INNOVATION STRATEGIES AND PERFORMANCE OF AGROCHEMICAL COMPANIES IN NAIROBI COUNTY

BY

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DECLARATION

I Regina N. Irungu, hereby declare that this research project entitled **INNOVATION STRATEGIES AND PERFORMANCE OF AGROCHEMICAL COMPANIES IN NAIROBI COUNTY** is my original work and has not been presented for any degree award in any other university.

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This MSC research project prepared by Regina N. Irungu has been submitted for examination with my approval as the university Supervisor.

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DEDICATION

This study is dedicated to my family for their endless support, availability and encouragement throughout the study period.

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LIST OF ABBREVIATIONS AND ACRONYMS

AAK	Agrochemicals Association of Kenya
DVS	Department of Veterinary Services
ERP	Enterprise Resource Plan
FAO	Food and Agricultural organisation
GDP	Gross Domestic Product
OECD	Organization for Economic Cooperation and Development
PCPB	Pest Control Products Board
PPB	Pharmacy and Poisons Board
R&D	Research and Development
VMD	Veterinary medicine Directorate

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ABSTRACT

The objective of the study was to establish the effects of innovation strategies on the performance of agrochemical firms in Nairobi County. The study sought to determine the effect of product, technological, marketing and process innovations on the performance of agrochemical companies in Nairobi County. This study employed "a descriptive survey research design. The target population for the study was the agrochemical firms in Nairobi who are listed as full members of Agrochemicals Association of Kenya. Since the population was small, the study was a census where all the 58 agrochemical firms in Nairobi were considered. Primary data was used in the study was collected from the respondents with the use of a semi-structured questionnaire. Descriptive statistics inferential statistics were used to analyze with aid of SPSS. The study concludes that there was a strong relationship (R-value = 0.532) between innovation strategies and organizational performance of agrochemical firms in Nairobi with innovation strategies explaining 21.4% of the total variance in the organizational performance of agrochemical firms in Nairobi. The study also concluded that product, technological, marketing and process innovations strategies have a positive effect on the organizational performance of agrochemical firms in Nairobi with marketing innovation strategy being the only one influencing the organization performance significantly. The concluded that agrochemical firms in Nairobi face innovation challenges to a moderate extent with high costs of developing new products, high cost of implementing new strategies, inadequate technological infrastructure, shortage of expertise, rigid regulating practice that discourages innovation, lack of a research and development department, lack of avenues to share innovative ideas and lack of top management support being the most faced challenges. The management of the agrochemical firms in Nairobi should set aside adequate budget to establish proper technological infrastructure, hire qualified experts, create avenues to share innovative ideas, set up a R&D department and create a conducive environment for innovation. The Government should create a business environment that encourages and supports innovation in the agrochemical sector. This should be in form of offering tax exemptions on the technologies required come up with more innovative products and relaxing the rigid regulating practices that discourages innovation. In future, a similar study should be done considering all the 47 counties in Kenya and with a focus on other sectors other than the agro-chemical sector.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Firms exist in highly competitive and dynamic global business markets where they face quite a number of challenges. The challenges include shorter product lifecycles, rising cost of doing research and development (R&D), increasing products complexities, geographically dispersed innovation teams and rapid market changes (Dutra, Ghodous, Kuhn, Tri, 2010). Valk, Chappin and Gijsberg (2011) notes that some firms have established innovation networks in order to deal with these challenges and increase their innovate capacity. The ability of the firms to innovate is the key to their survival because it helps them to exploit emerging opportunities and overcome the challenges (Narula&Upadhyay, 2010; Jimenez &Sanz-Valle, 2011; Letangule& Letting, 2012). Innovation involves introduction of new ways of doing business; new ways of decision making and new strategies of handling external relations (Polder, Mohnen& Raymond, 2010).Organization for Economic Cooperation and Development (OECD) (2005) comprehensively defines innovation asthe implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. Innovation in an organization leads to improvement in firm performance by reducing both the transaction and administrative costs and increasing firms' operational efficiency (OECD, 2005). Letangule and Letting (2012) notes that innovation is a critical requirement for the profitability and growth of firms.

The study was anchored on Disruptive Innovation Theory, Diffusion of Innovation Theory and Innovation Theory of Profit. According to the Disruptive Innovation Theory by Christensen (1997), organizations must abandon conventional principles of good

management at the point when they realize that an anticipated technology might disrupt the market in which they operate. According to Diffusion of Innovation Theory by Rogers (1995), adoption of an innovation in a social system occurs as process and doesn't occur simultaneously. Some members of the population adopt innovation earlier than the others and that the diffusion occurs in five steps which are knowledge, persuasion, decision, implementation and confirmation. Innovation Theory of Profit by Schumpeter (1934) asserts that the function of an entrepreneur is to make profit through introduction of successful innovations.

Agrochemical firms in Kenya face a myriad of challenges due intense competition due to proliferations of substitute products; liberalisation of the economy that has allowed entry of agrochemical firms from China and India; shifting customer expectations and increasing number of new entrants who have been licensed to operate in Kenya (Mutukaa, 2007). Changing customer needs also make it difficult for agrochemical firms to do accurate demand planning, product scheduling, repackaging of products in different pack sizes and deliver them to distributors (David, 2011).In order to overcome these challenges and meet changing customer expectations, agrochemical firms in Kenya must innovate. This should capture product innovation, technological innovation, process innovation and marketing innovation.

1.1.1 Concept of Innovation

Innovation is considered as a critical enabler for growth and profitability of businesses. Innovation is mandatory for private sector firms that want to survive in the highly dynamic and competitive markets. The ability of a firm to innovate is the most critical and vital factor for gaining sustainable competitive advantage (Tidd, Bessant and Pavitt, 2001). Innovation is a criticalingredientand an integral part of firm to attain sustained success (Davila, Epstein &Shelton, 2009)). According to Brown (1997), a lot of emphasize has been accorded on

building innovative firms that consider innovation as a necessary requirement for organisational survival. Forbes and King (2013) assert that innovation is an important approach for firms to differentiate their products and services from those of competing firms.

Davila *et al.*(2006) defines innovation as a successful implementation of creative ideas to make some specific and tangible changes in the product or service in which the innovation occurs. In order to achieve sustainable competitive edge, Zhou and Wu (2010) emphasizes that in a turbulent business environment, innovation is a key enabler. They further noted that whereas firms need a continuous innovation process to respond to the ever-fast changing environmental conditions, the goal of sustainability requires new ways of doing business. On the other hand,VillaVerde and Requena (2011) states that innovation is an outcome of employees' creativity and this creativity should always be directed at adding value to the consumers. Zemplinerová (2010) summarizes by stating that innovation is usually based on people's knowledge, skills and experience.

1.1.2 Innovation Strategies

OECD (2005) recognizes four fundamental innovation strategies. These include product innovation, technological innovation, marketing innovation and process innovation. Product innovation refers to introduction of a new products or services or significantly improving existing products or services (Polder *et al.*, 2010). According to Polder *et al.* (2010), organizations that innovative their products tend to have a competitive advantage over firms that introduce products already existing in the market. Product innovation is therefore essential and a critical success and survival factor for a firm (Lee & Zhou, 2012). According to Nyawira (2016), a firm can implement product innovation strategies such as introduction of new products and services; increase in product portfolio; improvement in product/service

user friendliness; shortening of product cycles and constant monitoring changes in customer tastes and preferences.

Sun and Lee (2013) define technological innovation as the introduction of new design and production technologies with the aim of improving organisational productivity. According to Subramanian and Nilakanta (1996), technological innovation affects the technical system of an organization through the methods and equipment that are used to transform information or raw materials into products or services. They further argued that technical innovation helps firms to achieve corporate success, business efficiency, competitive advantage and improved productivity. Armbruster and Lay (2008) noted that technological innovation affects the processes, routines and finally the operations of an organization. Firms can achieve technological innovation by adopting ERP systems to provide capabilities to enhance and support production processes and automate routine tasks (Valacich& Schneider, 2012).

Marketing innovation refers to implementation of new marketing techniques leading to significant changes in the design, packaging, placement, design, pricing strategy and product promotion (Polder et al., 2010). Marketing innovation looks at three dimensions which are product strategy, promotion strategy and price strategy (Rust, *et al.,*2004). These strategies lead to tactical marketing actions which involve change in product packaging, product design, product distribution methods as well as product advertisement. Marketing innovation strategies that can be used by the insurance firms are introduction of innovative promotion activities, use of new product placements, change in product design, and introduction of new innovative product offers, change of market pricing strategies and use of innovative mix of target market (Nyawira, 2016).

Process innovation refers to introduction of a new production method or a significant improvement of an existing production method (Polder *et al*., 2010).According to Tavassoli&Karlsson (2015), process innovation strategies involve execution of new or essentially improved production techniques. Basic process advancement procedures incorporate changes in strategies or hardware. Process innovation is defined by OECD (2005)"the implementation of new or significantly improved methods for production or delivery, to include significant changes in techniques, equipment, and/or software." Cascio (2011) working definition of process innovation is the implementation of substantially new, significantly improved, or more efficient methods of producing, manufacturing, and distributing the organization's market offerings. According to Soi (2016), a firm can adopt process innovation strategies such as conformance to regulations and reduction of operational and production costs.

