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Science and Technology**

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THE KENYA INNOVATION SURVEY REPORT 2012

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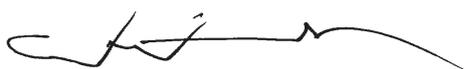
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FOREWORD

Science, Technology and Innovation (ST&I) is crucial in the transformation of Kenya's economy from a factor-driven economy to an innovation-driven economy. This calls for better understanding, of and improvement in the state of ST&I in the country, in order to attain this desired status. It is important to establish a mechanism to gather requisite evidence to inform the design of various policy interventions to ensure sustainable progress in the development of ST&I. Kenya through the NEPAD-led African Science, Technology and Innovation Indicators Initiative (ASTII) has since 2007 developed human and institutional capacities needed to produce internationally comparable ST&I indicators. The generation of ST&I indicators in Kenya is a joint effort between the Ministry of Higher Education, Science and Technology (MoHEST) as the national focal point, and the Kenya National Bureau of Statistics (KNBS).

This report presents the results of the national innovation survey carried out to provide insights into the national system of innovation by measuring innovation activities at firm level. These results, though obtained from a survey, present significant evidence that forms a good starting point to inform common national stakeholder debate on issues affecting innovation, and help guide better understanding of the dynamics and processes of the national innovation ecosystem. The outcome is expected to result in policies that will assist the country configure the national system of innovation and create an environment that will boost innovation in all sectors of the economy, as envisaged in the Kenya Vision 2030 development blueprint.

Overall, the report is an effort to provide the government and other stakeholders with a solid statistical foundation on innovation performance, while analyzing related trends and policy implications. It is hoped that this report marks an important initial step towards developing a measurement framework for national planning, budgeting and monitoring of innovation activities.



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ACRONYMS

AIO	African Innovation Outlook
ASTII	African Science, Technology and Innovation Indicators Initiative
AU	African Union
CIS	Community Innovation Survey
CSPro	Census and Survey Software Program
DRMD	Directorate of Research Management and Development
EAC	East African Community
GoK	Government of Kenya
ISIC	International Standard of Industrial Classification
KNBS	Kenya National Bureau of Statistics
MDGs	Millennium Development Goals
MoHEST	Ministry of Higher Education Science and Technology
MTP	Medium Term Plan
NCST	National Council for Science and Technology
NGO	Non-Governmental Organization
NEPAD	New Partnership for Africa's Development
NSE	Nairobi Securities Exchange
NSI	National System of Innovation
OECD	Organization for Economic Co-operation and Development
R&D	Research and Experimental Development
SPSS	Statistical Package for Social Sciences
ST&I	Science Technology and Innovation

EXECUTIVE SUMMARY

Kenya, like the majority of African countries, has been lacking an institutionalized national ST&I system of indicators to support evidence-based policy formulation, implementation and maintenance to support national development. Currently, a number of African countries, including Kenya, have recognized the need to develop such frameworks and are therefore participating in the African Union (AU)/New Partnership for Africa's Development (NEPAD)-led African Science, Technology and Innovation Indicators Initiative (ASTII). ASTII aims to build capacity in African countries to conduct regular research and experimental development (R&D) and innovation surveys to obtain ST&I indicators for monitoring and evaluating progress towards attainment of national development goals. The Ministry of Higher Education, Science and Technology (MoHEST) is the ASTII focal point and collaborates with the Kenya National Bureau of Statistics (KNBS) in implementing the programme.

This report presents the results of the national innovation survey undertaken from March to June 2012. The survey was designed to measure the innovation activity based on a set of core indicators to inform policies that will help the country configure the national system of innovation in order to respond to socio-economic challenges. The survey was based on the Oslo Manual by OECD. The survey covered Nairobi, Mombasa, Kisumu, Nakuru and Eldoret.

The results of the survey indicated an overall innovation intensity of 89.9% for the period 2008-2011. Specifically, 70.9% of the surveyed firms had implemented product (goods or services) innovation, 92.4% of the implemented process innovation while 85.4% had organization and marketing innovation. In terms of innovation novelty, 15.8% of the firms indicated to have introduced innovations that were new to the Kenyan market while 1.9 % of the firms had successfully, implemented innovations that were new to the world. In addition, 20.9% of the firms introduced both product and process innovations in the Kenyan market.

The business environment was found to be generally not supportive to innovation as firms faced various challenges ranging from high cost of implementing innovation to having weak linkages to knowledge-based institutions in terms of supply of innovation ideas. Acquisition of machinery, equipment and software was the most performed innovation activity. Customers were the main source of ideas for innovation. Most firms engaged in innovation activities to improve the quality of goods and services. However, many innovation activities and projects were seriously delayed due to lack of sufficient funds.

