INNOVATION MANAGEMENT IN KENYA'S MANUFACTURING SECTOR

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DECLARATION

The research project is my original work and has not been to any institution of learning for award of any academic certificate. All the references cited in the text have been duly acknowledged.

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DEDICATION

To my late loving Mum, Evelyn

For her gloomed foundation. I miss you mama; a lot. You remain my heroine for always. R.I.P good mum.

My caring Dad, Reuben

Who underwent pain to ensure I have good education and for constantly reminding me the importance of education.

My dear friend Lydia

For your support and encouragement during the entire period of study.

ABSTRACT

Managers in companies constantly strive to increase efficiency, implement best practice and deliver increased shareholder value. They seek to improve cash flow through efficiencies of scale and cost reductions measures but there are limits to cost saving. The best way to create value and sustainable growth in firm is to innovate ahead of the competition. The study explored innovation management in Kenya's manufacturing sector. It was based on exploratory study design and sought to explore answers to three questions: to what extent firms in Kenya's manufacturing sector recognize the importance of innovation? What are the main drivers of innovation in firms in Kenya's manufacturing sector? And which model of innovation used by these firms? To achieve the study objectives a survey was carried out and questionnaires were administered to selected firms in the manufacturing sector and the data collected was analyzed. The findings indicate that the main drivers of innovation in manufacturing sector are external factors with competition topping the list. While innovation was driven by mostly eternal factors the major sources of innovation that firms relied on are internal. It was also found that there was little financial investment set for innovation. From the findings a model for innovation was developed. The researcher recommended that for firms to realize meaningful innovation financial innovation must be increased to at least 10% of the revenue. The firms should also rely on every employee in the firm for ideas and document them so that it's easy to implement the ideas.

Key words: Innovation, Innovation Management.

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LIST OF ABBREVIATION

CEO	Chief Executive Officer
CIMC	Comprehensive Intellectual Capital Management
GDP	Gross Domestic Product
GE	General Electrics
KPMG	Klynveld Peat Marwick Goerdeler
MIT	Massachusetts Institute of Technology
NIH	Not Invented Here
PWC	Price WaterhHouse Coopers
R & D	Research and Development
TQM	Total Quality Management

CHAPTER ONE: INTRODUCTION

1.1 Background

Crossan and Apaydin (2010, p. 2) give a comprehensive definition of innovation as production or adoption, assimilation and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. Innovation is both an outcome and a process. The core meaning of innovation thus relates to renewal or improvement, with novelty being a consequence of this improvement. It is necessary for people to change the way they make decisions, or choices outside of their norm for an improvement to take place. Schumpeter (1934) proposes that innovation changes the values onto which the system is based. When people value system change, the old economic system will also change to make room for the better one. When that happens innovation is said to have occurred.

Innovation management emerged as a discipline with Edison's innovation factory in the 1890s. Edison changed the image of the sole inventor by converting innovation to a process with recognized steps practiced by a team of inventors working together – laying the basic design of the R&D department. The steps include idea generation, concept development, feasibility studies, product development, market testing and launch. Innovation management thus corresponds to the management of the process of development of new products, processes and services. In cases where the organization does not make or offer products innovation lies in improving the processes to meet the organization's mission that is process innovation (CIMC, 2002).

Managers in companies constantly strive to increase efficiency, implement best practice and deliver increased shareholder value. They seek to improve cash flow through efficiencies of scale and cost reductions measures but there are limits to cost saving. In a global economy firms operating in lower-cost countries perform better than those operating in higher-cost countries however efficient they are. The best way to create value and sustainable growth in firm is to innovate ahead of the competition. A firm needs to create temporary monopolies where its products are the only show in town (Sloane, 2003).

All businesses want to be more creative in their thinking. Most CEOs of the fastest growing companies believe that their strongest competitive advantage is unique products and services and the distinct business processes that power them to market (Smith, 2005). Kelly (1998) argues that in today's world, wealth flows directly from innovation, not optimization and that wealth is not gained by perfecting the known. Efficiency is a necessary condition for business success but is insufficient to sustain growth in the long-term. While new levels of efficiency and productivity require inventive solutions, the goal of efficiency is not the same as the goal of innovation (Smith, 2005). Innovation plays a vital role in the development of new products processes and business concepts. Innovation drives growth and opportunity in new markets and breathes life into a mature industry (Creative Australia, 2010).

Andrew *et al.* (2009) argue that in today's global economy, the need to be one step ahead of the competition is even more urgent- especially for industries in the United States. The emergence of challengers from rapidly developing economies such as India, China, Brazil and Eastern Europe has changed the playing field. In their conclusion they

proposed that it is critical that companies and countries do all they can to encourage, support and advance in innovation. Arza and Lopez (2010) published a paper that estimated the relationship between innovation and productivity and the realities of innovative activities in developing countries. The results suggested that investing in different types of innovative activities-and not only in R&D and doing in-house activities systematically contributed to firms' innovative and economic performance. Naranjo et al. (2011) sought to analyze the organizational culture with an innovation strategy. The study found that organizational culture is a clear determinant of innovation strategy. It also found that adhocracy culture fosters innovation strategies and hierarchical cultures promote imitation culture.

1.1.1 Innovation in Kenya

As Africa is preparing itself for Information Technology revolution a small number of innovations in Kenya are positioning the country as a regional leader in technology. An example is *ushahidi* platform that was developed during the post election violence to collect reports from eyewitnesses and to map the most affected areas to create awareness about the crisis. The goal was to share information with all parties to provoke response from humanitarian aid. The innovation was used in Haiti and Chile earthquake mapping. Another innovation that has spurred the world is the mobile phone money transfer. When safaricom created MPESA the goal was to reach the enable cash transfer through mobile phone technology but now it also used to operate bank accounts (Mghendi, 2010).

Kenya's financial system has experienced remarkable financial innovation with possible implication on monetary transmission mechanisms and hence on conduct of monitory policy. A lot of reforms have been undertaken in financial sector that have led to

proliferation of financial products, activities and organizational forms that have improved and increased the efficiency of the financial system. Technological advances and changing economic conditions have created impetus for this change. All these developments coupled with changes in the international financial environment and increasing integration of domestic and financial markets have led to rapid financial innovation. Some of the financial innovations include use of debit and credit cards, use of paper money instead of cash, use of Magnetic Ink Character Recognition which ensure clearing of cheques speedily and efficiently, M- pesa and Zap (Misati et al. 2010).

Agriculture plays a big role in Kenya's economy and contributes about 23.8% of the country's GDP. Only 20% of land in Kenya is considered arable while the rest is either arid or semi-arid characterized with low rainfall and periodic drought. Public agricultural research institutions have led innovations in the agricultural sector. A good example is coming up with maize varieties that suit the various climatic conditions (Brooks et al., 2009).

The integration of science, technology and innovation in national productive process is vital to the success of the government's policy priorities and programmes outlined in Kenya vision 2030. This is particularly important within the context of demands for global economic competitiveness, sustainable development and equity concerns. Consequently the development of the necessary scientific infrastructure, as well as the technical and entrepreneurial skills is an essentially prerequisites for transformation of Kenya into a knowledge based society. Introduction of innovative ideas into products, processes and services is highly dependent on a clearly defined and supportive policy (Research, Innovation and Technology Sector, 2009).

1.1.2 The Kenya Manufacturing Sector

Manufacturing sector comprises establishment that engages in the mechanical, physical or chemical transformation of materials, substances or component into new products. Kenya has a large manufacturing sector serving both the local market and exports to the East African region and the rest of the world. It is dominated by subsidiaries of multinationals. The sector has contributed 13% of the gross domestic product (GDP) in the year 2004. In 2004 the sector expanded by 1.4% compared to 1.2 in 2002 (PWC, 2006).

Under the economic pillar of the Kenya vision 2030, manufacturing is one of the key sectors expected to deliver the envisaged 10 per cent economic growth rate per annum, by increasing and sustaining its contribution to Gross Domestic Product (GDP) by at least 10 percent per annum by the year 2012. The sector will also support the country's social development agenda through creation of jobs, generation of foreign exchange, and attracting local and foreign investment. The sector faces various challenges. The challenges include: competition from cheaper imports, shorter product life cycle, low investment in capital and high cost of production. In order to counter these challenges firms in the Kenya's manufacturing sector must be innovative enough to come up with products that are competitive in the market and innovative processes to reduce the cost of production.

1.2 Problem Statement

Manufacturing sector is yet to experience a big leap to high sustainable growth in the country. The sector plays an important role in economic recovery and employment creation, bringing to fore the core aspect of achieving competition in a global

environment. A brief analysis of economic history, especially in United Kingdom, will show that industrial and technological innovations have led to substantial economic benefits for the innovating company and the innovating country (Trott, 2008). At the MIT Emerging Technology Symposium 2003, GE CEO, Jeff Immelt, set out his beliefs about innovation, where he said that the world is just a moment of complacency away from an abyss called commodity hell, where businesses compete only on price and the share goes to the least common denominator. He further argues that firms in future will be working for customers instead of investors and businesses are not built for the future. Immelt concluded by suggesting that the only source of profit, the only reason people will invest in companies in the future is their ability to innovate and their ability to differentiate (Smith, 2005).

Studies of innovation in manufacturing sector of the economy have been carried out in different countries. KPMG (2007) wrote a paper on innovation in manufacturing sector of India where areas of innovation in manufacturing were identified. The paper sought to find out what innovation is in the context of manufacturing, challenges facing innovation in the Indian manufacturing sector and the key success factors for successful innovation. India is one of the fastest growing economies in the world. Its economy is the tenth largest in the world and therefore challenges faced by India's manufacturing firms may not be same as that of Kenya. Zahiruddin *et al.* (2011) in their study to explore innovation in small and medium enterprise in Malaysia focused on process innovation to measure innovativeness of a firm. There are other types of innovations in manufacturing sector such as product innovation, market innovation and others and therefore a firm's innovativeness cannot be determined by a single type. Dickson and Hidjimanolis (1995)

in their study discussed innovation management practices manufacturing industries in cypress. Their study concentrated on roles of networks in fostering innovation in small scale manufacturing firms in cypress. Their study also concentrated small scale manufacturing firms in cypress. Small firms faces various challenges such lack essential resources for innovation compared to large scale manufacturing firms. It is not right to import the whole some results of a research without taking into account the environmental differences and hence the need to carry out local research in order to understand the problem better (Aosa, 1992).