1.1.3 Organizational Performance

Performance is defined as "a state of competitiveness of the company, Niculescu (1999) a level of efficiency and productivity which ensures a sustainable market presence. On the other hand, Noye(2002) defined performance as an aim to achieve the goals thatyou have been given in convergence with the enterprise's guidelines. Răzvan-Dorin(2013) concluded that performance is not simply an achievement of a result but rather an outcome of comparison between the result and the targeted goal. According to Răzvan-Dorin(2013) the concept of performance is rarely defined explicitly. Its meaning is assumed to be known as default. He defines performance as either: an excellent result of an action, the result of an action, whether greateror not, or the maximum capability.

Financial performance of an organization are based on accounting and derived from calculations during financial reporting and include return on assets, return on equity, earnings before tax, profitability, earnings per share and earnings after tax.On the other hand, market performance refers to the ability of a firm to produce and distribute their products and services effectively at reasonable prices. Market performance also refers to the ability of a firm to meet consumer demands and expectations in regard to goods or services. Some firms measure market performance market share dominated and volume of sales. Finally, shareholder value refers to the value the shareholders gain from investing in a company (Richard *et al.*, 2009).

Organizational performance is a function of effectiveness and efficiency since the firm must produce the right goods and services using as little resources as possible (Răzvan-Dorin, 2013). Firms typically try to perform financially, marketwise and shareholder-wise.First, the firms try to perform well financially by realizing good returns on their investment. Secondly, firms try to perform well in terms of the market by trying to gain as much market share as possible. The firms do this by producing goods and services that are in demand and then offering them at reasonable prices to enable them to make profit and yet remain market leaders. Finally, the firms strive to perform well by improving the value of the shareholders wealth which the shareholders get in form of dividends (Richard *et al.*, 2009).

1.1.4Agrochemical Industry in Kenya

Agrochemical industry is majorly driven by population explosion, increasing demand for food, rising consumer awareness and increased awareness on the benefits of pesticides and fertilizers in crop production, technological development and increased government investments in agriculture. Kenya's agricultural sector plays a vital role in economic growth. According to FAO (2017), agricultural sector contributes 26% of Kenya's Gross Domestic

Product (GDP). It contributes to 27% of GDP indirectly via linkages with other sectors of the economy. More than 40% of Kenya's total population and more than 70% of Kenya's rural population is employed by the agricultural sector. The key players in Kenya's agrochemical industry are mostly big multinational R&D companies such as Syngenta, Monsanto, Bayer, Du Pont and Dow Agroscience where they account for around 36% of Kenya's agrochemical market share (Sitanda, 2013).

The agrochemical industry in Kenya is highly regulated by various bodies. Agrochemicals Association of Kenya (AAK). AAK is the umbrella organization in Kenya for manufacturers, repackers, formulators, distributors, importers, farmers and users of pesticides (AAK, 2017).AAK responsible for facilitating responsible management of pest control solutions for improved agricultural production, public health and environmental protection. Other regulators of the Kenya's agrochemical industry are Pest Control Products Board (PCPB), Pharmacy and Poisons Board (PPB), Department of Veterinary Services (DVS) and Vetinary Medicine Directorate (VMD). The industry is also grappling with the challenge of substitute products. Competition in the agrochemicals industry is intense due to the number of registered agrochemical firms and dealers (Mutukaa, 2007). Due to these challenges, agrochemical firms have to innovate their products, technologies, processes and marketing methods.

1.2 Research Problem

Innovation is important for firms that want to adapt to the ever changing business environments and gain competitive advantage that is sustainable. This sustainability can be attained if firms make innovation a continuous process (Zhou & Wu, 2010)). OECD (2005) defines innovation as "the implementation of a new or significantly improved product (good

or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations (Polder*et al.,* 2010).

Agrochemical industry of Kenya is ever changing and the firms continually face both challenges and opportunities. In order to exploit emerging opportunities and overcome the challenges of competition and presence of substitute products, the firms must innovate. Further, environmental regulations and changing needs of customers and expectations of other stakeholders, the agrochemical firms have to rethink and formulate strategies that are compliant to environmental regulations and meet the expectations of customers and the other stakeholders (Narula & Upadhyay 2010).

Several studies have been carried out on the effect of innovation on firm performance. Internationally, Cascio (2011) investigated whether marketing innovation has a substantial impact on firm performance in Florida, USA and found out that marketing innovation conceptually has a direct influence on firm performance. Hassan, Shaukat, Nawaz and Naz (2013) conducted an empirical study on the effect of innovation types on the performance Pakistan's manufacturing sector and concluded that innovation types had positive effects on performance. Locally, Nyawira (2016) found out that innovation strategies influences firm performance of insurance firms in a positive manner. Soi (2016) concluded that innovation helped telecommunication firms in Kenya to make higher profits. Kamakia (2014) concluded that product innovation in commercial banks had a great impact on customer satisfaction.

The literature reviewed never focused on the effect of product, technological, process and marketing innovation strategies among agrochemical firms in Kenya. Majority of the firms focused on the effects of innovation strategies on banking, insurance and manufacturing firms other than agrochemical manufacturing firms. This creates a gap in knowledge that this

study sought to bridge the gap by answering the following research question: What is the effect of innovation strategies on the performance of agrochemical firms in Nairobi County?

1.3 Research Objectives

The main objective of this study was to establish the effects of innovation strategies on the performance of agrochemical firms in Nairobi County.

The specific objectives of the study were:

(i) To determine the effect of product innovation on the performance of agrochemical companies in Nairobi County.

(ii) To establish the effect of technological innovation on the performance of agrochemical companies in Nairobi County.

(iii) To find out the effect of marketing innovation on the performance of agrochemical companies in Nairobi County.

(iv) To establish the effect of process innovation on the performance of agrochemical companies in Nairobi County.

1.4 Value of the Study

The findings of this study would be of great value to various parties. To Theory and Practice this study will contribute to the theory of innovation by establishing whether adoption of innovation strategies affect the performance of agrochemical companies. The findings are an addition to the existing knowledge pool. Researchers and academic scholars may find this knowledge useful while researching on related subject matters as they may use the findings of the study as stepping stone for further research. The findings of this study can be very useful to the practitioners in the agrochemical industry in Nairobi County. The study gave

insight into how product innovation strategies, technological innovation strategies, marketing innovation strategies and process innovation strategies affect the performance of the agrochemical firms in Kenya in regard to the effects of innovation strategies on the performance of agrochemical companies in Nairobi County.

To policy implementation the findings of the study may be very useful to the policy makers and regulators such as the National Government, County Governments, Pest Control Products Board (PCPB), Agrochemicals Association of Kenya (AAK), Pharmacy and Poisons Board (PPB), Department of Veterinary Services (DVS) and Veterinary Medicine Directorate (VMD). The findings of the study may enlighten the policy makers and regulators on the effect of product innovation strategies, technological innovation strategies, marketing innovation strategies and process innovation strategies on the performance of the agrochemical firms. This may greatly help in the formulation and implementation of policies that foster innovation in the agrochemical industry in Nairobi County and therefore improving the overall performance of the firms.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the theoretical and empirical literature related to innovation, innovation strategies and firm performance. Theoretical review will discuss the theories relevant to innovation while empirical review will discuss previous studies done in regard to the effect of innovation strategies on the organizational performance.

2.2 Theoretical Framework

The study was based on three relevant theories of innovation. These include Disruptive Innovation Theory, Diffusion of Innovation Theory and Innovation Theory of Profit. The subsequent sections discusses the theories.

2.2.1 Disruptive Innovation Theory

OECD Oslo Manual (2005) defines disruptive innovation as "as an innovation that has a significant impact on a market and on the economic activity of firms in that market." (p. 58). According to the manual, it's not usually clear whether an innovation is disruptive or not until long after its introduction. In the seminal work, Christensen (1997) argues that firms have undergone extinction due to an emergence of disruptive technologies.

Due to its popularity, disruptive innovation theory has attracted intense discussion and critique. Danneels (2004) argues that disruptive innovation is vaguely defined. For instance, it is difficult to establish whether an innovation is inherently disruptive or whether its disruptiveness varies from one market or industry to another. According to Schmidt and

Druehl (2008), an innovation that dramatically disrupts the current market is not necessarily a disruptive innovation . Managers and scholars need to be able to distinguish disruptive from sustaining technology which is difficult to achieve (Andrew & Baljir, 2015).

In spite of the criticisms, the theory of disruptive innovation was relevant to this study. It gave insight to the innovations taking place in the chemical industry and how this innovation affected the survival and prosperity of the chemical firms. It also explained why many chemical firms are making serious investments in R&D in order to tackle emerging challenges such as extreme competition and changing climate patterns due to global warming.

2.2.2 Diffusion of Innovation Theory

Adoption of an innovation in a social system occurs as process and doesn't occur simultaneously (Rogers, 1995). Some members of the population adopt the innovation earlier than the others. Innovation adopters were put five categories. These are innovators, early adopters, early majority, late majority and laggards. Innovators are the first to try out the innovation and are usually venturous when it comes to new ideas. These innovators are usually risk-takers. Early Adopters are opinion leaders of a social system and are always ready to embrace change when a need arises. Early Majority are people who adopt innovation after they see evidence that the innovation with effectiveness. Late Majority are the people who are skeptical of change and only embrace innovation after it has been tried out by the majority. Laggards are very conservative people and are very skeptical when it comes trying out new ideas. They are usually the last to adopt new innovation.

Innovation diffusion occurs in five steps. Step one: knowledge. In this step, people get first exposure to an innovation. Stage two: persuasion. It is in this stage where people form an attitude towards an innovation. The attitude can be favorable or unfavorable. Step three is

decision. It is at this stage a person decides whether to adopt or reject an innovation. Step four involves implementation. At this stage, the people who have decided to adopt an innovation start implementing it. Step five is confirmation. In this step, innovation users evaluate the innovation and subsequently decide either to continue using the innovation or abandon it all together. The decision to adopt the innovation is influenced by five key factors. These include relative advantage, compatibility, complexity, triability and observability of the innovation.