The survey results therefore provide significant trends in key sectors with regard to the innovation capacity of the country and implications for attaining the goals and objectives of Kenya Vision 2030. Based on these trends, a number of targeted policy interventions are therefore proposed in order to stimulate the performance of innovation as a key driver of economic growth.

CHAPTER ONE

INTRODUCTION

1.0 Background

Kenya has witnessed steady growth in the development and application of Science, Technology and Innovation (ST&I) in social economic development since the pre-colonial era. The Science and Technology Act (1977), Cap. 250 of the Laws of Kenya, was enacted after the breakup of the original East African Community (EAC). The Act and its subsequent revisions has been guiding the country in the integration of ST&I into national socio-economic endeavours, including both production and service sectors. Recently, in the pursuit of improved national socio-economic growth and global competitiveness, the Ministry of Higher Education, Science and Technology in consultation with stakeholders has come up with a national policy framework for science, technology and innovation. The Policy is aimed at guiding the mainstreaming of the application of ST&I in all sectors and processes of the economy in order to ensure that Kenyan citizens benefit from acquisition and utilisation of available ST&I capacities and capabilities and thus achieve the objective of Vision 2030, which is to have national transformation into a newly industrialized knowledge-based economy.

While the ST&I Policy, provides a framework for a harmonized and co-ordinated approach to creating a robust knowledge-based economy centred on self-reliance and equitable development, it is currently not supported by an institutionalized system of ST&I indicators. Such an institutionalized system of ST&I indicators is necessary for measurement and assessment of the status and progress made in policy implementation, and for evidence-based formulation and review of other relevant policies and strategies.

Indeed, Kenya is among a number of African countries that have recognized the need to develop frameworks for the assessing the contribution of ST&I to their economic growth. This is evident from the sentiment expressed by the African Heads of States and Government during their Summit of 2007 in Addis Ababa where they committed to promote and support research and innovation activities, and the requisite human and institutional capacities of the continent. These sentiments were in line with Africa's Science and Technology Consolidated Plan of Action CPA of 2006 that proposed a regional approach to promoting the role of science and technology in support of social and economic transformation of the continent. The CPA provides a basis for an African Science, Technology and Innovation Indicators Programme and a need for uniformity of approach among countries.

1.1 ST&I Indicators and National Development

Kenya Vision 2030, the long-term development blueprint for the country is motivated by a collective aspiration for a much better society than the one we have today, by the year 2030. Its aim is to transform Kenya into a rapidly industrializing middle income nation, providing a high quality of life to all its citizens, in a clean and secure environment by the year 2030. Vision 2030 further proposes intensified application of ST&I to raise productivity and efficiency levels across the three pillars (social, economic and political).

Kenya Vision 2030 is to be implemented in successive five-year Medium-Term Plans (MTPs). The first MTP covering the period 2008-2012 is in its final stages of implementation. A reliable set of ST&I indicators is therefore critical in monitoring and evaluating progress towards attainment of the MTPs targets. Statistical measures regarding R&D and innovation are required to generate policy-relevant indicators to monitor progress of specific interventions and to support evaluation based on the evidence provided by the indicators within the context of a National System of Innovation (NSI). It is through proper monitoring and evaluation that relevant policy learning experiences will be achieved, which will lead to improvement of interventions and measures aimed at producing desired outcomes for the attainment of the both the Millennium Development Goals (MDGs) and the Vision objectives. Comprehensive ST&I indicators are of paramount importance for continuously informing ST&I policy development in key sectors of the economy and hence support Vision 2030 implementation.

1.2 The ASTII Programme in Kenya

The ASTII Programme as outlined in the Africa's Science and Technology Consolidated Plan of Action (CPA), among other things, aims to build the human and institutional capacities needed to produce common internationally comparable indicators as tools for research and innovation surveys at national

levels (AIO, 2010). The development of ST&I indicators in Africa was conceived in Johannesburg in 2003 during the first African Ministerial Council Science and Technology (AMCOST I). The meeting resolved to “develop and adopt common sets of indicators to benchmark national and regional systems of innovation” (NEPAD, 2003). Thereafter, a series of meetings were convened to put in place structures and mechanisms to enable African countries undertake surveys to generate the indicators. In 2005 during the AMCOST II meeting in Dakar Senegal, African countries adopted the recommendation to establish an intergovernmental committee or relevant national authorities to develop and adopt the use of common indicators in the production of the African Innovation Outlook (NEPAD, 2005). This led to the first meeting of the Intergovernmental Committee on Science, Technology and Innovation Indicators in Maputo, in 2007. The meeting recommended that, “African countries shall use the existing internationally recognized ST&I manuals and/or guidelines, particularly the OECD Frascati and Oslo Manuals to undertake Research and Experimental Development (R&D) and innovation surveys respectively (NEPAD, 2007).