Several studies on innovation have been carried out here in Kenya. A study by Odeny (2010) identifies strategies for enhancing biotechnology innovation for crop improvement in Kenya. Misati *et al.* (2010) sought to examine the effects of financial innovation on monetary policy transmission focusing on the interest rate channel through which the Central bank implements the policy. The study concludes that financial innovation poses complex challenges to the conduct of monetary policy which would necessitate constant revision of policy and instruments, targeting frameworks and operating procedures to enhance monetary policy effectiveness. Although many studies have been done on innovation management in manufacturing sector none has been done on Kenya's manufacturing sector. Having understood crucial role played by manufacturing sector and the bridge offered by innovation in enabling the sector achieve competitiveness several questions arises that needs to be answered. For instance: to what extent firms in Kenya's manufacturing sector recognize the importance of innovation? What are the main drivers of innovation in firms in Kenya's manufacturing sector? And which model of innovation is used by these firms?

1.3 Objectives of the Study

The general objective of the study was to explore how firms in Kenya's manufacturing sector manage innovations. However, the following were the specific objectives:

i. To determine the extent to which firms in Kenya's manufacturing sector recognize the importance of innovation.

ii. To identify the main drivers of innovation in the Kenya's manufacturing sector.

iii. To develop a model of innovation in Kenya's manufacturing sector of the economy.

1.4 Value of the Study

The study is expected to contribute to theory and practice. It will be useful to both practitioners and academicians. The findings of the study will help broaden the academic content in as far as innovation management is concerned to both academicians and researchers. The study may also be used as base for further studies. Policy maker in the government may use the study to come up with policies that will encourage, support and advance innovations in the country. The government plays an important role in facilitating innovation. It can do this by financing R&D, regulating competition, purchasing products of innovation, infrastructure building etc.

Manufacturing firms in Kenya may use the study to foster innovation in their firms. The biggest challenge faced firms is how to fit innovation in their daily operation. The study may be used to tackle this challenge by identifying areas that needs attention from managers in order to increase a firms' innovativeness.

The study may also be used by foreigners in better understanding of Kenya's manufacturing sector especially in the area of innovation. Opportunities for investment

can be identified in the manufacturing sector. Foreigners may use the study to establish innovation opportunities by looking at the main drivers of innovation in the sector.

CHAPTER TWO: LITERATURE REVIEW

2.1 Innovation Management

Crossan and Apaydin (2010, p.2) give a comprehensive definition of innovation as production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome. Thus the core meaning of innovation relates to improvement or renewal, with novelty being a consequence of this improvement. According to Myers and Marguis (1969) innovation is not a single action but a total process of interrelated sub-processes. Therefore innovation management is the management of all the activities involved in the process of idea generation, technology development, manufacturing and marketing of a new (or an improved) product, process or equipment.

Firms must be able to adapt and evolve if they wish to survive. Most business operates with the knowledge that their competitors will inevitably come up with a product that changes the basic competition. Managers constantly strive to increase efficiency, implement best practice and deliver increased shareholder value. They seek to increase cash flow through efficiencies of scale and cost reductions but there are limits to cost saving. In a global economy firms operating in lower-cost countries perform better than those operating in higher-cost country. The best way to create value and sustainable growth is to innovate way ahead of the competitor. There is need to create temporary monopolies where the product a company offers is unique (Sloane, 2003).

There isn't a business that doesn't want to be more creative in its thinking. CEOs of the fastest growing companies claim that their strongest competitive advantage is unique products and services and the distinct business processes that power them to market (Smith, 2005). Kelly (1998) argued that wealth today flows directly from innovation, not optimization. Wealth is not gained by perfecting the known. Efficiency is a necessary condition for business success but is insufficient to sustain growth for a long period of time (Smith, 2005). Much evidence exist for innovation as the main driver of growth, prosperity and source of profitability for companies thus the questions that are asked on research no longer revolve around why innovation is important but the focus has shifted to how to innovate and how innovation process can be managed (Fredberg et.al., 2008).

2.2 Types of innovation

It is possible to classify innovations regarding several criteria: area of the organization, technical characteristics, degree of innovativeness or tangibility. The approach used in this section identifies innovation types according to the area of the organization. Schumpeter (1934) identified five areas of innovation: generation of new or improved products- product innovation, introduction of new production processes- process innovation, and development of new sales markets- market innovation, development of new supply markets and reorganization or restructuring of the company (Fagerberg, 2005; Drejer, 2004). Table 2.1 gives a typology of innovation

Table 2.1: Typology of innovation

Type of innovation	Description
Product innovation	Development of new products, changes in design of established products, or use of new materials or components in manufacture of established products.
Process innovation	A new way of making or delivering goods or services: for example, going to visit the doctor and recording that you have arrived for your appointment by touching a screen instead of talking to a receptionist.
Organization innovation	Implementation of a new or incrementally changed organizational method or managerial form. Examples include introduction of a new accounting procedure and a new venture division.
Marketing innovation	Implementation of a new or incrementally changed marketing strategy that develops the sales market. An example includes new sales approach such as direct marketing.

Adopted and modified from Trott (2008)

Product innovation focuses on existing market for existing products, differentiating through features and functions that the current offers do not have. This form of innovation is normally highly dependent on first time to market although patents can sometime keep competitor at bay for prolonged periods. Market innovation focuses on differentiating the interaction with a prospective customer during purchase process. The goal is to outsell the competitor rather than out-product them.

Process innovation focuses on improving profit margin by extracting waste not from the offer itself but from the enabling process that produce it. The primary goal is to remove nonvalue-adding steps from the workflow. Examples include WalMarts vendor-managed inventory process and Dell's direct-retail model (Moore, 2005). Organization innovation involves the implementation of a new or incremental change in the organizational method or managerial form.

2.3. Models of innovation

The Traditional arguments about innovation have centered on two schools of thought. One, the social deterministic school argued that innovations were a combination of the result of a combination of external social factors and influence, such as demographic changes, economic influences and cultural changes. The argument was that when the conditions were 'right' innovation would occur. The second school of thought i.e. individualistic school argued that innovations were as a result of unique individual talent and such innovators are born (Trott, 2008).

Literature on what 'drives' innovation tended to divide into two school of thought, that is, market-based view which argues that market conditions provide the context which facilitates or constrain the extent of innovation activity in a firm and (Slater and Narver 1994; Porter, 1980, 1985) and the resource-based view of innovation which considers that a market-driven orientation does not provide a secure foundation for formulating innovation strategies which are dynamic and volatile; rather a firm's own resources provide a much more stable context in which to develop its innovation activity and shape its market in accordance to its own view (Penrose, 1959; Wernerfelt, 1984; Grant 1996; Prahalad and Hamel, 1990; Conner and Prahalad, 1996; Eisenhardt and Martin, 2000).

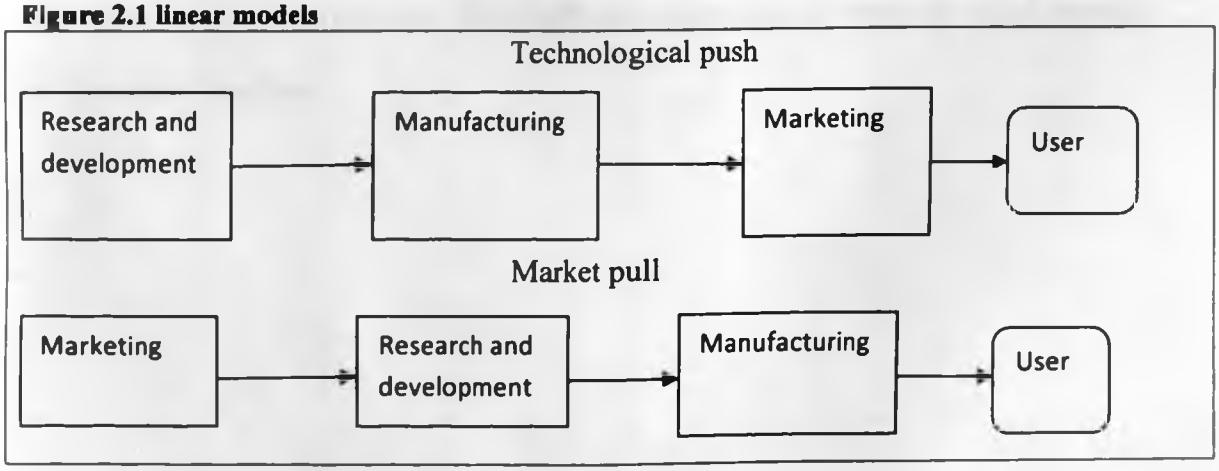
The innovation process models have evolved in five generations from simple linear models to increasingly complex interactive models (Rothwell, 1992). The first and the second generation models are technology push and market pull models. They have a simple and linear sequential process and thus are referred to as the linear models. The third generation model is the coupling model. It recognizes interactions and feedback loops between different elements. The fourth generation interactive model combines both

the technology push and the market pull models and emphasize also the external linkages. The fifth-generation innovation models, the network models, perceive the innovation process as a multi-factor process, which requires high level of interaction, networking and knowledge (Trott 2008, Tidd *et al.* 1998, Rothwell 1992).

2.3.1 Linear models

The recognition that innovation occurs through the interaction of science base, technological development and the need of the market was a significant step forward. The explanation of the interaction forms a basis of models of innovation today. Price and Bass (1969) argue that, in Science, Innovation is often viewed as an orderly process, starting with the discovery of new knowledge, moving through various stages of development, and eventually emerging in final, viable form. According to linear model, innovation seems to be a rational process, essentially similar to the other, more systematic functions of an organization. The assumption is that it can be analyzed into component parts and controlled rationally—that is to say, planned, programmed, managed much as other, more routine activities are (Edgerton, 2004). Figure 2.1 shows the two linear models.

