firms’ performance achievement of 4.33.

| Source: Field Data (2014) |

<table>
<thead>
<tr>
<th>Table 1: Descriptive Statistics</th>
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<tr>
<td>Customer Demand</td>
<td>75</td>
<td>4.10</td>
</tr>
<tr>
<td>Green Product innovation</td>
<td>75</td>
<td>4.26</td>
</tr>
<tr>
<td>Firm Performance</td>
<td>75</td>
<td>4.33</td>
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Reliability and Validity

Since the data collection tool was pre-tested before data collection, the constructs are considered to have high content validity (see Wong and Law, 2002). Reliability of the model was measured by Cronbach á values. As shown in Table 2, Cronbach á values for customer demand, green product innovation and firms’ performance were 0.848, 0.960 and 0.754, respectively, which were all above the threshold of 0.7 thereby indicating internal consistency and reliability of all measurements of the study indicators.

Table 2: Reliability and Validity Test

<table>
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<tr>
<th>Constructs</th>
<th>Cronbach’s α values</th>
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<tbody>
<tr>
<td>Customer Demand</td>
<td>0.848</td>
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Source: Field Data (2014)

Hypotheses Testing and Results

As presented in literature review, three hypotheses were formulated to test the relationship between customer demand, green product innovation and firms’ performance.

Hypothesis 1

H1a: Customer demand does not influence green product innovation
H1b: Customer demand influences product innovation

Hypothesis one tested the influence of customer demand on firms’ product innovation. The statistical results are shown in Table 3.
Using Chi-Square 5 percent level of significance, the null hypothesis that customer demand does not have influence on green product innovation is rejected. By rejecting the null hypothesis, it means we accept the alternative hypothesis that customer demand influences green product innovation. It implies that customer demand exercise some pressure to force manufacturing firms to embark on green product innovation.

**Hypotheses 2, 3 and 4**

H2a: Green product innovation does not influence market share  
H2b: Green product innovation influences market share  
H3a: Green product innovation does not enhance Revenue  
H3b: Green product innovation enhances Revenue

Hypotheses 2 and 3 aimed at establishing relationship between green product innovation and firms’ performance, which is measured items of market share and enhanced revenue. The test results of these hypotheses are shown in detail in Table 4.

### Table 3: Chi-Square Results

<table>
<thead>
<tr>
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<th>Value</th>
<th>Degree of freedom</th>
<th>Asymp. Sig. (2-sided)</th>
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</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>48.626(a)</td>
<td>24</td>
<td>.002*</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>21.335</td>
<td>24</td>
<td>.619</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1.718</td>
<td>1</td>
<td>.278</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at p<0.05  
**Source**: Field Data (2014)
Using Pearson’s Chi-Square test at 5 percent significance level, all null hypotheses that green product innovation does not have a significant relationship with firms’ performance (market share and sales revenue) are rejected. By rejecting the null hypotheses, we accept the alternative hypotheses that green product innovation has significant influence to firms’ performance (market share and sales revenue). This implies that manufacturing firms that adopt green design and process can achieve a significant growth in market share and revenue thereby enhance overall firms’ performance.

**Discussion of Findings**

The empirical findings revealed that customer demand has a significant association with green product innovation. These findings are consistent with other studies, for example, Lunghwa and co-workers (2013) as well as Gronhaug and Kaufmann (1988) said that customer demand can exert significant pressure to firms to adopt the green innovation design and process, and introduce new products development strategies. A discussion with experts in the industry revealed that firms that adopted a flexible strategy in meeting customer demand by introducing eco-friendly products have
increased their publicity, which, in turn, has enhanced their business revenue and profitability.

The study found a significant relationship between green product innovation and firms’ performance. The findings are in consistent with the findings from Lin and colleagues’ (2013) study in Vietnam. It means that green product innovation is an important ingredient to induce performance and not otherwise. A discussion with experts in the industries revealed that implementation of eco-innovation can require huge investments, which, in turn, cannot enable firms to attain their competitive position. In addition, they said that with changing customer preference(s) and buying habits, many firms found it difficult to have flexible strategies of green production to meet customer demands. As a result, they tend to focus further on measuring their revenues and profitability without putting great attention on green product innovation as a way to enhance overall business performance.

**Conclusion and Managerial Implication**

The study provides a useful managerial guideline to manufacturing firms in Dar es Salaam on ways and strategies to adopt in order to improve performance. By showing the relationship between customer demand and green product innovation, it is recommended that firms should take a positive approach to study and understand customer preference in anticipating changes of customer preferences in the future and try to deliver products that satisfy customer needs. Firms that will be able to do this and satisfy customer needs accordingly, will be able to enhance their performance and attain their market position. Also green innovation should be taken as a competing strategy to gain competitive advantage, and firms should always strive to maintain the green innovation competence in order to attract more customers to their products as a way to boost their sales volume and performance as well as strive in wealth creation.
However, this study cannot go without some limitations. First, the study used a small sample size based in Dar es Salaam. Other researchers can take a bigger sample than that involved in this study to include manufacturing industries in different regions in the country for better generalization of results. Second, the study used only the Chi-Square statistics in finding out relationship between variables. In future, more tools of analysis can be used such as structured equation analysis model to enhance the relation of the research constructs.
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