In Kenya, the Ministry of Higher Education Science and Technology (MoHEST) as the national focal point in collaboration with the Kenya National Bureau of Statistics (KNBS), has since 2007 been participating in the NEPAD-led African Science, Technology and Innovation Indicators Initiative (ASTII) to develop national ST&I system of indicators. Like other participating countries, Kenya’s ST&I system of indicators comprises Research and Experimental Development (R&D) indicators generated through R&D surveys and Innovation Indicators generated through innovation surveys. The ASTII national implementation framework consists of the national focal point, a national steering committee and a technical committee. The Government of Kenya (GoK) has been funding the national R&D and innovation surveys with NEPAD giving support through regional capacity-building for key members of the technical committee who in turn train the national teams that undertake the surveys. In this way, there is sharing of common concepts and survey methodology for comparability of outcomes.

The key question that needs to be addressed is how Kenya should effectively facilitate and promote innovation. This is a challenge in itself, and is even made greater by the need for the innovation to result in sustainable productive growth. The promotion should be done while taking into consideration that innovation does not happen in isolation but in a global, complex and dynamic system, that is non-linear in its response to policy intervention. Non-linearity in this case implies that a new policy intervention may not result in an expected outcome because of the feedback loops in the system that link it to other policy interventions, and framework conditions, in ways that are difficult to predict. Nevertheless, a reliable set of indicators generated in a sustainable and predictable manner will help alleviate the levels of uncertainty in the innovation ecosystem.

1.3 Rationale for National Innovation Surveys

National innovation surveys form a basis for the measurement framework for innovation. The surveys are designed to highlight, among other things, the driving forces behind innovation, the importance, not only of products and processes but also of marketing and organizational practices, the role of linkages and diffusion, and the view of innovation as a system. The link between innovation and economic change is of central interest and therefore is the main reason as to why regular surveys should be undertaken in the country. This is due to the premise that through innovation, new knowledge is created and diffused thus expanding the country’s economic potential to develop new products and more productive methods of operation. Such improvements depend not only on technological knowledge, but also on other forms of knowledge that are used to develop products, process, marketing and organizational innovations. It is worth noting that specific types of innovation can differ greatly in their impact on firm performance and on economic change. For this reason, it is important to be able to identify the implementation and impacts of different types of innovation. Therefore, it is imperative to define and develop a set of core innovation indicators to provide the required ST&I performance metrics.

ST&I indicators will be used in a broader way to support policy learning. Some of the specific uses of these indicators include: monitoring, benchmarking, evaluation, foresight, provision of information about firm behaviour and as a basis for further analysis that may lead to policy development. These indicators will be used to monitor the national system of innovation and hence contribute to the public policy debate on ST&I. In addition, the indicators can be used to monitor public spending on

ST&I by providing answers to the following three questions:

- How much does the country spend on ST&I?
- Where does it spend it (geography and sector)?
- Why does it spend it (socio-economic objectives)?

Another pertinent question which can be answered by the indicators is; what does the government get from its spending on ST&I? This however requires further probing of the national system contextualized within ST&I policy objectives.

Following a review of the current NSI, the new ST&I Policy and Bill, seeks to effectively entrench ST&I into the National Production System by putting in place measures for strengthening the NSI. Reliable indicators will therefore further assist the country to configure and shape the pathway of the NSI and hence ensure competitiveness of the outcomes anticipated from the system. This can be achieved through various approaches such as, a country deciding upon a set of indicators which are relevant to policy objectives and once agreed, targets can be set supported by relevant policies and programmes to attain them (Gault, 2010).

1.4 Objectives of the Innovation Survey

This innovation survey, the first in Kenya, was carried out in order to generate crucial learning lessons to inform the planning of the main national innovation survey to be undertaken at a later date. However, the overall objective of the innovation survey, being part of the national ST&I system of indicators that is under development, is to build Kenya's capacity to develop and use innovation indicators in designing and implementing ST&I policies and strategies for national development. The survey is therefore an attempt to probe the activity of innovation through the collection of data on various aspects of innovation in order to develop relevant innovation indicators and specific innovation policies for the country. These indicators will then enable key stakeholders to understand the state of the national innovation system and its capacity to deliver the intended results so as to address the components that need attention.

Specifically, the innovation survey is designed to:

- Develop and cause the adoption of internationally comparable innovation indicators;

- Build human and institutional capacities to collect innovation indicators;
- Inform the country on the state of innovation; and
- Provide both qualitative and quantitative data on innovation at firm level.