Diffusion of innovation theory is criticized because of its several limitations. The theory doesn't take into consideration an individual's resources or the social support they get in order to adopt an innovation. The diffusion of innovation theory sometimes ignores the influence of cultural norms on adoption of an innovation (Deligiannaki& Ali, 2011). The theory of innovation diffusion usually doesn't focus on the role of presence or absence of networks. Poor introduction of an innovation can impede its diffusion. In spite of the limitations, the diffusion of innovation theory has been successfully applied in different fields such as ICT, agriculture, social works, marketing and public health. This made the theory relevant for this study (Chile, 2017).

2.2.3 Innovation Theory of Profit

According to Innovation Theory of Profit, the function of an entrepreneur is to make profit through introduction of successful innovations. According to Schumpeter (1934), the primary role of an entrepreneur is to bring about innovations in the production process which in turn leads to getting profits. He defines innovations as changes in the production and marketing process. The changes are meant to increase profit margin by widening the gap between production costs and selling price.

This theory classifies innovations into two categories. The first category of innovation refers to all the activities or policies that contribute towards reduction of the production cost. This kind of innovation involves introduction of a new production method or technique. This entails use of new machinery and innovative methods of organizing the production industry. The second category of innovation encompasses all the activities aimed at increasing product demand. These activities can be improvement of existing products, introduction of products, emergence of new markets, introduction of new product designs as well as getting new sources of raw material (Cantwell, 2001).

Schumpeter Innovation Theory of Profit has been subjected to criticism on various grounds. The first ground is that the theory ignores other factors that cause fluctuations in firm profitability and only concentrates on the innovations that drive innovation. Innovation is not the sole factor that influences firm profitability. The theory further assumes that it's the capitalist who bears all the risks which is not true since it's the entrepreneur who bears the greatest. In spite of these limitations, Schumpeter's innovation theory of profit is widely accepted in the modern economy and is used to explain the effect of innovation on fluctuations in firm performance. The theory is therefore was relevant to this study (Piore, 2007).

2.3 Empirical Review

This section reviews previous empirical literature in regard to the effect of innovation strategies on the performance of agrochemical companies. Both local and international studies are reviewed. The section is subdivided into various innovation strategies. These strategies include product innovation, technological innovation, marketing innovation and process innovation.

2.3.1Product Innovation and Firm Performance

Product innovation is defined by Polder *et al.* as an introduction of a new product or service or a significant improvement of an existing product or service in a firm (2010). Polder et al. (2010) further argues that companies that introduce highly innovative products have a competitive edge over firms that introduce products that already exist in the market. This implies that innovative firms have a higher productivity level compared to the less innovative firms. Product innovation is therefore essential and a critical success and survival factor for a firm (Lee & Zhou, 2012).

Numerous studies have been conducted in relation to product innovation. In her quest to establish the effect of product innovation strategies on the performance of insurance firms in Kenya, Nyawira (2016) established that insurance firms in Kenya have adopted various product innovation strategies such as introduction of new product and services; increase in product portfolio; improvement in product/service user friendliness; shortening of product cycles and constant monitoring changes in customer tastes and preferences. The study concluded that product innovation strategies influences firm performance of insurance firms in a positive and a statistically significant manner.

Soi (2016) conducted a study to determine the effect of innovation strategies on the performance of firms in the Telecommunication sector in Kenya. One of her specific objectives was to find out whether the performance of telecommunication firms in Kenya is affected by their product innovation. The study had a sample size of 163 managers working among telecommunication firms in Kenya. The study concluded that product innovation

strategies helped telecommunication firms in Kenya to make higher profits, enhanced business growth, improved investment and overall increased productivity.

Kamakia (2014) carried out a study with the objective of determining the effect of product innovation on performance of commercial banks in Kenya. The study aimed at shedding light on the nature and importance of product innovation. The study adopted a cross-sectional survey research design. The target population for the study was the forty-three commercial banks licensed and operating in Kenya as at 31st July 2014.The study used both primary and secondary data while the analysis was done using descriptive statistics such as frequency distribution, means and standard deviations. The researcher concluded that product innovation had a great impact on customer satisfaction.

2.3.2 Technological Innovation Strategies and Firm Performance

Sun and Lee (2013) define technological innovation as the introduction of new design and production technologies with the aim of improving organizational productivity. Ndunga, Njati and Rukangu (2016) observe that technological innovations include the infrastructure changes and development, recruitment of a skilled workforce and acquisition of superior and advanced database management systems. Technological innovation affects the technical system of an organization through the methods and equipment that are used to transform information or raw materials into products or services (Subramanian &Nilakanta, 1996).

Numerous studies have been conducted in regard to the effect of technological innovation on the firm performance. Ndunga*et al.* (2016) conducted a study on influence of technological innovation on bank performance in Meru town, Kenya. The study targeted the 20 registered commercial banks operating in Meru town as at January 2016. The study concluded that technological innovation has positively influenced the financial performance of commercial

banks in Meru town. The study recommended that the commercial banks can make more profits by investing technologies such as mobile and internet banking.

Nyawira (2016) sought to establish the effect of technological innovation strategies on the performance of insurance firms in Kenya. The study found out that that insurance firms in Kenya use technological innovation strategies such as adoption of new innovative technologies, adoption of new systems such as Enterprise Resource Planning (ERP), increasing investment in innovative technologies and automation of routine tasks. The study established that technological innovation strategies have a positive and a statistically significant influence on the performance of insurance firms in Kenya.

2.3.3 Marketing Innovation Strategies and Firm Performance

Polder et al. (2010) defines marketing innovation as implementation of new marketing techniques leading to significant changes in the design, packaging, placement, design, pricing strategy and product promotion. On the other hand, Rust et al. (2004) define marketing innovation using three dimensions which are product strategy, promotion strategy and price strategy. These strategies lead to tactical marketing actions which involve change in product packaging, product design, product distribution methods as well as product advertisement. Marketing innovation is usually non-technological and often leads to business efficiency and effectiveness (Chen, 2006).

Nyawira (2016) conducted a study with a specific objective of finding out the effect of marketing innovation strategies on the performance of insurance firms in Kenya. The study revealed that the marketing strategies used by the insurance firms are introduction of innovative promotion activities, use of new product placements, change in product design, and introduction of new innovative product offers, change of market pricing strategies and

use of innovative mix of target market. The study concluded that marketing innovation strategies influenced firm performance in a positive and significant manner.

Soi (2016) investigated the effect of marketing innovation strategies on the performance of firms in the Telecommunication sector in Kenya. The study targeted telecommunication firms Safaricom Limited, Airtel Limited and Telkom Limited. The researcher used both quantitative and qualitative analysis. The study established that marketing innovation had a large impact on the performance of telecommunications in Kenya. The study also established that the firms used aggressive anti-competitors marketing strategies and that these strategies constantly changed in order to adapt to the changing business environment.

2.3.4 Process Innovation Strategies and Firm Performance

Process innovation refers to introduction of a new production method or a significant improvement of an existing production method and other supporting activities such as regular maintenance and daily operations such as accounting, purchase and computing (Polder *et al*., 2010). They further add that process innovation involves bringing significant improvements in supporting activities such as maintenance, accounting and purchasing. Process innovation strategies also involve execution of new or essentially improved creation techniques.

Various studies have been done on the effect of process innovation on firm performance. The fourth objective of a study by Soi (2016) was to determine whether process innovation influenced the performance of the telecommunication firms in Kenya. Her study found out that process innovation increases the customer satisfaction which is a good indicator of a firms' operational performance. The study revealed that a firm's profitability is greatly influenced by process innovation strategies and inferential statistics revealed that process innovation had a significant statistical effect on the performance.

Hassan, Shaukat, Nawaz and Naz (2013) conducted an empirical study on the effect of innovation types on the performance Pakistan's manufacturing sector. Specifically, the study explored the effects of types of innovation such as product, process, marketing and organizational on different aspects of firmperformance. The study collected data from 150 respondents from manufacturing firms using survey questionnaires. Factor analysis, correlation and regression analysis were used. The study concluded that innovation types had positive effects on performance of Pakistan's manufacturing firms but process innovation had a greater impact on firm performance.

2.4 Summary of Empirical studies and Knowledge Gaps

Literature review revealed that product innovation, technological innovation, process innovation, marketing innovation strategies had a positive and significant effect on the performance of firms in the insurance, banking and manufacturing firms across the globe. The innovations help firms make more profits by improving product designs, using more efficient production process, using more innovative technologies and using new or significantly improved marketing techniques.

The literature reviewed never focused on the effect of product innovation, technological innovation, process innovation and marketing innovation strategies among agrochemical firms in Kenya. Majority of the firms focused on the banking, insurance and manufacturing firms other than agrochemical manufacturing firms. This creates a gap in literature that this study seeks to bridge by establishing the effect of product innovation, technological innovation, process innovation and marketing innovation strategies on the performance of agrochemical firms in Kenya that formulate, repack and markets veterinary products as their core source of revenue.