Figure 2.1 linear models



Source: Trott, 2008

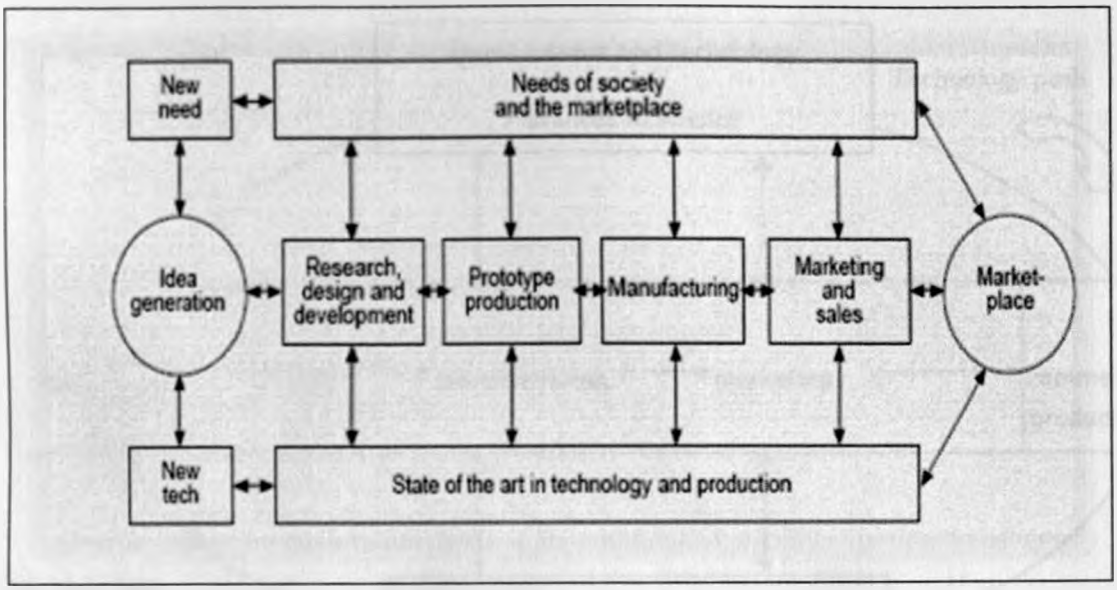
In the technology-driven model it is assumed that scientists make unexpected discoveries, technologists apply them to develop product ideas and engineer and designers turn them into prototypes for testing. It is left for manufacturing to devise ways of producing the product efficiently. Finally, marketing and sales will promote the product to the potential consumer. In this model the marketplace was a passive recipient for the fruits of R &D (Trott 2008).

In the 1970s new studies of actual innovations suggested that the marketplace was played a vital role in the innovation process (von Hippel, 1978). This led to the second linear model, the 'market-pull' model of innovation as shown in figure 2.1. This model emphasizes the role of marketing as an initiator of new ideas resulting from interaction with customers. These, in turn are conveyed to R&D for design and engineering and then to manufacturing for production.

2.3.2 Simultaneous Coupling Model

Galbraith (1982) suggested that whether innovations are stimulated by technology, customer need, manufacturing or a host of other factors, including competition misses the point. The linear models are only able to offer an explanation of where the initial stimulus for innovation was born.

Figure 2.2: The Simultaneous Coupling Model



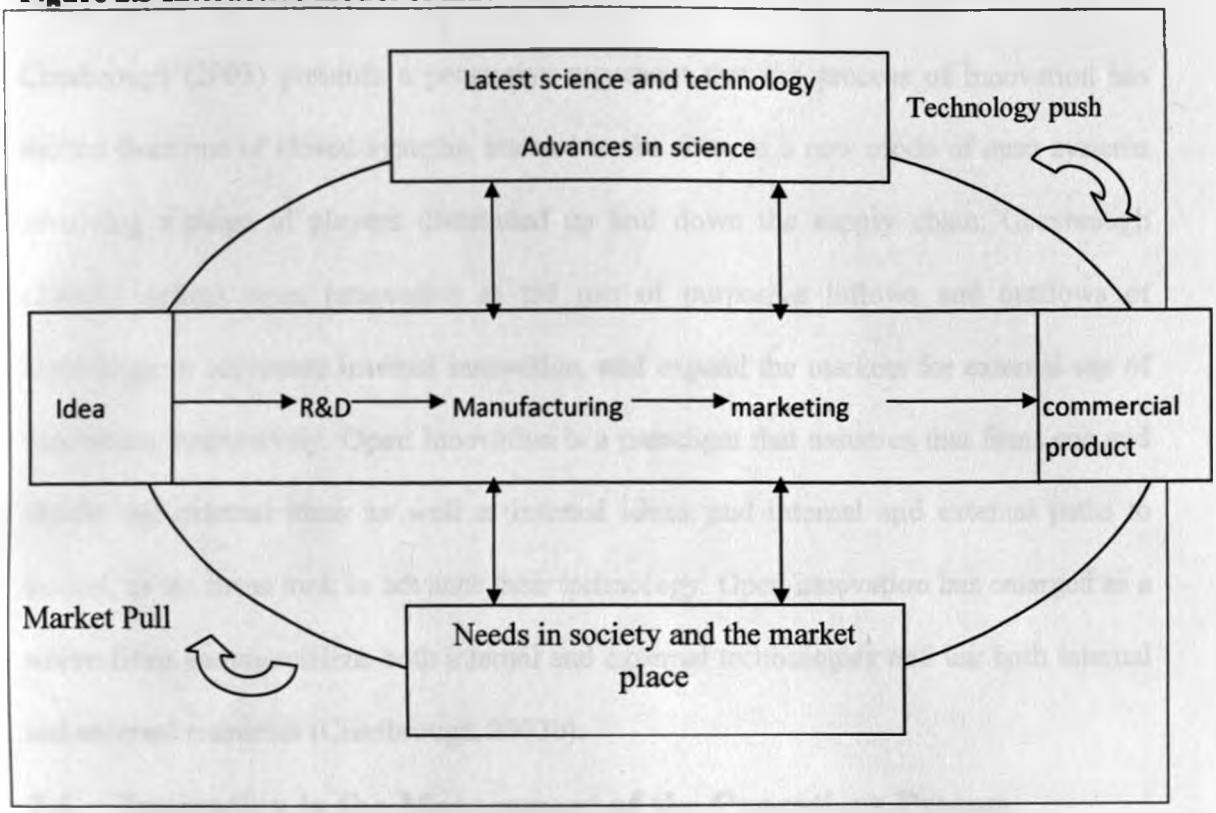
Source: Rothwell (1994)

The simultaneous coupling model shown in figure 2.2 suggests that it is the result of the simultaneous coupling of the knowledge within all the functions in the organization that will foster innovation. Furthermore, the point of commencement for innovation is not known in advance.

2.3.3 Interactive model

The interactive model combines the technology-push and market-pull models. It emphasize that innovations occur as the result of the interaction of the marketplace, the science base and the organization's capabilities.

Figure 2.3 Interactive model of innovation



Source: Rothwell and Zegveld (1985)

In interactive model there is no explicit starting point and the use of information flows is used to explain how innovations transpire and that they can arise from a wide variety of points. It can be regarded as a logical sequential, though not necessarily continuous, process that can be divided into a series of functionally distinct but interaction and interdependent stages (Rothwell and Zegveld, 1985). Knowledge about technology and market needs is used throughout the innovation process. To obtain this knowledge (communication) networks are formed with internal and external partners. Innovation projects become part of a portfolio of projects aligned with the corporate strategy Model of an essentially sequential process with feedback loops and interaction with market needs and state of the art technology (Ortt & van der Duin, 2008).

2.3.4 Network Model

Chesbrough (2003) presents a persuasive argument that the process of innovation has shifted from one of closed systems, internal to the firm, to a new mode of open systems involving a range of players distributed up and down the supply chain. Chesbrough (2006b) defines open innovation as the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology. Open innovation has emerged as a where firms commercialize both internal and external technologies and use both internal and external resources (Chesbrough, 2003b).

2.4 Innovation in the Management of the Operations Process

The way in which an organization secures, deploys and utilize its resources will determine the extent to which it can successfully pursue its specific performance objectives (Barnes, 2006). Slack *et al.* (2004) argue that there are five operations performance objectives: cost, quality, speed, dependability and flexibility. New, innovative ways of working within operation process to gain competitiveness is every operations manager's duties. The question is often how to start? An excellent starting point for all analysis is the customer.

Quality performance is the key operations management responsibility and innovation to help improve quality performance is critical to all organization. Trott (2008) in his book identified some of the triggers of innovation that puts customers' perspective in a product: gap analysis, quality circles and process improvement teams, total quality

management, quality function deployment, ISO 9000 approach and EFQM excellence model. In order to design quality services and products and services it is necessary to fully understand your customer and their expectations. Assessing expectation is difficult as customers are different from each other and change with time. Gap analysis technique is used to aid understanding the differences between customers and consumer view or experience of a product or service

A quality circle is a small group of voluntary workers who meet regularly to discuss problems (not necessarily restricted to quality matters) and determine possible solution. 'Process improvement teams' is used to reflect the need to look at the whole business process being considered. Quality circles can be a rich source of innovation solutions to problems and cost saving and patent applications may follow (Trott, 2008).

TQM can be defined as an effective system of integrating the quality development, quality maintenance and quality improvement efforts of various groups in an organization so to enable production and services at the most economical levels which allows for full customer satisfaction. For a TQM approach to be successful all the staff in all departments has to be involved. Quality and employee improvements are therefore inextricably linked and should part of continuous cycle. If a modest innovative and improvement cycle continues, by embedding the approach in the culture of the organization the long-term and total result may exceed that of radical solution (Feigenbaum, 1986). Singh and Smith (2004) studied a model of the relationship between total quality management (TQM) and innovation. Customer focus was discussed and the conclusion was that a closer relationship with customers opens channels for better innovation management practices. Making design decisions concurrently rather than

sequentially requires superior coordination among different disciplines involved-marketing, engineering, operations and most importantly, the customer. Quality function deployment is a structured approach to this problem that relates the voice of the customer to every stage of the design and the delivering process.

Many countries have developed their own quality systems and standards and in 1994 these were combined to become the international standards organization ISO 9000- a set of standards governing documentation of a quality program. Companies that are certified are listed in a directory and this information is made available to potential customers. Many large organizations insist that all their suppliers should have ISO quality standards thus much time and effort is spent in new, innovative ways of controlling and developing processes to maintain the agreed and certified standards. Completing the certification process can be long and expensive (Krejewski and Ritzman, 2001, 267); however, compliance with ISO 9000 says nothing about the actual quality of the product.