1.5 Concepts and Definitions

The concepts and definitions presented in this report have been adopted from guidelines developed by the Organization for Economic Co-operation and Development (OECD) and documented in the Oslo Manual (OECD, 2005).

The statistical unit for the survey is the enterprise which refers to a business, company or firm and can range from a very small concern with only one or two employees to a much larger and more formal business or firm. Innovation according to the Oslo Manual is "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". The minimum requirement for an innovation is that it must be new (or significantly improved) to the firm. A common feature of an innovation is that it must be implemented, which implies that it must be brought into actual use in the firm's operations, and further connect to the market for wealth creation.

Innovation is a concept with varying definitions depending on the field of study and social theories (Goldsmith and Foxall, 2003). However, according to most definitions, innovation refers to the creation of new, better or more effective products, processes, technologies, or ideas that are accepted by markets, governments and society. Innovation encompasses two basis ideas: novelty and commercialization or diffusion to varying degrees depending on who is defining it. The aspect of novelty or improvement is crucial to the concept, as well as acceptance by the affected subsystems of society for example consumers, users and government among others. However, innovation is not well understood unless put into context. There is a tendency by most people to consider only dramatic innovations associated with scientific and technological breakthroughs, for instance, a new type of machine or a completely new gadget introduced into the market. The survey also took into account a broad spectrum of innovations that included those that are new to the country and also new to the world as well as incremental innovations in terms of products, processes, and organizational procedures and/or marketing.

It is worth establishing a distinction between the activity of innovation and innovation activities. Innovation activities are all scientific,

technological, organizational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. Some innovation activities are themselves innovative; others are not novel activities but are necessary for the implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation.

Implementation of innovation comprises of several types of activities and expenditures, including but not limited to: intramural (in-house) and extramural (outsourced) R&D; acquisition of machinery, equipment and software; acquisition of other external knowledge and know-how; training; market introductions and other activities (including significant design changes). The determining factor for these various activities to be considered as innovation activities is that they result in improved products or services being introduced to the market. These activities generally lead to the implementations of technological innovations, which include product and/or process innovations.

The other groups of activities, the non-technological innovations, are broadly categorized as organizational and marketing innovations. Organizational innovations are new or significant changes to firm structure of management methods, while marketing innovations include the implementation of new or significantly improved designs or sales methods. Innovation activities vary greatly in their nature from firm to firm. Some firms engage in well-defined innovation projects, such as the development and introduction of a new product, whereas others primarily make continuous improvements to their products, processes and operations. These firms can be innovative in such a way that an innovation consist of implementation of a single significant change, or of a series of smaller incremental changes that together constitute a significant change.

There are four broad levels of novelty of innovation defined in relation to the firm and the market in which the firm operates. These levels in ascending level of novelty are as follows: new to the firm, new to the market of the firm in Kenya (and to its competitors), and new to the world. New to the firm is the minimum entry level for an innovation. A product, process, marketing method or organizational method may already have been implemented by other firms, but if it is new to the firm (or in case of products and processes: significantly improved), then it is an innovation for that firm. On the other hand, the concepts new to the market and new to the world concern whether or not a certain innovation has already been implemented by other firms, or whether the firm is the first in the Kenyan market or industry

or worldwide to have implemented it. Firms that first develop innovations can be considered as drivers of the process of innovation. Many new ideas and knowledge originate from these firms, but the economic impact of the innovations will depend on the adoption of the innovations by other firms as is the case with the M-PESA mobile money transfer application. Further, innovations are new to the market when the firm is the first to introduce the innovation on its market, the market being both the firm and its competitors and it can include a geographic area or a product line.

An innovation is new to the world when the firm is the first to introduce the innovation for all markets and industries, both domestic and international. New to the world implies a qualitatively greater degree of novelty than new to the market, and this is the desired level to ensure competitiveness and sustainable economic growth.

Further, for the purpose of understanding the content of this report, an innovative firm is one that has implemented an innovation during the period under review including those firms with ongoing and/or abandoned innovations.

1.6 ST&I Survey Cycles

The important role placed on knowledge and learning has made innovation policies to focus more on research and economic development in the private and public sectors (Lundvall, 2007). In recognition of the foregoing, the first Kenya National R&D survey was carried out in June 2009, with the 2007/2008 Financial Year as the reference period, and the results published in the first series of the NEPAD African Innovation Outlook (AIO) 2010. This report presents the main findings of the first National Innovation Survey covering the reference period 2008/09-2010/11. It is envisaged that the system of indicators being developed will be sustained through regular surveys in line with international best practices in order to ensure a continuous supply of requisite evidence to inform the development of the NSI through evidence-based policies. Thus, a cycle of R&D Surveys (after every two years) and Innovation Surveys (after every three years) should be implemented in order to feed the policy formulation process with up to date evidence in order to ensure the NSI is configured to generate the desired results to spur economic development.