Table 2.1: Summary of the Empirical Studies and Knowledge Gaps

Study	Methodology	Findings	Knowledge Gaps	Focus of Current Study
Influence of technological innovation on Bank performance in Meru town, Kenya (Ndunga *et al,* 2016).	Descriptive study	The study concluded that technological innovation has positively influenced the financial performance of commercial banks in Meru town.	The study only focused on the influence of technological innovation on Bank performance in Meru town, Kenya.	To establish the effect of innovation strategies on the performance of agrochemical companies in Nairobi County.
The Effect of Innovation Strategies on the Performance of Insurance Firms in Kenya (Nyawira, 2016).	Descriptive study	The study concluded that innovation strategies influences firm performance of insurance firms in positively and statistically significantly.	The study only focused on the effect of innovation on the performance of insurance firms in Kenya and not agrochemical firms.	To establish the effect of innovation strategies on the performance of agrochemical companies in Nairobi County.
Effect of innovation strategies on the performance of firms in the telecommunication industry in Kenya (Soi, 2016)	Descriptive study	The study established that Innovation strategies helped telecommunication firms in Kenya to make higher profits.	The target population of the study was the telecommunication firms and therefore the findings might not apply to agrochemical firms.	To establish the effect of innovation strategies on the performance of agrochemical companies in Nairobi County.
The effects of innovation on firm performance of supporting industries in Hanoi, Vietnam(Tuan, Nhan, Giang and Ngoc, 2016).	Descriptive study	Process, marketing and organization innovation has a significantly positive effect on innovative, market, production and finance performances.	The study was carried out in Hanoi, Vietnam and therefore the findings cannot be directly applied to local agrochemical firms in Kenya.	To establish the effect of innovation strategies on the performance of agrochemical companies in Nairobi County.

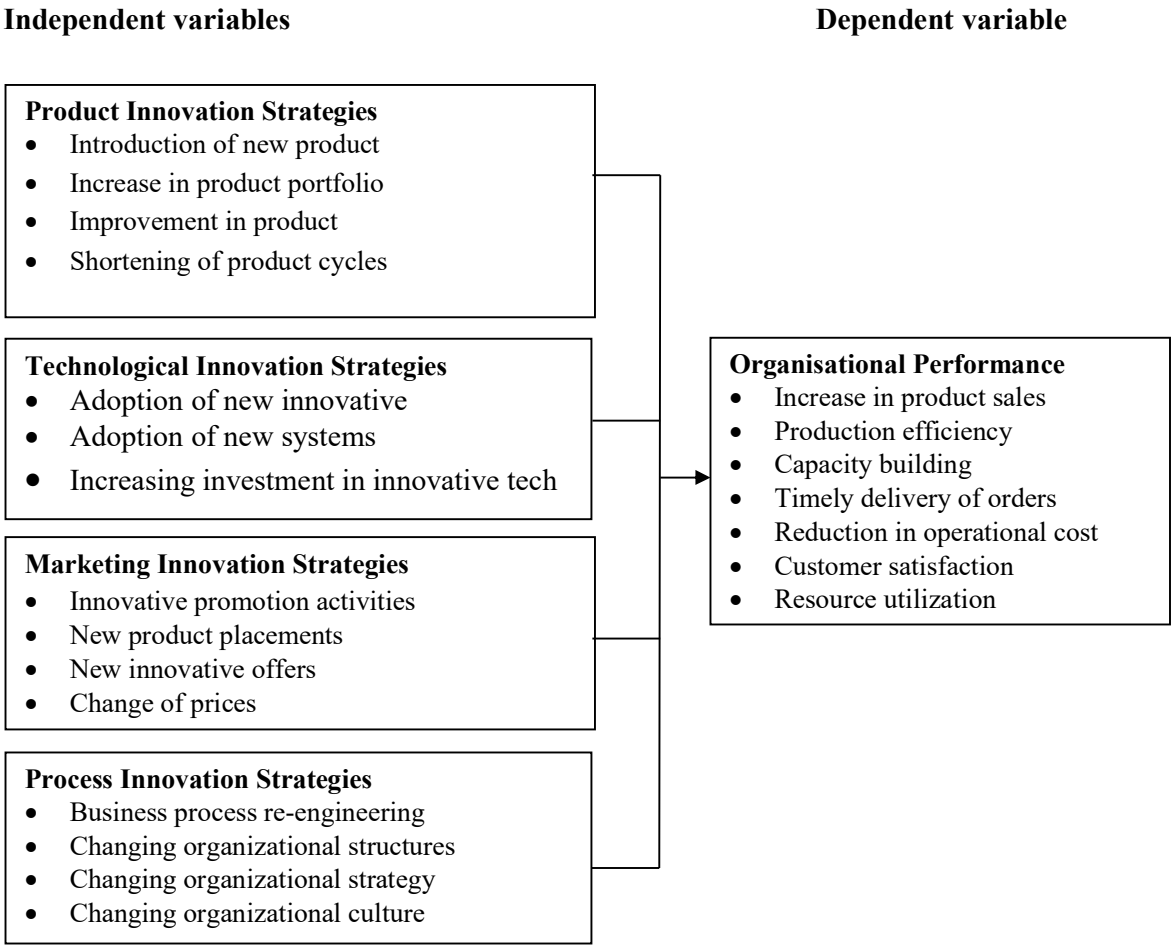
Effect of product innovation on performance ofcommercial banks in Kenya (Kamakia, 2014).	Descriptive study	Kamakia (2014) concluded that product innovation among commercial banks had a great impact on their customer satisfaction.	The focus of the study was on commercial banks in Kenya. These findings cannot be generalized to agrochemical firms.	To establish the effect of innovation strategies on the performance of agrochemical companies in Nairobi County.
Effect of innovation types on the performance Pakistan's manufacturing sector (Hassan, Shaukat, Nawaz and Naz, 2013)	Descriptive study	Innovation types have positive effects on the performance of manufacturing firms in Pakistan.	The study was done on manufacturing firms in Pakistani and therefore might not be relevant to local agrochemical firms.	To establish the effect of innovation strategies on the performance of agrochemical companies in Nairobi County.
Marketing Innovation and Firm Performance: Research Model, Research Hypotheses, And Managerial Implications (Cascio, 2011)	Descriptive study	Marketing innovation conceptually has a direct influence on firm performance in Florida, USA.	The study was carried out in Florida, USA and therefore the findings might not apply to local agrochemical firms	To establish the effect of innovation strategies on the performance of agrochemical companies in Nairobi County.

Conceptual Framework

Conceptual framework refers to the diagrammatic representation of the relationship between the dependent and the independent variables. In this study, the dependent variable was the organizational performance while the independent variables were innovation strategies. These strategies include product innovation strategies, technological innovation strategies, marketing innovation strategies and process innovation strategies. The theoretical expectation was that those product innovations, technological innovation, process innovation, marketing innovation strategies have a positive effect on firm performance. This is because innovations help firms make more profits by improving product designs,

using more efficient production process, using more innovative technologies and using new or significantly improved marketing techniques. The conceptual model as shown in Figure 2.1.

Figure 2.1: Conceptual Model



Source: Researcher (2018)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was used in the study on effect of innovation strategies on the performance of agrochemical companies in Nairobi County. The chapter discusses research design, population, sampling design, data collection and data analysis techniques.

3.2 Research Design

This study employed a descriptive survey research design. Mugenda and Mugenda (2003) defined research design as the structure, plan and strategy that is adopted in order to answer various research questions. The study adopted a descriptive research design since the design allows the researcher to describe the population of interest at a given point in time. The design allowed description of the effect of innovation strategies on the performance of agrochemical companies in Nairobi County.

3.3 Population of the Study

The target population for this study was the agrochemical firms in Nairobi County. There are a total of 58 agrochemical firms listed as full members of Agrochemicals Association of Kenya. The list of the agrochemical firms in Nairobi County is as shown in Appendix III. The study was a census since the population is small.

3.5 Data Collection

This study used primary data. The data was collected using semi-structured questionnaires that were administered through "drop-and-pick-later method". The questionnaire was the preferred method of data collection since it allows standardized collection of data from the respondents. The study was targeting the senior managers in the agrochemical firms.

The questionnaire contained both open-ended and closed-ended questions. The questionnaire was structured into three sections as follows: Section A contained general information questions; Section B contained questions on the innovation strategies used by agrochemical firms; Section C comprised of questions on the performance of agrochemical firms while Section D had questions on the challenges of innovation faced by agrochemical firms in Nairobi. The questionnaire is as shown in Appendix II.

3.5 Strategies and Techniques to be used in Data Analysis

The study used both descriptive and inferential statistics to analyse the data collected. Descriptive statistics were used to describe the variables using measures of central tendency and dispersion. Quantitative data collected using closed-ended questions were analysed using mean scores, standard deviation and frequency distributions. Qualitative data was analysed through content analysis according to common themes.

Inferential statistics was used to establish how innovation strategies affect the performance of agrochemical firms in Nairobi, Kenya. The study used both correlation and multi-variate regression analysis. In order to conduct regression and correlation analysis, the variables measured on nominal scale were quantified using data reduction technique and saved as a dummy variable.

The following regression model shall be used:

$$Y= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y – Organisational Performance (dependent variable)

X_1- X_4 – The independent variables

X_1- Product Innovation Strategies

X_2- Technological Innovation Strategies

X_3- Marketing Innovation Strategies

X_4- Process Innovation Strategies

β_0 - Is the constant of the model

β_1- β_4 – Are the regression coefficients

ε – Stochastic error term estimate

CHAPTER FOUR

DATA ANALYIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results of data analysis and discussion of the study findings. The objective of the study was to establish the effects of innovation strategies on the performance of agrochemical firms in Nairobi County. Specifically, the study sought to determine the effect of product, technological, marketing and process innovations on the performance of agrochemical companies in Nairobi County. Primary data used in the study was collected from the respondents by use of a semi-structured questionnaire. The researcher administered the questionnaires through "drop-and-pick-later" method so as to give the respondents ample time to respond. Descriptive statistics (frequencies, percentages, means and standard deviations) and inferential statistics (regression analysis) were used to analyze with aid of Statistical Package for Social Sciences (SPSS).