In the year 1988, 14 leading Western European companies formed the European Foundation for quality management and gave an award for the most successful application of TQM in Europe. In the year 1999 this idea and model was refined and developed into the EFQM model that reflected the increased understanding and emphasis on customer focus and is result oriented Performance measurement is by self-assessment which EFQM defines as 'a comprehensive, systematic and regular review of an organization's activities and result referenced against a model of business excellence' EFQM excellence model embeds innovation and learning in the performance of the organization (Slack *et al.*, 2007; Van looy *et al.*, 2003).

There are other sources of innovation to a firm. The Community Innovation Services-CIS survey, shows that, apart from internal sources, interaction with users is the most important source of innovation for firms followed by contacts with suppliers, participation at fairs/exhibitions and impulses from competitors. Contacts with the public R&D infrastructure (universities and research institutes) are generally considered to be of much lesser importance. Although there are some differences in results across countries and/or industries, the ranking of the various sources in terms of their importance is remarkably robust. The biggest difference is actually between firms of different sizes; large firms consistently value external sources of innovation more highly than do small firms (Fagerberg, 2006).

2.5 Innovation Management Measurement Areas

Over the past fifty years a considerable literature has accumulated on the subject of innovation and how best to manage the process within the firm (Porter and Ketel, 2003). Measurement of the process of innovation is critical for both practitioners and academics, yet the literature is characterized by a diversity of approaches, prescriptions and practices that can be confusing and contradictory. Conceptualized as a process, innovation measurement lends itself to disaggregation into a series of separate studies. The consequence of this is the absence of a holistic framework covering the range of activities required to turn ideas into useful and marketable products (Adam, 2006). Within this literature there is evidence that competitive success is dependent upon a firm's management of the innovation process (Adam et al., 2006). Adam et al (2006) developed a framework that can be used to measure innovativeness of a firm.

Table 2.2: Innovation measurement framework

Framework category	Measurement area
Inputs	People, physical and financial resources, tools
Knowledge management	Idea generation, knowledge repository, information flows
Innovation strategy	Strategic orientation, strategic leadership
Organization and culture	Culture, structure
Portfolio management	Risk/return balance, optimization tool use
Project management	Project efficiency, communication, collaboration
Commercialization	Market research, market testing, marketing and sales

Source: Adam *et al* (2006)

The Information Communication Technology (ICT) is considered the driving force behind the long unprecedented economic growth period of the last decade. It provided the infrastructure for economic development, helped create the knowledge society, contributed to innovation and created value for the economy. More importantly, it brought the world closer together by improving the dissemination of knowledge, accelerating research, stimulating innovation and facilitating collaboration (Ho, 2007).

Smith *et al.* (2010) argue that human capital plays an important role in enhancing innovation capacity. Innovation capacity is defined as the ability of enterprise to identify trends, new technologies, acquiring and exploiting this knowledge and information. Jimenez and Sanz-Valle (2005)'s empirical study of a range of Spanish enterprises examines how an enterprise configures human resources management strategy for innovation performance and the outlined the importance of aligning human resources management strategy to nurture innovation in a firm.

Jung, Chow, and Wu (2003) argue that transformational leadership enhances innovation by engaging employees' personal value systems thereby heightening levels of motivation toward higher levels of performance and encouraging employees to think creatively. The

study by Jung et al. (2003) of 32 Taiwanese companies found that transformational leadership had significant and positive relationships with organizational innovation as it was mediated by an organizational culture in which employees are encouraged to freely discuss and try out innovative ideas and approaches.

From the innovation measurement framework organizational characteristic that facilitates the innovation process can be developed. In a study examining the relationship between innovation stimulus and innovation capacity and innovation performance Prajogo and Ahmed (2006) found that there was a strong relationship between innovation stimulus and innovation capacity and a strong relationship between innovation capacity and innovation capacity. Table 2.2 gives a summary of organizational characteristic that facilitate the innovation process.

Table 2.3: Organization characteristics that facilitate the innovation process

Organizational requirement	**Characteristics for innovation**
Growth orientation	A commitment to long-term growth rather than short-term profit
Organizational heritage and innovation experience	Widespread recognition of the value on innovation.
Vigilance and external links	The ability of the organization to be aware of its threats and opportunities
Commitment to technology and R&D intensity	The willingness to invest in the long-term development of technology
Acceptance of risk	The willingness to include risky opportunities in a balanced portfolio
Cross-functional cooperation and coordination within organizational structure	Mutual respect among individuals and a willingness to work together across functions
Receptivity	The ability to be aware of, to identify and to take effective advantage of externally developed technology
Space for creativity	An ability to manage the innovation dilemma and provide room for creativity
Strategy towards innovation	Strategic planning and selection of technologies and markets
Coordination of a diverse range of skills.	Developing a marketable product requires combining a wide range of specialized knowledge

Source: Trott (2008)

One way to achieve growth and sustain performance is to foster and encourage creativity and innovative practices internally within the organization. Innovation should be viewed as a philosophy that guides the company forwards and should be managed 'outside' the traditional, functional structure of the organization- perhaps on a cross-functional basis (Cottam *et al.*, 2002). For an organization to innovative there has to be a wide spread recognition of the value of innovation in the organization. The organization should also develop strategy for innovation and commit resources for innovation.

Networks are a very important element supporting the rise of techno capitalism. For invention and innovation, networks have become the means to collaboration, helping diffuse knowledge, reproduce creativity, and pull together the resources needed to undertake research. Developing a marketable product requires combining a wide range of specialized knowledge and skill and there organization must ensure that it has a pool of various skills. A firm's heritage is and culture is undisputedly considered crucial to the firm's technological capabilities as it fosters and encourages widespread recognition of the need to innovate. This is clearly illustrated in the extent to which groups and department are willing to cooperate.

2.6 Degree of Innovativeness

Companies try to foresee and ensure that it is ready for possible changes and some instances can modify world technology. The future is unknown and therefore some companies will prosper other will not. Organization often find themselves competing in innovation race without knowing the where the start and finish line are. Some of them know but end up becoming followers (Paritt *et al.*, 1991).

The four broad innovation strategies commonly used in technology intensive firms are: leader/ offensive- the aim is to ensure that product is launched into the market before the competition; fast followers/ defensive- a company develops improved versions of the original. The improvement maybe in terms of cost, different design and addition features; cost minimization/imitative- the strategy is based on being a low cost produce achieve by economy of scale and Market segmentation specialist- this strategy is based on meeting the precise requirement of a particular market segment or niche (Freeman, 1982; Maidique and Patch 1988).

2.7 Global perspective of innovation

Many countries have realized the importance of innovation to their economies and thus do all what is possible to encourage it. Competition is as emerging countries are now becoming stronger competitors in cost efficiencies and thus low cost product. The innovation environment at the same time is also changing. Competition is becoming more intense and international leading to shorter product life cycle. Because of the ICT revolution knowledge is readily available making innovation expensive and risky. To beat this companies must adopt new strategies in innovation and thus are increasingly looking for new partners with complementary expertise in order to share their technology. Companies now in the world are using the open model of innovation where they share their innovation process in all industries. The shift has now moved from the traditional closed models of innovation to network models of innovation (Barker *et al.*, 2008).

Globalization has changed the scope for open innovation as it has widens the choices of partners which have given rise to global innovation network. Firms have built networks

of distributed research and development globally for reasons such as: get local market trend, tap local knowledge and also to be sources of new technology. Large firms adopt 'eco-system' of innovations across different countries in order to meet the growing demand from suppliers and customers (Cooke, 2005; Forester Research, 2004 cited by Barker *et al.*, 2008).

Knowledge-based resources and innovations are important sources of competitive advantage for firms. Awareness of the importance of continuously seeking new knowledge, firms increasingly seek knowledge-rich locations such as specific industry cluster across the world. These are locations characterized by concentration of firms operating in related and supporting activities, specialized workforce and specialized environment that nurtures the industry (Ferreira & Serra, 2008). Porter (1998) noted that the potential benefits of clustering included: improving accessibility to specialized factors, ease access to market and technology information, promoting complementariness and cooperation among firms, access to infrastructure and increase competitive pressure. Cluster promotes innovation through technology and knowledge transfer, development of a skilled labor force in related industries and social infrastructure. An example of such a region is Silicon Valley. Many of the world's largest technology corporations are based there. It is the leading hub high technology innovation (Patton & Kenney, 2003). Patton & Kenney attributed the vibrancy of Silicon Valley and other clusters to the concept of social capital. Others include Bangalore which is the hub for information technology companies in India. The developed countries in Europe, North America and Japan recognize that innovation is important in reenergizing their economies. Many countries also accept that the primary units of competition based on high quality, innovative

products are not nations but firms within regions some of which occasionally bridge national boundaries.

It is now understood that supporting innovation goes beyond increasing the supply of new knowledge and technologies. Rather, innovation emerges out of the interplay between scientific, technological, socio-economic, institutional and organizational arrangements (Smits, 2002). Further innovation stems from collaboration and interactions among a diverse network of actors, forming innovation coalitions (Engel, 1995) or, more recently, public-partnerships (Hall *et al.*, 2001; Hartwich & Tola, 2007).

2.8 Challenges facing innovation management in firms.

Innovation management concerns the management of all the activities in the process from idea generation to its successful commercialization and practical application named innovation. Managing the innovation process is a challenging task and more technology is involved in the process, the more the complex and uncertain it gets. In a recent study by the Open University business school suggested that many British companies recognize the importance of innovation in order to remain competitive (cited in Patel, 1999). However the findings revealed that many of these organizations were not clear about how to 'fit' innovation into the overall business strategy and day-to-day workings of their organization. This may be one of the obstacles to the encouragement of innovation (Cottam *et al.*., 2002).

An empirical carried out by Synectics (1993, cited in Ceserani and Greatwood, 1999) suggested that senior management did not possess the appropriate skills to encourage and foster innovation. The study investigated the responses of 750 top managers from 150 organizations in USA on the importance of innovation. The results showed that although

80% of manager considered innovation to be important but only 4 percent felt that they had the appropriate skills to foster and develop innovation (Cottam *et al.*, 2002).