CHAPTER 2

METHODOLOGY

2.0 Introduction

The National Innovation Survey was based on the guidelines of the Organization for Economic Co-operation and Development (OECD) *Oslo Manual* (OECD, 2005). More specifically, it was designed according to the methodological recommendations for Community Innovation Surveys (CIS) 2006 provided by Eurostat, the Statistical Office of the European Commission. The CIS 2006 is the standard adopted by ASTII for innovation surveys in all AU countries.

The survey was done in two phases; phase one was done in Nairobi, the capital city of Kenya, and comprised of ten teams covering ten clusters around Nairobi and its environs. Phase two had four teams that visited Mombasa City, Nakuru Town, Eldoret Town and Kisumu City, upcountry. The surveyed firms were randomly selected.

Depending on the size of the firms, different respondents were tasked to fill in different parts of the questionnaire hence such questionnaires were left behind and collected at an agreed later date. However, in some firms, the respondents filled the questionnaire under the guidance of the interviewers.

2.1 The Questionnaire

The innovation survey questionnaire was based on the one was used by Community Innovation Survey (CIS) Version 6 and the Oslo Manual. The questionnaire, detailed in Appendix 1, was divided into eleven parts as follows:

- Part 1: General information of the firm
- Part 2: Product (goods or services) innovation
- Part 3: Process innovation
- Part 4: Ongoing or abandoned Innovation activities
- Part 5: Performed innovation activities and expenditures
- Part 6: Sources of information and co-operation for innovation activities
- Part 7: Effects / Objectives of innovation
- Part 8: Factors hampering innovation activities
- Part 9: Intellectual property rights
- Part 10: Organizational and marketing innovation
- Part 11: Specific innovations

2.2 Target Population, Sample Frame and Sample Units

2.2.1 Target population

The International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4 was used to prepare the target population of firms across all the economic activities. The individual categories of the ISIC classification aggregated into 21 sections were populated by firms based on their main economic activities and appropriately placed in respective divisions to achieve fair representation in each category. All firms listed on the Nairobi Securities Exchange (NSE) in February 2012 were included as part of the core target firms. The yellow pages of the Nairobi and Upcountry Postal Directories, individual firm websites and websites such as www.mocality.com were used to obtain the contacts of the firms i.e. telephone and/or mobile number(s), email, postal and physical addresses. The physical address was particularly important in organizing the targeted firms into clusters. This was to ensure

efficient and effective coverage, without teams having to crisscross the survey areas, thus saving on time and travel distance while covering the designated areas.

2.2.2 Sample Frame and Sample Units

The sample frame consisted of all registered firms, public/private universities and public research institutions, national polytechnics and NGOs. The firms were randomly selected by ISIC sector from the frame. A total of 194 firms were selected in Nairobi and its environs while 102 firms were selected upcountry as follows: Mombasa (25 firms), Kisumu (25 firms), Eldoret (24 firms) and Nakuru (25 firms).

2.3 The National Steering Committee Meeting

A National Steering Committee comprising of key stakeholders was convened in February 2012 to sensitize the stakeholders and get their buy-in for the survey. Invitations were sent out to stakeholders from the public and private sectors. Publicity was also done in the print media to sensitize the public on the importance of conducting the survey and to invite their cooperation if involved.

2.4 Training

Specific knowledge, skills and experience are required to conduct innovation surveys effectively and provide policy-relevant advice. ASTII stresses the importance of the quality of data which should be aligned with the African Charter on Statistics. Training sessions were based on the Oslo Manual which relates to innovation surveys. The participants were taken through the introduction to innovation surveys, data collection and data processing and the innovation survey questions using different methods of training such as lectures, group discussions/ exercises and presentations.

A total number of forty-three persons drawn from of the Ministry of Higher Education, Science and Technology (MoHEST), the Kenya National Bureau of Statistics (KNBS) and the Ministry of Trade were trained on various aspects of conducting the survey. During the training of research assistants, team leaders and co-ordinators for the survey, the questionnaire was the main focus and a systematic discussion of each question was done so as to bring everyone to a common understanding of the whole survey process. The appropriate and necessary modifications were also made to some questions to enhance clarity. The participatory training enhanced ownership of the questionnaire and hence promoted its successful administration. The duration of the

training was four days whereby participants were introduced to the different types of innovation that provide the basis for benchmarking and analysing the impact of policies on innovation.