4.2 Response Rate

A total of 58 semi-structured questionnaires were administered to senior manager's employees in agrochemical firms in Nairobi. The response rate is as tabulated in Table 4.1.

Table 4.1: Response Rate

Response Rate	**Frequency**	**Percentage**
Properly Filled	52	89.66
None Response	6	10.34
Total	**58**	**100**

Source: Field data (2018).

Table 4.1 presents the results of the response rate. The researcher managed to receive 52properly filled questionnaires resulting to a response rate of 89.66%. This was considered

as an adequate representative of the target population compared to the 80% recommended by Edwards, Clarke and Kwan (2002).

4.3 Reliability Test

In this section, the researcher sought to establish the internal consistency of the questionnaire used. This was aimed at establishing whether the questionnaire was reliable and collecting data on the effect of innovation strategies on the performance of agrochemical firms in Nairobi County. To test the internal consistency of questionnaire, a Cronbach Alpha was used a greater than 0.7 co-efficient was an indicator of internal consistency. The results are as shown in Table 4.2.

Table 4.2: Reliability Statistics

Variable	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Product innovation	.723	.739	5
Technological innovation	.766	.761	5
Marketing innovation	.783	.787	6
Process innovation	.759	.755	5
Firm Performance	.784	.793	7
Challenges Of Innovation	.850	.849	8
Aggregate	**.766**	**.765**	**36**

Source: Field data (2018)

Table 4.2 presents the reliability statistics results. The results indicate that the questionnaire used was internally consistent in all the sections as evidenced by the Cronbach's Alpha co-efficient aggregate value of 0.763. Product innovation, Technological innovation, Marketing innovation, Process innovation, Firm Performance and Challenges of Innovation recorded Cronbach's Alpha co-efficients of 0.723, 0.766, 0.783, 0.759, 0.784 and 0.85

0respectively.Since all the co-efficient recorded were greater than 0.7, the researcher concluded that the questionnaire was reliable in measuring the variables related to the effect of innovations strategies on the organisational performance of agrochemical firms in Nairobi.

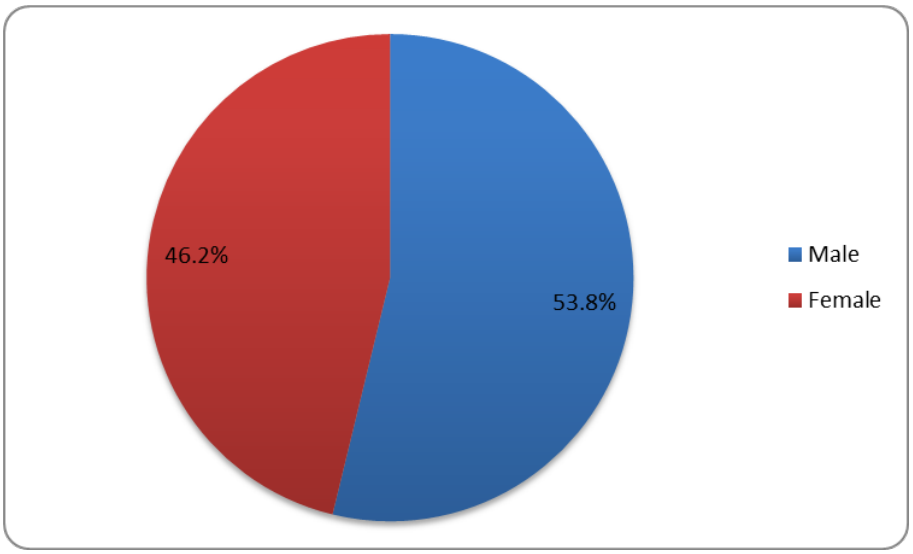
4.4 General Information

This section presents the general information of the respondents. The researchers discussed gender of the respondents, level of education, position held in the organisation, working experience, firm size and years in operation. The findings are discussed below.

4.4.1 Gender of Respondents

The study sought to establish the gender of the respondents. This would indicate the state of gender parity in the distribution of questionnaires. The study findings are as shown in Figure 4.1.

Figure 4.1: Gender of Respondents



Source: Field data (2018)

Figure 4.1 presents results on the gender of respondents. The results reveals that majority (53.8%) of the respondents were of male gender while the remaining 46.2% were of female gender. This is a clear indication that the researcher was not gender biased during distribution of questionnaires. Further, the results indicate that the agrochemical firms in Nairobi observes gender parity when recruiting employees.

4.4.2 Level of Education

The respondents were also required to indicate their highest level of education. The results are as tabulated in Table 4.3.

Table 4.3: Level of Education

Level	Frequency	Percent
Graduate Level	37	71.2
Post Graduate Level	14	26.9
College Level	1	1.9
Total	**52**	**100.0**

Source: Field Data (2018).

Table 4.3 presents results on the level of education. It was established that majority (71.2%) of the respondents had a graduate level of education followed by 26.9% who had a post-graduate level. Only 1.9% of the respondents reported to have a college level of education. These results indicate that the respondents were well educated to understand the effect of innovation strategies on the performance of agrochemical firms in Nairobi County.

4.4.3 Position Held in the Organisation

The study further sought and obtained information in regard to the positions held by the respondents. Table 4.4 shows the results.

Table 4.4: Position Held in the Organisation

Position	Frequency	Percent
Sales Manager	8	15.4
Quality Control Manager	7	13.5
Customer Care	6	11.5
Warehouse Manager	6	11.5
Business Development Manager	1	1.9
Commercial and Marketing Manager	1	1.9
Factory Manager	1	1.9
Product Development	1	1.9
Production Supervisor	1	1.9
Quality Assurance	1	1.9
Regional Manager	1	1.9
Registration and Product Development Officer	1	1.9
Technical Registrations	1	1.9
Technical Sales Representative	1	1.9
Missing	15	28.8
Total	**52**	**100.0**

Source: Field Data (2018).

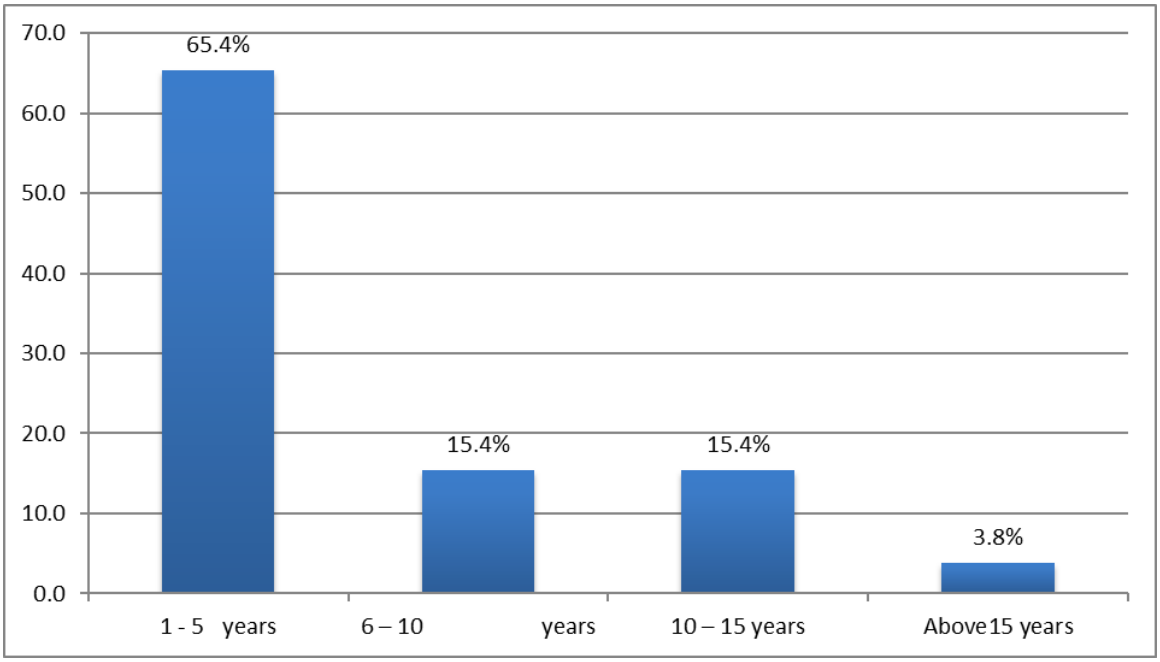
Figure 4.4 presents results on the positions held by the respondents. The results indicated that the respondents held various positions in their respective firms. Most (15.4%) of the respondents sales managers followed by Quality Control Managers at 13.5% and then Customer Care at 11.5%. Warehouse Managers also accounted for 11.5%. The other positions held included those of Business Development Manager, Commercial and Marketing Manager, Factory Manager, Product Development, Production Supervisor, Quality

Assurance, Regional Manager, Registration and Product Development Officer, Technical Registrations and Technical Sales Representative. The results indicate that the respondents were in a position to comprehend the effect of innovation strategies on the performance of agrochemical firms in Nairobi County.

4.4.4 Working Experience

The study further sought to establish the number of years the respondents had been working in their respective agrochemical firms in Nairobi. The findings are as shown in Figure 4.2.

Figure 4.2: Working Experience



Source: Field Data (2018).