Susman *et al.* (2006) argue that many managers do not want to pursue innovation, believe that they will not be able to develop successful new products and believe that even if they develop successful new products they won't make enough money for initiative to be worthwhile. These beliefs provide a barrier to innovation because they convince managers that innovation is not worthwhile. They further argue that in order for innovative effort to succeed, the firm's culture should be supportive of innovation. An innovative- supportive culture is one that values creativity and cooperation. An innovative culture should seek to conquer barriers to innovation. Firms need to overcome 'organizational antibodies' that encapsulate and reject new ideas because of the NIH syndrome.

Small enterprises have some competitive advantages over large companies such as flexibility and speed of response but they encounter more challenges in the innovation process brought about by access to resources. Because of limitation of resources small enterprises have technological weaknesses such as narrow technical skills, very specialized range of technologies, and difficult to develop them and thus rely on external linkages to develop them (Tidd *et al.*, 1998). Christensen (1997) argues that management of technology innovation process can be caused by technology and its characteristics. One major challenge is the complexity of managing resources.

2.9 Conceptual model

In an era of globalization, deregulation, increasing competition, new technologies and e-commerce, organizations are finding it harder to compete. In this dynamic and changing

environment, one way to create growth and sustain performance is to innovate (Higgins, 1996). Furthermore, it has been suggested that innovation is essential in order to generate long-term stability, growth, shareholder returns, and sustainable performance and remain at the leading edge of the organization's industry (Cook, 1998). Innovation occurs through the interaction of science base technological development and consumer needs. Figure 2.4 provides conceptual model of innovation in a manufacturing firm.

Figure 2.4: Innovation Conceptual framework

Source: Trott (2008)

Innovation occurs through the interaction of science base (dominated by universities and large science based organization), technological development (dominated by industry) and the needs of the market. The interaction of these activities forms the basis of models of innovation. It believed that the linkages between these key components will produce a successful innovation (Trott, 2008). Innovation in firms can be driven by both its resource base internal factors and needs of the society. These drivers affect both the sources of innovation, implementation and the output of innovation. A firm may decide to source ideas from outside the organization or within the organization. These ideas are then implemented to come up with an output which may be a new or improved product or process. Other outputs include patents, journals, and new markets.

2.10 Summary

Innovation management is the management of all the activities involved in the process of idea generation, technology development, manufacturing and marketing of a new (or an improved) product, process or equipment. Different firms indulge in different types of innovation. Some concentrate on concentrate on product and some process depending on their innovation strategy. The literature review looked at innovation models and how they have evolved over generations. The literature also looked at innovation management measurement areas and a framework for measuring innovation was provided together with a summary of organization characteristics the facilitate innovation. The review also highlighted some of the triggers of innovation in the management of operation process. Global perspective of innovation was also captured in review of literature and some of the challenges facing innovation management were highlighted.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

A survey approach was used in carrying out this study where the units to be studied were manufacturing firms in Kenya selected to the criteria described in section 3.3. The survey focused on factual information or opinions depending on its purpose and it involved administering structured questionnaire to individuals. Since objective of the study was to seek answers to specific questions from a large number of respondents in innovations management, a survey approach was found to be appropriate.

3.2 Population

The target population for this survey consisted of Kenyan manufacturing firms listed in Kenya Association of Manufacturers (KAM) directory that are in Nairobi and surrounding areas. The list comprises multinationals, local companies and private owned companies. The population consisted 463 firms. Kenya association of manufacturers has divided the firm into groups, i.e. energy, electrical and electronics; plastic and rubber; textile and apparels; food, beverage and tobacco; pharmaceutical and medical equipment; metal and allied; paper and paperboard; motor vehicle assembly and accessories; building construction and mining; chemical and allied.

3.3 Sampling

The survey population taking into account low response rate and other hurdles (eg technical, financial and time) reported in this research targeted 100 manufacturing firms. Proportionate Stratified sampling design was carried out. The population is divided into 12 strata which are: energy, electrical and electronics; plastic and rubber; textile and

apparels; food, beverage and tobacco; pharmaceutical and medical equipment; metal and allied; paper and paperboard; motor vehicle assembly and accessories; building construction and mining; chemical and allied; plastic and rubber; and leather products and footwear. Table 3.1 shows the sampling schedule.

Table 3.1: Sampling schedule

Group (strata)	Strata size	Targeted Sample size	Percentage of the population
Energy, electrical and electronics	40	9	22.5
plastic and rubber	55	12	21.8
Textile and Apparels	38	8	21.1
Timber wood	15	3	20.0
Metal and allied	40	9	22.5
Food, beverage and tobacco	100	21	21.0
Pharmaceutical and medical equipment	20	4	20.0
Paper and paperboard	56	12	21.4
Motor vehicle assembly and accessories	17	4	23.5
Building construction and mining	12	3	25.0
Leather products and foot wear	9	2	22.2
Chemical and allied.	61	13	21.3
Total	463	100	21.6

3.4 Data Collection

The study relied heavily on primary data, collected through administering questionnaires to some selected firm's representatives. Two respondents from each firm were asked to fill in the questionnaire. One of the respondent came from the strategic level of the organization that is either managing director, chief executive officer, financial manager

etc. while the other came from the operational level i.e. production manager, operations manager, supervisor etc. Mostly quantitative data was collected. The research instrument is divided into three parts. The first part was used to collect the biographic data of respondent and some information about the firm. The second part was used to collect information on drivers of innovation while the third part collected data on innovation process inputs.

3.5 Data Analysis

The process of data analysis involved several stages. The complete questionnaires were edited for completeness and consistency, checked for errors and omissions and then coded (Keasworth & Harding, 1992). In order to determine the extent to which firms in the manufacturing sector recognize the importance of innovation, descriptive statistics including percentages, mean and standard deviation was used in the analysis. To determine the main drivers of innovation descriptive statistics including frequencies, mean, variance standard deviation and percentages was used in the analysis of data. Content analysis will be used to analyze qualitative information collected in the survey. This will used to support the results of quantitative analysis in and draw conclusion.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the data analysis and interpretation which draws from the objectives of the study. The analyses are both qualitative and quantitative. In this chapter we are going to analyze more extensively the findings that we acquired from the survey, distributed to several manufacturing firms in Nairobi and surroundings. The chapter is structured according to the questionnaire and provides discussion of the findings. In addition data and observations, gained from the survey will be well incorporated into the discussion.

4.2 Data collection and population studied

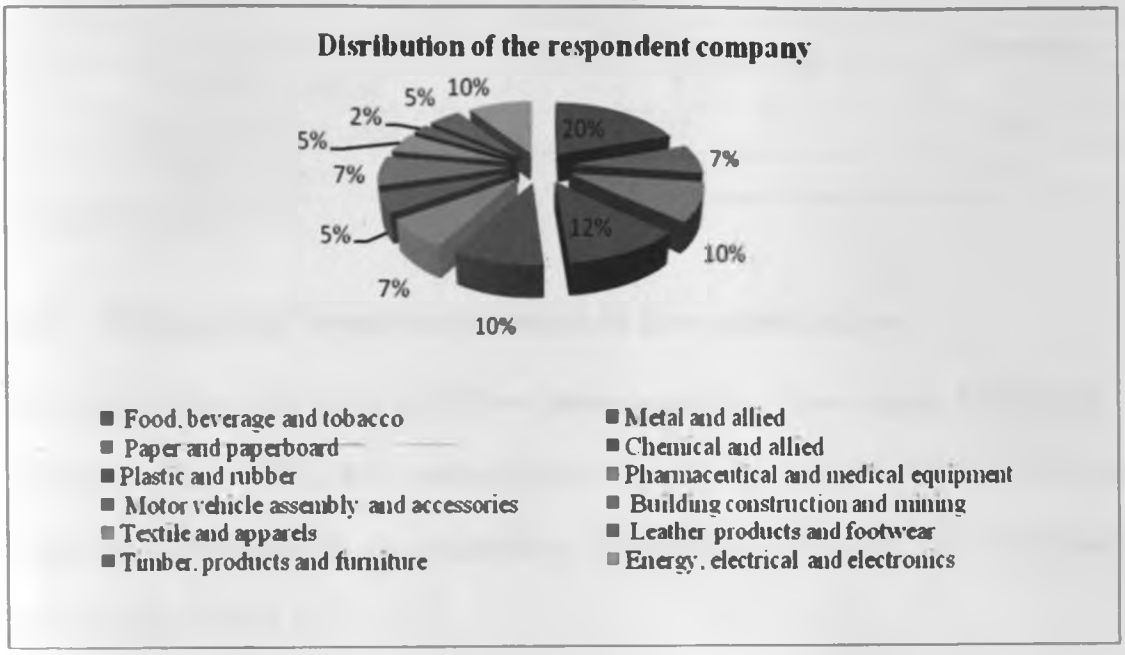
The research was personally administered by researchers themselves by issuing questionnaires to Manufacturing firms in Nairobi, Kenya. The study was carried out within Nairobi because of the limitation in resources and time. Out of the targeted 100 companies only 41 responded by completing the questionnaire thus achieving a response rate of 41%. The response rate was considered statistically sufficient for further analysis. The response rate is presented in Table 4.1 and Figure 4.1.

Table 4.1: Distribution of response by groups

Group	Response frequency	Percentage
Food, beverage and tobacco	8	19.5%
Chemical and allied	5	12.2%
Paper and paperboard	4	9.8%
Plastic and rubber	4	9.8%
Energy, electrical and electronics	4	9.8%
Metal and allied	3	7.3%
Pharmaceutical and medical equipment	3	7.3%
Building construction and mining	3	7.3%
Motor vehicle assembly and accessories	2	4.9%
Textile and apparels	2	4.9%
Timber, products and furniture	2	4.9%
Leather products and footwear	1	2.4%
Total	41	100%

Source: research data

Figure 4.1: Distribution of respondent by group



Source: Research Data

Majority of the respodents came from Food, beverage and Tobacco, this constituted 20% of the respodents while only one respodent came from leather products and footwear which constituted 2%.