2.5 Field Personnel

The field personnel were drawn from MoHEST, the Ministry of Trade and KNBS. Each team comprised of a team leader and three to five enumerators. Co-ordinators were assigned responsibility over the team leaders to facilitate overall team work and enhance reporting. The field survey personnel had a letter of introduction, signed by the Permanent Secretary, MoHEST, to deliver to firms selected for the innovation survey. The letter gave a brief description of the survey and requested the firms to co-operate by completing the accompanying survey questionnaire. In order to ensure that the survey implementation run smoothly, co-ordinators held regular progress review meetings. During the meetings, progress was assessed and at the same time various challenges were identified and appropriate solutions put in place to deal with them. This approach ensured that the survey carried out without major hitches.

2.6 Data Processing

In this survey, data processing personnel were drawn from the Kenya National Bureau of Statistics assisted by some officers from the Ministry of Higher Education, Science and Technology. The questionnaires were received from the field, recorded and edited in preparation for data capture.

2.6.1 Data Capture, Validation and Analysis

Data processing and analysis were done at the KNBS. The Census and Survey Software Programme (CSPPro) was used for data capture, editing, validation and tabulation. The Statistical Package for Social Sciences (SPSS) was used for further analysis and tabulation. In developing the data capture system, certain controls were in-built to check the characters entered after which validation was done in preparation for the production of frequency tables and in readiness for data analysis.

2.7 Coverage

The Innovation Survey covered business firms in Nairobi, Mombasa, Kisumu, Nakuru and Eldoret. A total of 293 firms were targeted in this innovation survey. Out of these, 160 firms completed and returned the questionnaires, thus representing a 54.6 percent overall response rate. A detailed representation of the response rate is shown in Table 2.1 below.

Table 2.1: Response rate of firms from different regions of the innovation survey

Region	Targeted firms	Responded	No Response	Response Rate
Nairobi	194	84	110	43.3
Mombasa	25	17	8	68.0
Kisumu	25	15	10	60.0
Nakuru	25	23	2	92.0
Eldoret	24	21	3	87.5
Total	293	160	133	54.6

CHAPTER THREE

RESULTS

3.0 Introduction

This chapter presents the results of the National Innovation Survey. These results are a reflection of the national innovation ecosystem across key sectors of the Kenyan economy. It is expected that the evidence provided by these results will inform various policy interventions at a national level to enhance Kenya's innovation capabilities and overall competitiveness.

Kenya, like the majority of African countries, has been lacking a national ST&I system of indicators to support evidence-based policy. This can be attributed to the use of development approaches that have not factored in the need for measurement of ST&I activities in order to achieve socio-economic transformation (NEPAD, 2010). In fact, it is only in the current development blueprint, Kenya Vision 2030 launched in 2008, that ST&I is recognized as the key foundation or enable for sustainable development. The need for evidence-based policy processes is now gaining ground. To this end, Kenya, alongside an increasing number of other African countries has been implementing the African Union NEPAD-led ASTII.

The results will contribute to increased knowledge about innovation in firms in order to devise appropriate innovation policies. This is therefore a revelation of the current status of the national innovation system.

3.1 Characteristics of enterprises covered by the survey

Table 3.1 summarizes the number of employees in the sectors by main innovation activity in 2008 and 2011. From the figures obtained from the sampled firms in various sectors, it was evident that the main employers in order of size were:

- Financial and Insurance
- Manufacturing
- Education
- Agriculture, Forestry and Fishing.

Employees of the four main sectors (Financial Services, Education, Manufacturing and Agriculture) accounted for 65.4% of the total employees of the firms sampled (Table 3.1). In each of these sectors, the employees with at least a university degree provided the largest proportion of the likely human resource involved in innovations (either directly or indirectly) between 2008 and 2011. The results are such that about 5.3% of the employees in the agriculture, forestry and fishing sector had a university degree, 6.4 % for manufacturing, 50.3% for education, and 28% for finance and insurance. It is noteworthy that, these sectors have great potential for leading the country to sustainability in terms of wealth and employment creation through increased innovation activities within the sectors. Indeed, according to Kenya Vision 2030, the contribution of the manufacturing sector to the GDP has remained stagnant at about 10% since the 1960s. Given that the locally-manufactured goods comprise only 25 % of Kenya's exports, a large potential exists to improve Kenya's competitiveness in the region by replacing external suppliers gradually. This can be attained through innovations in the sector. Therefore, for Kenya to attain a knowledge-based economy status there is need to generate and increase relevant human resource in ST&I, provide a favourable environment and give necessary incentives for innovation activities.