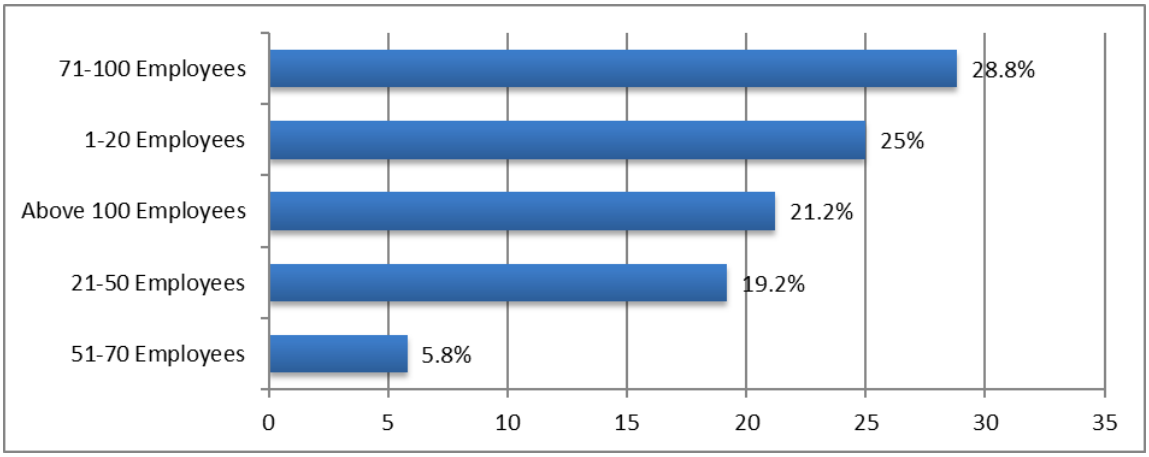
Figure 4.2 presents the findings on the respondents working experience. It was also established that majority (65.4%) of the respondents had a working experience of 1-5 years followed by 15.4% of the respondents who had a working experience of 6 – 10 years. Further, those with a working experience of 10-15 years also accounted for 15.4%. Only

3.8% of the respondents had a working experience of over 15 years. This shows that the respondents had sufficient working experience to understand the effect of innovation strategies on the performance of agrochemical firms in Nairobi County.

4.4.5 Firm Size

The respondents were further requested to indicate the size of their firms. The collected data was analysed and the findings are as shown in Figure 4.3.

Figure 4.3: Firm Size



Source: Field Data (2018)

Figure 4.3 presents results on the results firm size. The results in the table reveals that most (28.8%) of the respondents were from firms that had 71-100 employees followed by those from firms with 1-20employees at 25%. Those from firms with over 100 employees accounted for 21.2%. Only 5.8% of the respondents were from firms with 51-70 employees. This indicates that the agrochemical firms in Nairobi were big enough to necessity in product, process, marketing and even technological innovation.

4.4.6 Years in Operation

The respondents were further requested to indicate the number of years their firms had been in operation. The collected data was analysed and the findings are as shown in Table 4.5.

Table 4.5: Years in Operation

Years	Frequency	Percent
Above 20 Years	23	44.2
10 -20 years	23	44.2
5 – 10 Years	4	7.7
1 – 5 Years	2	3.8
Total	**52**	**100.0**

Source: Field Data (2018).

Table 4.5 presents the results on the number of years the agrochemical firms have been in operation. The results in the table above reveals that most (44.2%) of the firms had been in operation for years above 20 years followed by another 44.2% of the firms that had been in operation for a period between 10-20 years.7.7 % indicated that the firm had been in operation for a period between 5- 10 years. Only 3.8% of the respondents reported that their firms had been in operation for 1-5 years. This indicates that the agrochemical firms in Nairobi have been in operation long enough to understand the effect of innovation strategies on the performance.

4.5 Descriptive Statistics

The study sought to determine the extent to which agrochemical companies in Nairobi had implemented product, technological, marketing and process innovations strategies. The study further sought to establish the level performance of agrochemical companies in Nairobi. The mean scores recorded were interpreted using the following interpretation scale: 1.00 - 1.49:

No Extent; 1.50 - 2.49: Little Extent; 2.50 - 3.49: Moderate Extent; 3.50 - 4.49: Great Extent and 4.50 - 5.00: Very Great Extent.

4.5.1 Product Innovation Strategies

The study sought to determine the extent to which agrochemical companies in Nairobi had implemented product innovations strategies. The results are tabulated in Table 4.6.

Table 4.6: Product Innovation Strategies

Statement	Mean	Std. Deviation
Increasing chemical product portfolio	4.52	0.542
Introducing new chemical product	4.31	1.020
Improving chemical product user friendliness	4.15	0.697
Monitoring changing customer needs	3.83	0.810
Shortening product cycles	3.22	1.083
Aggregate Mean	**4.00**	**0.830**

Source: Field Data (2018).

Table 4.6 presents the results on the extent of implementation of product innovation strategies. Product innovation strategies recorded an aggregate mean score of 4.00(*SD*= 0.830) implying that agrochemical companies in Nairobi had implemented product innovations strategies to a great extent. The products innovations that have been used to a great extent by agrochemical companies in Nairobi include: increasing chemical product portfolio (*M*=4.52, *SD*= 0.542); Introduction of new chemical product (*M*=4.31, *SD*= 1.020); Improving chemical product user friendliness(*M*=4.15, *SD*= 0.697) and Monitoring changing customer needs(*M*=3.83, *SD*= 0.810). The standard deviations indicate that the respondents' opinions were clustered around implementation to a great extent.

4.5.2 Technological Innovation Strategies

The study sought to determine the extent to which agrochemical companies in Nairobi had implemented technological innovations strategies. The results are as shown in Table 4.7.

Table 4.7: Technological Innovation Strategies

Statement	Mean	Std. Deviation
Adoption of new systems such as ERP	3.69	1.001
Automating routine tasks	3.46	0.999
Using new innovative production technology	3.33	1.211
Process innovation	3.29	1.006
Increasing investment in innovative technology	3.23	1.262
Aggregate Mean	**3.40**	**1.096**

Source: Field Data (2018).

Table 4.7 presents the results on the extent of implementation of technological innovation strategies. Technological innovation strategies recorded an aggregate mean of 3.40(*SD*= 1.096) implying that agrochemical companies in Nairobi have implemented product innovations strategies to a moderate extent. Adoption of new systems such as ERP was the only technological innovation strategy implemented to a great extent (*M*=3.69, *SD*= 1.001). The standard deviations indicate the extent of difference respondents' opinions.

4.5.3 Marketing Innovation Strategies

The study sought to determine the extent to which agrochemical companies in Nairobi had implemented marketing innovations strategies. The results are as shown in Table 4.8.

Table 4.8: Marketing Innovation Strategies

Statement	Mean	Std. Deviation
Changing market segmentation	4.12	0.784
Adopting innovative promotion activities	4.02	0.707
Changing product design	3.83	0.964
Adopting innovative pricing strategies	3.73	0.910
Introducing new product placement strategies	3.69	1.058
Introducing innovative product offers	3.65	0.968
Aggregate Mean	**3.84**	**0.898**

Source: Field data (2018).

Table 4.8 presents the results on the extent of implementation of marketing innovation strategies. Marketing innovation strategies recorded an aggregate mean score of 3.84(*SD*= 0.898) implying that agrochemical companies in Nairobi have implemented marketing innovations strategies to a great extent. All the listed marketing innovations that have been used by agrochemical companies to a great extent. They include: changing market segmentation; adopting innovative promotion activities; changing product design; adopting innovative pricing strategies; introducing new product placement strategies and introduction innovative product offers. The standard deviations indicate presence of a little variations in respondents' opinion.

4.5.4 Process Innovation Strategies

The study sought to determine the extent to which agrochemical companies in Nairobi had implemented process innovations strategies. The results are as shown in Table 4.9.

Table 4.9: Process Innovation Strategies

Statement	Mean	Std. Deviation
Introducing business process re-engineering	3.51	0.857
Business information technology	3.40	0.891
Changing organizational strategy	3.06	1.145
Changing organizational structures	2.77	1.041
Changing organizational culture	2.63	1.205
Aggregate Mean	**3.08**	**1.028**

Source: Field Data (2018).

Table 4.9 presents the results on the extent of implementation of process innovation strategies. Technological innovation strategies recorded an aggregate mean of 3.08(*SD*= 1.028) implying that agrochemical companies in Nairobi have implemented process

innovations strategies to a moderate extent. Introduction of business process re-engineering was the only marketing innovation strategy implemented to a great extent (*M*=3.69, *SD*= 1.001). Difference in respondents' opinions is as shown by the standard deviations recorded.

4.5.5 Organizational Performance

The extent of performance of agrochemical companies in Nairobi was sought by the study. The results are shown in Table 4.10.

Table 4.10: Organizational Performance

Statement	Mean	Std. Deviation
Timely delivery of orders	4.44	0.725
Capacity building	4.27	0.744
Resource utilization	4.19	0.715
Production efficiency	4.15	0.872
Reduction in operational cost	4.12	0.983
Increase in product sales	3.98	0.700
Customer satisfaction	3.96	0.907
Aggregate Mean	**4.16**	**0.807**

Source: Field Data (2018).

Table 4.10 presents results on the organizational agrochemical companies in Nairobi. Organizational Performance of agrochemical companies in Nairobi recorded an aggregate mean of 4.16(*SD*= 1.028) indicating that agrochemical companies in Nairobi were performing well to a great extent. The top rated performance parameters were: Timely delivery of orders(*M*=4.44, *SD*= 0.725); Capacity building(*M*=4.27, *SD*= 0.744); Resource utilization(*M*=4.19, *SD*= 0.715) and Production efficiency(*M*=4.15, *SD*= 0.872). There were

variations in the performance of agrochemical companies in Nairobi as indicated by the standard deviation.