4.3 Respondent level of education

The respondents were asked to fill the highest level of education they have attained. This question was important to the researcher because it determined the validity of the questionnaires that were returned. Majority of the respondents were undergraduate degree holders. They represented 78% of the respondent. The minority were master degree holders representing only 5% of the respondents. The distribution of respondent level of education is shown in Table 4.2.

Table 4.2: Respondents education level distribution

Level of education	Frequency	Percentage
College education	7	17%
undergraduate degree	32	78%
Masters degree	2	5%

Source: research data.

4.4 Respondent's number of years in the organization

The respondents were asked to fill how many years they have worked for the firm. A majority of them (54%) had worked for the organization between three to five years while 1% had worked for the organization for more than 10 years. The distribution is shown in the Table 4.3.

Table 4.3: Distribution of Respondents Number of Years in the Organization

Years	Frequency	Percentage
<1	2	5%
1 to 3	8	20%
3 to 5	21	51%
5 to 10	9	22%
>10	1	2%
Total	41	100%

Source: Research data.

4.5 Number of employees in the organization

The respondent was asked to fill the number of employees in the organization. This information is useful in determining the size of the organization by the number of employees in the organization. The distribution of number of employees is given in Table 4.4.

Table 4.4: Distribution of number of employee in the organization

Number of employee	frequency	percentages
<100	2	5%
100-300	24	59%
301-500	13	32%
501-1000	2	5%
>1001	0	0%
Total	41	100%

Source: Research data.

From the findings majority (59%) of the organizations that responded have between 100 and 300 employees while 5% percent that responded had less than 100 employees. None of the organization that responded has more than 1000 employees.

4.6 Innovation drivers

The central meaning of innovation relates to a quest for renewal. For this renewal to take place it is necessary for people to change the way they make decisions, to see things, they must choose to do things differently, make choices outside of their norm. Schumpeter (1934) stated that innovation changes the values onto which the system is based. So when people change their value (system) they 'drive' the old (economic) system to make room for the new one. When that happens innovation has occurred. Understanding the options within the drivers of innovation is important. Knowing the options of what can drive innovation can help firms choose multiple paths to explore and then grow from.

4.6.1 Type of innovation

There is no question that not all innovations are the same. Accordingly, they are frequently classified into typologies as a means of identifying their innovative characteristics or degree of innovativeness (Garcia and Calantone, 2002). The respondents were asked to indicate for the various innovation types the extent in which

the firms indulges. This is to help the researcher to determine whether firms in manufacturing participate in any form innovation and also identify the main type of innovation is dominant in the manufacturing sector. The results are presented in table 4.5.

Table 4.5: Innovation Type

Type of innovation	Mean	Standard deviation	Number of responses
Product innovation	4.14	0.90	41
Marketing innovation	4.00	1.15	41
Process innovation	3.71	1.25	41
Organizational innovation	3.57	0.98	41

Source: Research data.

From the findings it was evident that all the firms that responded try to be innovative in one way or another. It was also evident that the most dominant type of innovation in the manufacturing sector is development of new or improved product (product innovation). This is followed closely by market innovation. The firms indulge less in non-routine, significant, and discontinuous organizational change that embodies a new idea that is not consistent with the current concept of the organization's business. The results partly agreed with the findings of Egbetokum *et al* (2008) in that majority of the firms carried out product innovation, but slightly differed since in Nigeria product innovation is followed by process innovation.

4.6.2 Reasons for adoption of innovative practices

The researcher also sought to find why manufacturing firms adopt innovative practices. The respondent was asked to indicate the extent as to why their firms indulge in innovative practices. A likert scale of 1-5 was used in the rating where 5 represented major reason and 1 not a reason for innovation. Table 4.6 summarizes the results.

Table 4.6: Reasons for Innovation

Reasons for innovation	Mean	Standard deviation	Number of responses
Increase market share	4.86	0.38	41
Reduce cost	4.43	0.79	41
Increase product lifecycle	4.29	0.95	38
Improve product quality	4.14	1.21	40
Long-term survival of the firm	3.86	1.68	39
Reduce material consumption	3.71	1.38	37
Environmental regulation	3.29	1.50	41

Source: Research data.

Increasing market share had the highest mean (4.86) implying that majority of the firm involve themselves in creative practices to increase market share and thus the main driver of innovation in the manufacturing sector. Cost reduction, increase in product lifecycle, and improving product quality all had a mean of above 4.00 and therefore are among the major drivers of innovation in the sector. Environmental regulation had the least mean implying that it is the least impact on firms' innovativeness. It also comes out from Table 4.6 firms' that the major reasons for adoption of innovative practices besides customer satisfaction have to do with their product. Specifically, cost reduction, increased product life-cycle and product quality improvement rank next to increase market share in that order among the firms innovation objectives. The importance attached to these objectives could be explained by the fact that profitability of the businesses is significantly dependent on these. Findings from other developing economies have shown similar trends, for instance India, Bala-Subrahmanya (2005) found quality improvement, cost reduction and customer satisfaction as the leading reasons why firms innovate.

4.6.3 Enhancing innovation

Firms use various methods to encourage innovation use various methods to enhance innovation within firm. The respondent was asked indicate how often the firm employs these methods (i.e. giving administrative support, employee's freedom to experiment, creative practices, innovation management and employee development) were used to enhance innovation. The question sought to find out if the organization's culture enhanced innovation. The results were summarized in table 4.7

Table 4.7 Practices to enhance innovation

	Mean	Standard deviation	Numbers of responses
Employee development	4.00	0.82	39
Giving administrative support	3.57	1.40	37
Creative practices	3.29	1.12	29
Innovation Management practices	3.14	1.07	26
Freedom to experiment	2.57	0.96	38

Source: Research data.

Employee development topped the list as the method that firms use to enhance innovation with a mean of 4.00 as the method that is Oftenly used to enhance innovation. Employees freedom to experiment is least used by manufacturing firms to enhance innovation. This could be because the firms find it riskier to allow employees freedom to experiment.

4.6.4 Innovation strategy

An innovation strategy guides decisions on how resources are to be used to meet a firm's objectives for innovation and deliver value and build competitive advantage. The respondents were asked to indicate whether the organization he/she is working for has developed any strategy specifically for innovation. This sought to find out the extent to which firms appreciate the value of innovation. Table 4.8 summarizes the results.

Table 4.8: Innovation strategy

	Frequency	Percentage
Yes	31	76%
No	3	7%
Don't Know	7	17%
Total	41	100%

Source: Research data.

Majority respondents (76%) said yes while a minority (7%) said no. 17% of the respondents were not aware whether the firms they were working for had developed any strategies for innovation.

4.7 Innovation management process

A necessary starting point for a researcher beginning a new assignment is to understand the subject organization. A useful approach is to appreciate that managers control process which may be viewed as having inputs, process of conversion and output. This process includes the innovation process itself. To be effective and efficient all management activities must include some form of measure or measurement and therefore innovation management process can be measured. In the study inputs was measured by the level of financial investment that is set for innovation process.

4.7.1 Level of investment in innovation

Two measures were used to determine the level of financial investment on innovation; research & development expenditure and percentage of sale spent on innovation. This is used to determine the extent of strategic commitment on innovation. The respondent was asked to indicate the percentage of sales allocated for research and development. Some of the questionnaires had blank entry on this but the one that had entry are summarized in Table 4.9.

Table 4.9: percentage of research and development expenditure on sales

Percentage of investment	Frequency	Percentage
<1%	22	85%
1.0-3.0%	4	15%
3.1-5.0%	2	8%
5.1- 10.0%	1	4%
>10%	0	0%

Source: Research data

From the results it is evident that majority of the firms that responded (85%) spent less than 1% of the revenue they collect on R& D. None of the firm that responded spent more than 10% of sale on R&D. The respondent was also asked to estimate the percentage of sales that is spent directly on innovation. Not all firms responded to this question but those that responded have their results summarized in Table 4.10.

Table 4.10: Percentage of sales spent on innovation

Percentage of investment	Frequency	Percentage
<1%	18	78%
1.0-3.0%	3	14%
3.1-5.0%	1	4%
5.1- 10.0%	1	4%
>10%	0	0%
Total	23	100

Source: Research data

From the results it is also evident that majority of the firms that responded (78%) spent less than 1% of the revenue they collect on innovation. None of the firm that responded spent more than 10% of sale on innovation.

4.7.2 Incentives in the area of innovation

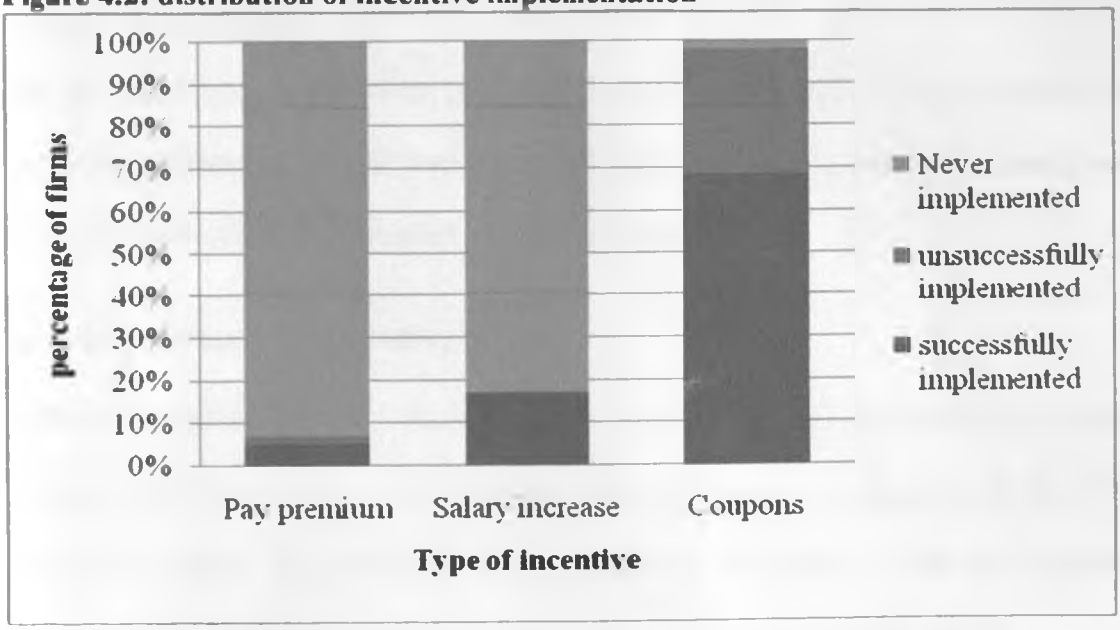
Incentives are given to employees in the organization to encourage them to come up with innovative ideas and implement them. Some incentives were selected and the respondents were asked to indicate how the given incentives are implemented in the organization. Table 4.11 summarizes the results.