Table 3.1: Number of employees in different sectors (2008 and 2011)

Sectors	2008	2011	Employees with a Degree
Agriculture, forestry and fishing	5,941	5,966	315
Mining and quarrying	132	123	5
Manufacturing	11,053	12,623	761
Electrical activities	2,385	3,739	1,037
Water supply	342	379	33
Construction	186	151	4
Wholesale and retail trade	1,812	1,914	81
Transportation and storage	4,863	5,409	13
Hospitality	3,163	3,741	219
Information and communication	1,774	3,812	416
Financial and Insurance activities	15,099	16,275	4,555
Professional Services	3,888	4,446	893
Public administration and defence	1,670	1,640	-
Education	7,874	9,791	4,440
Health	5,634	5,480	50
Arts, entertainment and recreation	996	946	212
Administrative and other support activities	62	132	81
Total	66,874	76,567	13,115

Considering the responses in terms of employment, innovation activities and resulting turnovers increase for the sectors between 2008 and 2011, it was evident that the financial and insurance, manufacturing, education and agriculture sectors were key participants in innovation.

Table 3.2 (a): Turnover change and Distribution of Graduates in the Sectors by product innovative firms and product non- innovative firms between 2008-2011

Sector	Innovative Firms				Non- Innovative Firms			
	Turnover change between 2008 and 2011	Graduate employees 2011	Total employees 2011	Proportion of graduate employees (%)	Turnover change between 2008 and 2011	Graduate employees 2011	Total employees 2011	Proportion of graduate employees (%)
Manufacturing	30,151,081,576	689	9,925	6.9	7,081,320,271	260	5,117	5.1
Education	4,242,208,631	4,439	9,790	45.3	180,000,000	889	1,387	64.1
Professional services	194,752,127	836	3,844	21.7	-2,676,000	0	350	0.0
Financial	59,614,703,512	4,555	16,275	28.0	7,750,000,000	4,370	6,486	67.4
Wholesale	1,076,626,000	79	1,902	4.2	0	2	44	4.5
ICT	31,442,385,216	383	3,706	10.3	23,700,000	6	17	35.3
Agriculture	2,625,164,160	311	5,672	5.5	53,500,000	11	316	3.5
Electrical	4,066,547,311	1,037	3,739	27.7	1,068,547,311	225	1,837	12.2
Water supply	123,842,242	12	156	7.7	183,503,211	23	259	8.9
Hospitality	1,799,321,612	212	3,322	6.4	842,610,406	23	624	3.7
Health	1,501,400,000	50	5,480	0.9	0	35	350	10.0
Others	26,054,052,000	93	5,149	1.8	89,409,358	15	2,012	0.7
Total	162,892,084,387	12,696	68,960	18.4	17,269,914,557	5,859	18,799	31.2

Table 3.2 (b): Turnover change and distribution of graduates in process innovative firms and process non-innovative firms by sector between 2008-2011

Sectors	Innovative Firms				Non Innovative Firms			
	Turnover change between 2008 and 2011	Graduate employees 2011	Total employees 2011	Proportion of graduate employees (%)	Turnover change between 2008 and 2011	Graduate employees 2011	Total employees 2011	Proportion of graduate employees (%)
Manufacturing	25,130,271,374	664	9,841	6.7	10,089,809,939	274	6,563	4.2
Education	3,713,020,631	3,794	7,878	48.2	100,000,000	36	41	87.8
Professional services	194,752,127	836	3,844	21.7	-2,676,000	50	417	12.0
Financial	59,614,703,512	4,555	16,275	28.0	0	0	0	0.0
Wholesale	902,626,000.0	51	1,743	2.9	275,000,000	36	354	10.2
ICT	31,509,385,216	413	3,801	10.9	82,200,000	33	106	31.1
Agriculture	2,625,164,160	311	5,672	5.5	53,500,000	11	316	3.5
Electrical	4,066,547,311	1,037	3,739	27.7	0	0	0	0.0
Water supply	125,342,242	13	168	7.7	309,745,453	31	343	9.0
Hospitality	1,799,321,612	212	3,322	6.4	842,610,406	23	624	3.7
Health	1,500,000,000	35	5,450	0.6	1,400,000	50	380	13.2
Others	26,076,052,000	298	5,935	5.0	60,557,358	23	2,585	0.9
Total	157,257,186,185	12,219	67,668	18.1	11,812,147,156	567	11,729	4.8

A comparison between turnover changes from firms with product and process innovations and those firms that did not innovate revealed that the former category reported higher turnover changes in absolute terms (Table 3.2a and Table 3.2b). These firms were also found to have employed higher numbers of graduates by the end of 2011 than those that were not undertaking product and process innovations. The likelihood of innovation in firm grows with the number of graduate employees and so will be the resulting turnover. It was also observed that some non-innovative firms had higher proportions of graduate employees than those that were innovating. The high presence of graduates in non-innovating firms indicates that this human resource is either being under-utilized or is untapped. Policy should create a favorable environment to foster innovation so as to more effectively meet their goals. Thus, non-innovating firms with large numbers of graduate employees will be encouraged to create an enabling environment to foster innovation and thus improve their returns.