4.6 Regression Analysis

Regression analysis was done to test how innovation strategies affect the performance of agrochemical firms in Nairobi. The results are as discussed under the model summary, analysis of variance and regression co-efficients.

4.6.1 Model Summary

Organisational performance was regressed against innovation strategies (process innovation strategies, marketing innovation strategies, technological innovation strategies, product innovation strategies). The model summary results are as tabulated in Table 4.11.

Table 4.11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.532[a]	.283	.214	.36847
a. Predictors: (Constant), Process Innovation Strategies, Marketing Innovation Strategies, Technological Innovation Strategies, Product Innovation Strategies				

Source: Field Data (2018)

Table 4.11 presents results on the model summary. The study established that there was a strong relationship (R-value = 0.532) between innovation strategies and organizational performance of agrochemical firms in Nairobi. The results also revealed that innovation strategies can explain 21.4% of the total variance in the organizational performance of agrochemical firms in Nairobi.

4.6.2 Analysis of Variance

Analysis of Variance (ANOVA) statistics were further computed to test the suitability of the regression model to the data collected. The findings of the study are as shown in Table 4.12.

Table 4.12: Analysis of Variance (ANOVAa)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.246	4	.562	4.136	.006[b]
	Residual	5.702	42	.136		
	Total	7.949	46			
a. Dependent Variable: Organisational Performance						
b. Predictors: (Constant), Process Innovation Strategies, Marketing Innovation Strategies, Technological Innovation Strategies, Product Innovation Strategies						

Source: Field Data (2018).

Table 4.12 presents the results on analysis of variance. The F-ratio of 4.136 and p-value of 0.6% indicated that the regression model used in the study was suitable for the data that was used. The model was therefore suitable for fore casting the organizational performance of agrochemical firms in Nairobi following the implementation of process, marketing, technological and product innovation strategies.

4.6.3 Regression Coefficients

Regression co-efficients were computed to establish how individual innovation strategies influenced organizational performance of agrochemical firms in Nairobi. The regression co-efficients were computed at 95% confidence interval with a p-value 0.05 being used as the indicator of significance. The results are as shown in Table 4.13.

Table 4.13: Regression Coefficients

Coefficients[a]				
Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	2.085	.562		3.708	.001
	Product Innovation Strategies	.051	.123	.064	.413	.682
	Technological Innovation Strategies	.022	.103	.033	.211	.834
	Marketing Innovation Strategies	.392	.125	.453	3.126	.003
	Process Innovation Strategies	.110	.109	.141	1.015	.316
a. Dependent Variable: Organisational Performance						

Source: Field Data (2018)

Table 4.6.3 presents results on the regression coefficients. It was established thatall the innovation strategies had a positive effect on the organizational performance of agrochemical firms in Nairobi as evidenced by the beta values of Process Innovation Strategies (β= 0.051), Marketing Innovation Strategies (β=0.022), Technological Innovation Strategies (β= 0.392) and Product Innovation Strategies(β= 0.110). Further, only Marketing Innovation Strategies(t-stat = 3.126, p-value = 0.003) recorded a p-value of less than 0.05 implying that it's the only strategy that had a significant effect on organization performance of agrochemical firms in Nairobi.

The study generated the following analytical equation:

$Y = 2.085 + 0.051X_1 + 0.022X_2 + 0.392X_3 + 0.110X_4$

Where,

X_1- Product Innovation Strategies

X_2- Technological Innovation Strategies

X_3- Marketing Innovation Strategies

X_4- Process Innovation Strategies

The above analytical equation shows that the performance of agrochemical firms in Nairobi would be 2.085 in the absence of product, technological, marketing and process innovation strategies. Improving product, technological, marketing and process innovation strategies by a unit would help improve the organisational performance of agrochemical firms in Nairobi by 0.051, 0.022, 0.392 and 0.110respectively. This indicates that marketing innovation strategy has the greatest impact on the performance of agrochemical firms in Nairobi.

4.7 Challenges of Innovation

The study further sought to establish the challenges faced by agrochemical firms in Nairobi when implementing innovation strategies. The results are shown in Table 4.14.

Table 4.14: Challenges of Innovation

Challenge	Mean	Std. Deviation
High costs of developing new products	4.27	0.598
High cost of implementing new strategies	4.23	0.921
Inadequate technological infrastructure	4.04	1.084
Inadequate resource for research and development	3.63	0.929
Resistance to change by staff of agrochemical firms	3.06	0.916
Inhibiting organizational culture	2.98	1.010
Absence of a sound innovation management program	2.71	1.054
Poor communication of innovation strategies	2.56	0.978
Aggregate Mean	**3.44**	**0.936**

Source: Field Data (2018).

Table 4.14 presents results on the challenges of innovation. The study established that agrochemical firms in Nairobi face innovation challenges to a moderate extent as was evidenced by the aggregate mean score of 3.44 (*SD*= 0.807). The challenges faced to great extent included: High costs of developing new products (*M*=4.27, *SD*= 0.598); High cost of

implementing new strategies (*M*=4.23, *SD*= 0.921) and Inadequate technological infrastructure (*M*=4.04, *SD*= 1.084).

The other challenges faced during innovation strategy implementation included lack or shortage of expertise, High cost of new technologies, Rigid regulating practice that discourage innovation, lack of employee management system, researching on new molecules is always very expensive, cost of new technologies is always high, generic pressure, employees are not empowered to innovate, ever stringent registration and regulatory requirements especially on export products, lack of a research and development department, lack of avenues to share innovative ideas and lack of support by the top leadership.

4.8 Discussion of Results

The first objective of the study was to find out what effect product innovation strategies have on the organizational performance of agrochemical firms in Nairobi. The study found that it had a positive impact. This supported existing literature. For instance, Nyawira (2016) concluded that product innovation strategies influences firm performance of insurance firms in a positive and a statistically significant manner. Soi (2016) concluded that product innovation strategies helped telecommunication firms in Kenya to make higher profits, enhanced business growth, improved investment and overall increased productivity. Kamakia (2014) concluded that product innovation had a great impact on customer satisfaction.

The second objective of the study to find out what effect technological strategies have on the organizational performance of agrochemical firms in Nairobi. It was established that technological innovation strategies had a positive effect on the organizational performance of agrochemical firms in Nairobi. These results were in sync with existing empirical literature. For instance, Ndunga*et al.* (2016) found out that technological innovation has positively

influenced the financial performance of commercial banks in Meru town. Nyawira (2016) sought to establish the effect of technological innovation strategies on the performance of insurance firms in Kenya and found out that technological innovation strategies have a positive and a statistically significant influence on the performance of insurance firms in Kenya.

The third objective of the study was to establish the effects of marketing innovations on organizational performance of agrochemical firms in Nairobi. The study established that marketing innovations strategies had a positive and significant effect on the organizational performance of agrochemical firms in Nairobi. The findings were also in support of studies. Nyawira (2016) conducted a study with a specific objective of finding out the effect of marketing innovation strategies on the performance of insurance firms in Kenya and found out that marketing innovation strategies influenced firm performance in a positive and significant manner. Soi (2016) investigated the effect of marketing innovation strategies on the performance of firms in the Telecommunication sector in Kenya and established that marketing innovation had a large impact on their performance.

The fourth objective of the study was to establish the effects of process innovations on organizational performance of agrochemical firms in Nairobi. The study established that process innovation strategies had a positive effect on the organizational performance of agrochemical firms in Nairobi. A study in study by Soi (2016) was to determine whether process innovation influenced the performance of the telecommunication firms in Kenya. She found out that process innovation increases the customer satisfaction which is a good indicator of a firms' operational performance. Hassan, Shaukat, Nawaz and Naz (2013) conducted an empirical study on the effect of innovation and established that the performance

Pakistan's manufacturing sector concluded that innovation types had positive effects on performance.

The objectives of the study was to establish the effects of product, technological, marketing and process innovations strategies on the performance of agrochemical firms in Nairobi County. The study established that there was a strong relationship (R-value = 0.532) between innovation strategies and organizational performance of agrochemical firms in Nairobi. The results also revealed that innovation strategies can explain 21.4% of the total variance in the organizational performance of agrochemical firms in Nairobi.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the study findings. The chapter also presents the conclusions of the study, and recommendations for policy and practice and suggestions for further research in relation to the effects of innovation strategies on the performance of agrochemical firms in Nairobi County

5.2 Summary of the Study

The objective of the study was to establish the effects of innovation strategies on the performance of agrochemical firms in Nairobi County. Specifically, the study sought to determine the effect of product, technological, marketing and process innovations on the performance of agrochemical companies in Nairobi County. Primary data used in the study was collected from the respondents with the use of a semi-structured questionnaire. Descriptive statistics and inferential statistics were used to analyze with the aid of SPSS.

The study established that there was a strong relationship (R-value = 0.532) between innovation strategies and organizational performance of agrochemical firms in Nairobi. The results also revealed that innovation strategies can explain 21.4% of the total variance in the organizational performance of agrochemical firms in Nairobi. all the innovation strategies had a positive effect on the organizational performance of agrochemical firms in Nairobi

Product, technological, marketing and process innovations strategies had a positive effect on the organizational performance of agrochemical firms in Nairobi. However, only marketing strategy that had a significant effect on organization performance. Further, the study

established that agrochemical firms in Nairobi face innovation challenges to a moderate extent with high costs of developing new products, high cost of implementing new strategies and Inadequate technological infrastructure were the most faced challenges.