Table 4.11: Incentive implementation

	Successfully implemented		Unsuccessfully implemented		Never implemented		Total	
	frequency	percentage	frequency	percentage	frequency	percentage	frequency	percentage
Pay premium	2	5%	1	2%	38	93%	41	100%
Salary increase	7	17%	0	0%	34	83%	41	100%
Coupons	28	68%	12	29%	1	2%	41	100%
Others	0		0		0		0	0

Source: research data

Figure 4.2: distribution of incentive implementation



Source: research data

The findings suggested that majority of the organizations use coupons as an incentive to encourage employees to innovate. Also majority of the organizations do not use pay premium and salary increment. Though majority of firms use coupons respondent felt that of all the other incentive it is the most unsuccessfully implemented.

4.7.3 Implementation of ideas

The respondent was asked to indicate if ideas from the management, other employees, customers and selective research and development sources are always, often, generally, rarely or never implemented. This was to help the researcher how firms deem the relevance of the different sources of ideas. Table 4.12 summarizes the results.

Table 4.12: distribution of implementation of ideas

Sources of ideas	Mean	Standard deviation	Number of responses
Management	4.6	0.55	41
Selective research and development	3.4	0.89	27
Customer feedback	3.2	1.10	41
Other employees	3.0	1.41	38

Source: Research data.

It was found that majority of the firms Oftenly implemented ideas from management and generally implemented ideas from other employee and therefore Ideas from management was regarded with at most importance than any other source.

4.7.4 Sources of innovation

Different organizations use different sources of innovation. Some depend on their internal source and others rely on external sources. The respondents were asked to rate how often the given sources were used by the organization. This was to help the researcher determine the major sources of innovation. Table 4.13 summarizes the results.

Table 4.13: Sources of innovation

	Mean	Standard deviation	Number of responses
Senior management	4.43	0.55	41
Quality circles	4.23	0.43	27
Middle level management	4.17	0.46	41
Network (e.g. collaboration with other companies, strategic partners	4.12	1.05	33
Internal research and development	4.07	0.72	41
customers	4.03	1.01	41
Group (i.e. from mother or daughter company)	3.87	0.75	19
Consultants	3.85	1.30	34
Competitors	3.83	0.45	41
Research laboratories	3.83	0.45	32
Supplier	3.62	0.55	41
Employee at tactical level (e.g. factory workers)	3.42	0.53	33
Public research and development infrastructure	3.26	0.87	32
Exhibitions	3.24	0.84	32
Media	3.04	0.71	40
Professional literature	2.98	1.23	39
Patents	2.43	1.14	23
Serendipity/chance/luck	2.21	0.22	26

Source: research data.

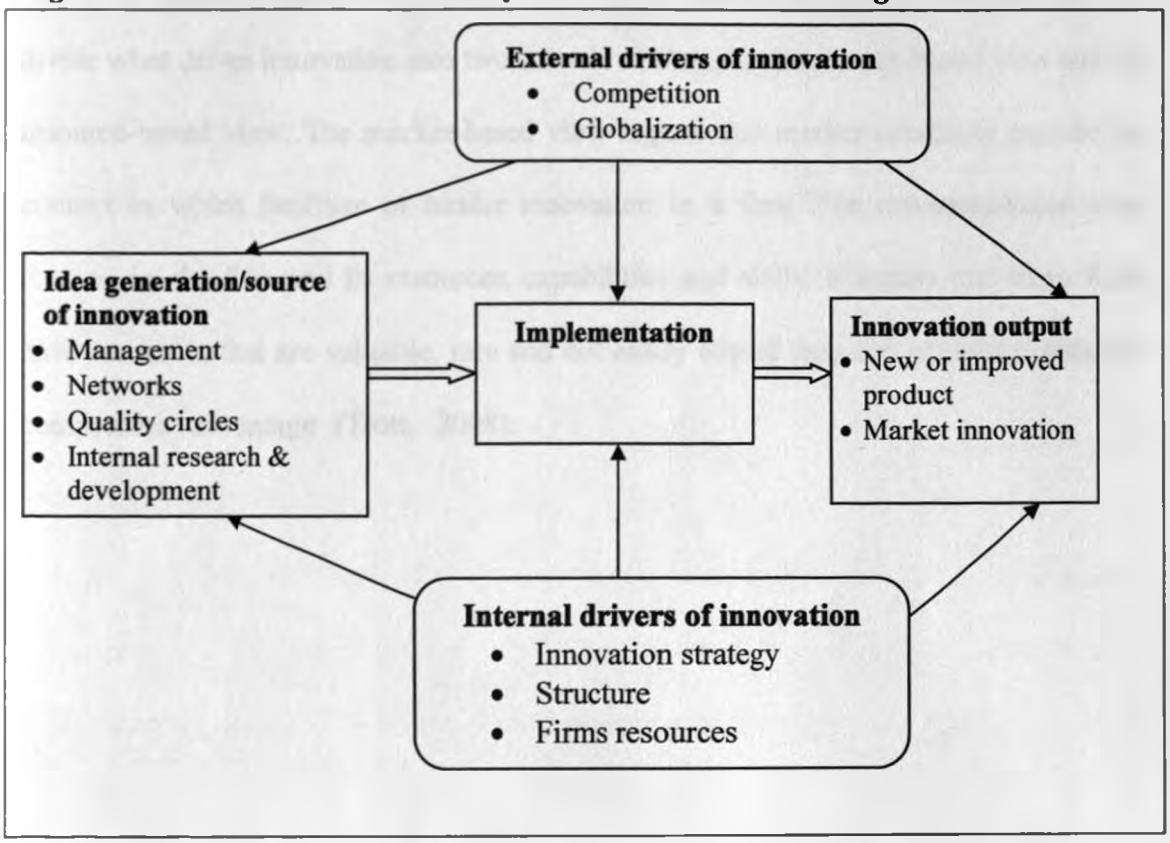
The findings indicate that senior management was very Oftenly used as source of innovation. The findings also show middle level management, quality circles and senior management had a mean of above 4.0 implying that that majority of the firms Oftenly used internal sources as source of innovation. Customers and networks also had a mean of above 4.0 and thus are the major external source of innovation. Serendipity was least used as a source of innovation which was followed by patents and professional literature. The foregone results differ with a recent study done by Jaruzelski and Dehoff (2007) that showed that customer probably matter more than any other stakeholder in innovation. Together with suppliers they exert considerable influence in the success of a firm's innovation.

4.8 Innovation model for the Kenya's manufacturing sector

It is important to understand innovation as a process since it shapes the way in which innovation can be tried and managed. Innovation as a process is viewed as having inputs, process of conversion and output. All these is affected by both internal and external factors.

From the data collected and the analysis carried out it is evident majority of the firm highly indulges in product innovation and marketing innovation and they do so mostly to increase market share, reduce cost, increase product lifecycle and improve product quality. For innovation to occur the first step is to generate ideas. The main sources of innovation for these firms are management (senior and middle level management), internal research & development, quality circles and established strategic networks. From the study findings it is possible to develop a model used by firms in the Kenya's manufacturing sector to innovate. Figure 2.4 shows the model.

Figure 4.3: innovation model used by firms in the manufacturing sector



Source: researcher (2011)

The model suggests that the first step of innovation is to generate ideas. The ideas are then implemented to end up with an output. The process is affected by some factors termed as innovation drivers. The model suggests that what 'drives' innovation in an organization can be classified into two categories: the external drivers of innovation and the internal drivers of innovation. The external drivers of innovation are the factors outside the firm that facilitate or constrain the extent of firm's innovation activities e.g. competition, globalization while the internal drivers of innovation are the factors within the firm that facilitate or constrain firm's innovation activities e.g. organization's culture, structure, skills, financial resources. Innovation drivers affect and influence how firms source for innovation and generate ideas, how ideas are implemented and the output of the innovation process.

The model agree with literature written on what drives innovation as the literature tries to divide what drives innovation into two schools of thought: the market-based view and the resource-based view. The market-based view argues that market condition provide the context in which facilitate or hinder innovation in a firm. The resources-based view focuses on the firm and its resources, capabilities and skills. It argues that when firms have resources that are valuable, rare and not easily copied they can achieve sustainable competitive advantage (Trott, 2008).

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter provides the summary of study findings, conclusion and recommendation. Limitations of the study and suggestion for further areas of study are also discussed in this chapter.

5.2 Summary of Study Finding

The current study was based on exploratory study design and sought to explore answers to three questions: to what extent firms in Kenya's manufacturing sector recognize the importance of innovation? What are the main drivers of innovation in firms in Kenya's manufacturing sector? And which model of innovation used by these firms? To achieve the study objectives questionnaires were administered to selected firms in the manufacturing sector and the data collected was analyzed.

The findings show that majority of the firms indulged in one form of innovation or another but mostly product and market innovation. The findings also show firms in the sector do innovate in order to increase market share, reduce cost, increase product life cycle and improve product lifecycle. For firms to be innovative it must instill a culture that encourages innovation from employees. An innovative- supportive culture is one that values creativity and cooperation. It should also give employee's freedom to experiment. From the findings employee's freedom to experiment was least often method used to enhance innovation but employee development was more often used than any other method. Majority of the firms (76%) in the sector had developed innovation strategy.

The present study was conducted in an attempt to establish to what extent, if any, firm in the Kenya's manufacturing sector has begun to make a commitment to innovation. Committing resources to innovation was taken as the indicator of the organization's strategic intent. On the basis that the lack of resources is often indicative to a lack of commitment (Piercy, 1982), it was found that 85% of the firms invested less than 1% of their revenue on research and development and 78% of the firms that responded spent also less than 1% of their revenue on innovation. On implementation of ideas it was found that majority of the firms' implemented ideas came from management more than other sources.