The study also established that the other challenges key challenges faced during implementation innovation strategy include lack or shortage of expertise, high cost of new technologies, rigid regulating practice that discourages innovation, employees are not empowered to innovate, ever stringent registration and regulatory requirements especially on export products, lack of a research and development department, lack of avenues to share innovative ideas and lack of top management support.

5.3 Conclusion of the study

The study concludes that there was a strong relationship (R-value = 0.532) between innovation strategies and organizational performance of agrochemical firms in Nairobi with innovation strategies explaining 21.4% of the total variance in the organizational performance of agrochemical firms in Nairobi.

The study also concludes that product, technological, marketing and process innovations strategies have a positive effect on the performance of agrochemical firms in Nairobi with marketing innovation strategy being the only one influencing performance significantly.

The study further concluded that agrochemical firms in Nairobi face innovation challenges to a moderate extent with high costs of developing new products, high cost of implementing new strategies, inadequate technological infrastructure, shortage of expertise, rigid regulating practice that discourages innovation, lack of a research and development department, lack of avenues to share innovative ideas and lack of top management support being the most faced challenges.

5.4 Recommendations of the Study

The greatest challenges faced by agrochemical firms in Nairobi when trying to innovate include the high costs of developing new products, high cost of implementing new strategies, inadequate technological infrastructure, shortage of expertise, rigid regulating practice that discourages innovation, lack of a research and development department, lack of avenues to share innovative ideas and lack of top management support being the most faced challenges.

The study makes the following recommendations. The management of the agrochemical firms in Nairobi should set aside adequate budget to establish proper technological infrastructure, hire qualified experts, create avenues to share innovative ideas, set up a R&D department and create a conducive environment for innovation.

The government should create a business environment that encourages and supports innovation in the agrochemical sector. This should be in form of offering tax exemptions on the technologies required come up with more innovative products and relaxing the rigid regulating practices that discourages innovation.

5.5 Implications for Policy

The government of Kenya needs to establish policies that will create an enabling environment to allow agrochemical firms to innovate. The policies should be aimed at streamlining the rigid regulating practice that discourages innovation among agrochemical firms. Further, the government should come up with policies aimed at reducing the cost of technologies needed by the agrochemical firms in order to be able to offer more innovative products.

The management of the agrochemical firms should create policies aimed at encouraging and promoting innovation. These policies should be aimed enabling the firms to hire personnel with the right expertise; establishing research and development departments; creating avenues for share innovative ideas and top management supporting and funding innovative ideas.

5.6 Areas for Further Research

The scope of this study was limited to the effect of innovation strategies on the performance of agrochemical firms in Nairobi County. This implies that the findings cannot be adequately used for firms outside Nairobi. In future, a similar study should be done considering all the 47 counties in Kenya.

This implies that the results can not apply to firms outside the agrochemical sector in Kenya. In future, a similar research can be replicated with a focus on other sectors other than the agro-chemical sector.

5.7 Limitations of the Study

The researcher sought data from the employees in senior positions in Agrochemical Firms in Nairobi County . By virtue of the positions they hold, the respondents had busy working schedules which delayed the process of data collection process. The researcher handled the limitations by using the drop-and-pick-later method to give ample time to fill-in the questionnaires.

The data sought was sensitive since it was related to family owned businesses. As a result, some of the respondents were unwilling to fill-in the questionnaires fearing that the information provided might be used to outdo them in business by competitors. The intention and objective of the study to fulfill academic requirements was explained to them. Further, the researcher guaranteed the respondents that the information provided would be confidential.

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Appendix I: Introduction Letter

Appendix II: Research Questionnaire

You have been selected to participate in a study that seeks to establish the effect of innovation strategies on the performance of agrochemical firms in Nairobi. The information provided will be used for academic purpose only and shall be treated with utmost confidentiality.

SECTION A: GENERAL INFORMATION

1. Name of the agrochemical firm? (Optional)

…….

2. Gender of Respondent

Male [ ] Female [ ]

3. Highest level of education

College Level [ ] Graduate Level [ ]

Post Graduate Level [ ] Any other (Specify) ……..

4. What position do you hold in this organization?

.....

5. How long have you been in this firm?

1 - 5 years [ ] 6 – 10 years [ ]

10 – 15 years [ ] Above15 years [ ]

6. Size of the agrochemical firm

1-20 Employees [ ] 21-50 Employees [ ]

51-70 Employees [ ] 71-100 Employees [ ]

Above 100 Employees [ ]

7.Years in the firm has been in Operation

1 - 5 Years [ ] 5 – 10 Years [ ]

10-20 Years [ ] Above 20 years [ ]

SECTION B: INNOVATION STRATEGIES

10. To what extent has your firm has adopted the following innovation strategies? Tick as appropriate using the following Likert scale of 1-5 where: 1= No Extent; 2= Little Extent; 3= Moderate Extent; 4= Great Extent; 5=Very Great Extent.

	INNOVATION STRATEGIES	**Respondents Ratings**				
	Product innovation strategies	**1**	**2**	**3**	**4**	**5**
1.	Introducing new chemical product					
2.	Improving chemical product user friendliness					
3.	Monitoring changing customer needs					
4.	Increasing chemical product portfolio					
5.	Shortening product cycles					
	Technological innovation strategies					
1.	Increasing investment in innovative technology					
2.	Automating routine tasks					
3.	Adoption of new systems such as ERP					
4.	Using new innovative production technology					
5.	Process innovation					
	Marketing innovation strategies	**1**	**2**	**3**	**4**	**5**
1.	Adopting innovative pricing strategies					
2.	Changing market segmentation					
3.	Introducing innovative product offers					
4.	Changing product design					
5.	Introducing new product placement strategies					
6.	Adopting innovative promotion activities					
	Process innovation strategies	**1**	**2**	**3**	**4**	**5**
1.	Introducing business process re-engineering					
2.	Changing organizational structures					
3.	Changing organizational strategy					
4.	Business information technology					
5.	Changing organizational culture					

SECTION C: FIRM PERFORMANCE

11. How do you rate the performance of your agrochemical firm? Tick as appropriate using the following Likert scale of 1-5 where: 1= No Extent; 2= Little Extent; 3= Moderate Extent; 4= Great Extent; 5=Very Great Extent.

Performance Measurement	**Respondents Ratings**				
	1	**2**	**3**	**4**	**5**
Increase in product sales					
Production efficiency					
Capacity building					
Timely delivery of orders					
Reduction in operational cost					
Customer satisfaction					
Resource utilization					

SECTION E: CHALLENGES OF INNOVATION IMPLEMENTATION

12. To what extent does your firm face the following challenges when implementing innovation strategies? Tick as appropriate using the following Likert scale of 1-5 where: 1= No Extent; 2= Little Extent; 3= Moderate Extent; 4= Large Extent; 5=Very Large Extent.

Challenges	**Respondents Ratings**				
	1	**2**	**3**	**4**	**5**
High costs of developing new products					
High cost of implementing new strategies					
Resistance to change by staff of agrochemical firms					
Inadequate resource for research and development					
Inadequate technological infrastructure					
Inhibiting organizational culture					
Absence of a sound innovation management program					
Poor communication of innovationstrategies					

What other challenges does your organization face when implementing innovation strategies?_____

_____

Thank you for participating in this study.

Appendix III: List of Agrochemicals Firms in Kenya

1. BASF East Africa Limited
2. Sineria East Africa Ltd
3. Organix Limited
4. Koppert Biological Systems (K) Ltd.
5. Dow Agrosciences
6. Arysta Life Science Corporation
7. Agriscope (Africa) Limited
8. Amiran Kenya Ltd
9. Anset International Ltd
10. Bayer E.A Ltd
11. Bimeda Ltd
12. Biomedica Laboratories Ltd
13. Chemraw Ltd
14. Cooper K Brands
15. East African Business Co.
16. Elgon Kenya Ltd
17. Export Trading Co. Inputs Kenya Ltd
18. Greenlife Crop Protection Africa Ltd
19. Hangzhou Agrochemicals Ind. (EA) Ltd
20. Kenagro Suppliers Ltd
21. Kilimo Centre Ltd
22. Lachlan (K) Ltd
23. Monsanto Kenya Ltd
24. Norbrook Kenya Ltd
25. Osho Chemical Industries Ltd
26. Pestgon Ltd
27. Oak Medica Ltd
28. Orbit Agro Chemical Industries Ltd (OCIL)
29. Rentokil Initial Kenya Ltd
30. Rockem Limited
31. Rotam Sub-Saharan Africa
32. Syngenta E. A. Ltd

33. Twiga Chemical Industries
34. Ultravetis E.A. Ltd
35. UngaFarmcare E.A. Ltd
36. Agrichem Africa Ltd
37. Anspa E.A Ltd
38. Bell Industries Ltd
39. Dera Chemical Industries
40. Dupont International
41. Fedo Agencies Ltd
42. Flamingo Horticulture Ltd
43. Highchem Essentials Ltd
44. Impact Chemicals
45. Insecta Ltd
46. Juanco SPS Ltd
47. KAPI Ltd
48. Laibuta Chemicals Ltd
49. Mea Ltd
50. Murphy Chemicals E.A. Ltd
51. Nairobi Veterinary Centre Ltd
52. Nordox AS(K) Ltd
53. Pytech Chemicals GMBH
54. Safina (EA) Ltd
55. Topserve E.A. Ltd
56. Tropical Farm Management
57. Turbo Highway Eld Ltd
58. Willowood Africa Ltd

Source: AAK (http://agrochem.co.ke/full-members/)