From the findings it is evident that majority of Kenya's manufacturing firms use internal sources of innovation and the major source is the senior management. The results also show that firms rely on external sources of innovation such as established networks and customers but to a less extent compared to internal sources. Serendipity and reviewing patents are used less as sources of innovation.

5.3 Conclusion

The study had three objectives i.e. to determine the extent to which firms in Kenya's manufacturing sector recognize the importance of innovation, to identify the main drivers of innovation in the Kenya's manufacturing sector and to develop a model of innovation in Kenya's manufacturing sector of the economy. Research findings suggest that firms in Kenya's manufacturing sector are involved in innovation mostly product innovation. They do so largely to increase to increase market share and reduce cost. Majority of the firms have developed strategies for innovation but the culture of the firms inhibits innovation. The level of financial resource used on innovation is minimal indicating that

there is low strategic intent by firms to innovate and thus innovation is not widely appreciated. The main drivers of innovation are market oriented.

5.4 Recommendations

In order to increase innovativeness, innovation capacity and performance firms must put in place a culture that encourages innovation. The level of commitment of resources (both human and financial resources) is very low and therefore there is need to increase the level of financial investment. Innovation should be viewed as a philosophy that guides the company forwards and is managed "outside" the traditional, functional structure of the organization perhaps on a cross-functional basis. Therefore, it is not until the discipline (innovation) has a strategic focus beyond the confines of a functional/operational level that the full potential of an innovation culture will be realized. Then also innovation strategy should be developed by firms and relevant metrics should also be developed to measure the success of these strategies. Firms must also learn to document some of the important issues so that measurements can easily be made. Few firms use public infrastructure such as public universities as a source of innovation. Apart from forming strategic alliances firms should also have linkages with public infrastructure because a lot of research are carried out there and may be a source of innovation. Since the innovation process is expensive and requires superior technology the firms must resort to open innovation in order to improve it manufacturing processes.

5.5 Study Limitation

Like similar studies, the current study is not without its limitations. These includes low response rate (41%). There is a possibility that the findings would have differed if the response rate was a little higher. Some firms are reluctant to share some information for

example the level of investments on R&D had response rate of 29 firms out of 41. Also majority of the firms returned only one questionnaire. The study was also limited in scope since it focused in firms that are in Nairobi and its surrounding. There are other manufacturing firms in different part of Kenya and ideally a survey of this kind should be carried on firms around Kenya but because of constraint such time and finances this was not possible.

5.6 Suggestion for further study

Current study has served the purpose of initiating researching on innovation management in Kenya. Since the research was limited in scope and low response rate a large sample targeting manufacturing firms across Kenya can be used for confirmatory analysis and validation. Further research can be done on other sectors of the economy and models for innovations developed.

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DATE 26/09/2011

TO WHOM IT MAY CONCERN

The bearer of this letter WANJIRIA DANIEL KIMEMIA

Registration No D61/61716/2010

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

JUSTINE MAGUTU
ASSISTANT REGISTRAR
MBA OFFICE, AMBANK HOUSE

UNIVERSITY OF NAIROBI
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Appendix II: Questionnaire

I am a postgraduate student at University of Nairobi school of Business. I am conducting a research on '*Innovation management in Kenya's manufacturing sector*'. This study is being carried out in partial fulfillment of the Award of a Master of Business Administration Degree of the University of Nairobi.

Part 1: Biographical and organizational details.

1. Name of the organization

2. Group under which the organization falls

- ☐ Energy, electrical and electronics
- ☐ Food, beverage and tobacco
- ☐ Metal and allied
- ☐ Paper and paperboard
- ☐ Chemical and allied
- ☐ Plastic and rubber
- ☐ Timber, products and furniture
- ☐ pharmaceutical and medical equipment
- ☐ Motor vehicle assembly and accessories
- ☐ Building construction and mining
- ☐ Textile and apparels
- ☐ Leather products and footwear

3. Kindly indicate the highest level of education have you attained?

Primary education ☐ Secondary education ☐ College education ☐

Undergraduate degree ☐ Masters Degree ☐ Doctorate ☐

Others (Indicate).....

4. Number of years you have worked in the organization .....

5. Number of employees in your organization

[ ] <100 [ ] 100-200 [ ] 201-300 [ ] 301-500

[ ] 501-1000 [ ] 1001-2000 [ ] >2000

Part 2: Innovation Drivers and Measures

Innovation is production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome.

6. In the tables below, alongside each innovation type kindly indicate the extent to which you think your firm indulges in.

Types of innovation	**Highly**	**Moderately**	**Less**	**Least**	**Not applicable**
Product innovation (development of new or improved product)	[ ]	[ ]	[ ]	[ ]	[ ]
Process innovation (development of new manufacturing process)	[ ]	[ ]	[ ]	[ ]	[ ]
Marketing innovation (e.g. new sales approach)	[ ]	[ ]	[ ]	[ ]	[ ]
Organizational innovation (e.g. new venture division, new internal communication system)	[ ]	[ ]	[ ]	[ ]	[ ]
Others (specify)	[ ]	[ ]	[ ]	[ ]	[ ]

7. Indicate in scale of 1-5, the extent to which the following reasons are why your firm innovates (Where 5= major reason and 1= not a reason).

	5	**4**	**3**	**2**	**1**
Increase market share	[ ]	[ ]	[ ]	[ ]	[ ]
Reduce cost	[ ]	[ ]	[ ]	[ ]	[ ]
Long term survival of firm	[ ]	[ ]	[ ]	[ ]	[ ]
Increase product life cycle	[ ]	[ ]	[ ]	[ ]	[ ]

Improve product quality	[ ]	[ ]	[ ]	[ ]	[ ]
Reduce material consumption	[ ]	[ ]	[ ]	[ ]	[ ]
Environmental regulation (e.g. environmental damage, fulfilling regulation and standards)	[ ]	[ ]	[ ]	[ ]	[ ]
Others (specify)	[ ]	[ ]	[ ]	[ ]	[ ]

8. In the scale of 1-5 indicate the extent in which your firm uses the following methods to enhance innovation. (With 5 = very often, 4=often, 3=less often, 2= often, 1= not at all)

	5	**4**	**3**	**2**	**1**
Giving Administrative support	[ ]	[ ]	[ ]	[ ]	[ ]
Giving employees freedom to experiment	[ ]	[ ]	[ ]	[ ]	[ ]
Creative practices (e.g. problem solving techniques, idea generation/brainstorming, etc)	[ ]	[ ]	[ ]	[ ]	[ ]
Innovation management (e.g. new product development, BPR)	[ ]	[ ]	[ ]	[ ]	[ ]
Employee development (e.g. training courses)	[ ]	[ ]	[ ]	[ ]	[ ]
Others (specify)	[ ]	[ ]	[ ]	[ ]	[ ]

9. Has your organization developed strategies specifically for innovation?

[ ] Yes [ ] No [ ] Don't know

Part three: Innovations Inputs

10. Pleases indicate the level of investment in innovation

	<1%	**1-3%**	**3-5%**	**5-10%**	**>10%**
Research and Development expenditure/sales for the last one year	[ ]	[ ]	[ ]	[ ]	[ ]
Percentage of sales spent on innovation	[ ]	[ ]	[ ]	[ ]	[ ]

11. Please indicate how incentives in the area of innovation are implemented

	Successfully implemented	**Unsuccessfully implemented**	**Never implemented**
Pay premium	[ ]	[ ]	[ ]
Salary increase	[ ]	[ ]	[ ]
coupons	[ ]	[ ]	[ ]
Others (specify)	[ ]	[ ]	[ ]

12. How are ideas from the following sources implemented (Multiple selection may be made)

	Implementation				
Sources of ideas	**Never**	**Rarely**	**Generally**	**Often**	**always**
Management	[ ]	[ ]	[ ]	[ ]	[ ]
Employees	[ ]	[ ]	[ ]	[ ]	[ ]
Customer feedback	[ ]	[ ]	[ ]	[ ]	[ ]
Selective research and development	[ ]	[ ]	[ ]	[ ]	[ ]
Others (specify)	[ ]	[ ]	[ ]	[ ]	[ ]

13. In the scale of 1-5 indicate how the following sources of innovation as used by your organization (where 5= major source and 1 not a source).

	5	**4**	**3**	**2**	**1**
Customers	[ ]	[ ]	[ ]	[ ]	[ ]
Supplier	[ ]	[ ]	[ ]	[ ]	[ ]
Competitors (analyzing the product of competitor)	[ ]	[ ]	[ ]	[ ]	[ ]
Public Research and development infrastructure (i.e. universities and public research institutions)	[ ]	[ ]	[ ]	[ ]	[ ]

Media (e.g. internet, television, news papers)	[ ]	[ ]	[ ]	[ ]	[ ]
Research laboratories	[ ]	[ ]	[ ]	[ ]	[ ]
Consultants	[ ]	[ ]	[ ]	[ ]	[ ]
Exhibitions (e.g. professional conferences, trade fa	[ ]	[ ]	[ ]	[ ]	[ ]
Internal Research and development	[ ]	[ ]	[ ]	[ ]	[ ]
Quality circles	[ ]	[ ]	[ ]	[ ]	[ ]
Senior management (e.g. directors, CEO,)	[ ]	[ ]	[ ]	[ ]	[ ]
Middle level management(e.g. Supervisors, depart heads)	[ ]	[ ]	[ ]	[ ]	[ ]
Employees (factory workers, clerical officers)	[ ]	[ ]	[ ]	[ ]	[ ]
Serendipity/ chance/ luck	[ ]	[ ]	[ ]	[ ]	[ ]
Profession literature- consult literature for innovative ideas	[ ]	[ ]	[ ]	[ ]	[ ]
Patents- consult patents for innovative Ideas	[ ]	[ ]	[ ]	[ ]	[ ]
Group (i.e. from mother or daughter company)	[ ]	[ ]	[ ]	[ ]	[ ]
Internal Research and Development	[ ]	[ ]	[ ]	[ ]	[ ]
Network (e.g. collaborations with other companies, strategic partners)	[ ]	[ ]	[ ]	[ ]	[ ]
Others (specify)	[ ]	[ ]	[ ]	[ ]	[ ]

Thank you.