Table 3.3: Rate of turnover change between 2008-2011 per sector

Sector	Innovative Firms		Non-Innovative Firms	
	% Product Turnover changes	% Process Turnover Changes	% Product-turn over changes	% Process Turnover changes
Manufacturing	16.74	14.9	3.93	5.97
Education	2.35	2.2	0.10	0.06
Professional services	0.11	0.1	0.00	0.00
Financial	33.09	35.3	4.30	-
Wholesale	0.60	0.5	-	0.16
ICT	17.45	18.6	0.01	0.05
Agriculture	1.46	1.6	0.03	0.03
Electrical	2.26	2.4	0.59	-
Water supply	0.07	0.1	0.10	0.18
Hospitality	1.00	1.1	0.47	0.50
Health	0.83	0.9	-	0.00
Others	14.46	15.4	0.05	0.04

A comparison of turnover changes in the period 2008-2011 between innovative and non-innovative firms (Table 3.3) did indicate that innovative firms were responsible for over 90% of the turnover in both product and process innovation. By sector, financial, ICT and manufacturing were leading in turnover changes among the sectors that were innovating. These sectors were also the leading ones in turnover changes among the non-innovating firms, but the percentage turnover changes were much lower.

3.2 Innovation Intensity

The results of the survey indicated 89.9% of the firms that responded reported to have successfully implemented innovations thus translating to an innovation intensity of 89.9%. In terms of the specific types of innovation, 70.9% of the firms had implemented product innovation (goods or services), 92.4% of the firms had implemented process innovations while 85.4% of the firms implemented organization and marketing innovations. In terms of novelty of the innovations recorded during the period under review, 15.8% of the firms surveyed indicated to have introduced innovations that were new to the Kenyan market. A total of 20.9% of the firms indicated that they introduced both product and process innovations in the Kenyan market. Only 1.9 % of the total respondents had successfully implemented innovations that were new to the world, thus achieving the highest degree of novelty.

Table 3.4: Origin of Innovation by sector and location

Sectors	No. of Firms	Kenya	Rest of Africa	Rest of the world
Manufacturing	39	82.1	5.1	12.8
Education	10	100	0	0
Wholesale	10	70	10	20
Hospitality	7	100	0	0
Financial	8	75	25	0
Professional services	9	55.6	22.2	22.2
ICT	5	100	0	0
Health	5	80	20	0
Agriculture	5	80	20	0
Electrical	3	100	0	0
Water supply	2	100	0	0
Others	9	88.9	0	11.1

Other than in the manufacturing sector, the rest of the sectors exhibited weak adoption or introduction of innovations from elsewhere (Table 3.4). Except for the manufacturing, wholesale, and professional services sectors, none of the other surveyed firms reported to have adopted any innovation from other parts of the world outside Africa. Firms from the education, hospitality, ICT, electrical and water supply sectors reported that all the innovations arose from Kenya alone.

3.3 Types of innovation

3.3.1 Product (goods or services) innovation

The manufacturing and wholesale sectors were the most active under innovation of new or significantly improved goods (Table 3.5). In the service innovation, education and manufacturing sector led in reporting new or significantly improved services. All the other sectors recorded scores of below 10% for product innovation.

Table 3.5: Proportion of firms with new or significantly improved goods and services and level of novelty

Sector	New or improved goods (%)	New improved services (%)	New to firm	New to market
Manufacturing	46.4	25.9	28.2	33.3
Wholesale	10.7	7.1	8.5	3.7
Hospitality	7.1	9.4	5.6	7.4
Professional services	7.1	8.2	9.9	7.4
Agriculture	4.8	4.7	7.0	7.4
Education	4.8	11.8	9.9	14.8
ICT	3.6	4.7	7.0	7.4
Financial	3.6	9.4	8.5	7.4
Electrical	2.4	3.5	2.8	3.7
Water supply	2.4	1.2	2.8	-
Health	2.4	5.9	2.8	-
Others	4.8	8.2	7.0	7.4

About a third of the product innovations in manufacturing sector (29.7%) were developed by own firm while about another third of the innovations were either through modification or in collaboration with other enterprises (**Table 3.6**).

Table 3.6 Product innovations ownership by sector

Main activity	Total firms No.	Own Enterprise (%)	Own + other enterprises (%)	Own enterprise by modifying goods or services (%)	Mainly other enterprises (%)	Not Stated (%)
Manufacturing	64	29.7	12.5	14.1	3.1	40.6
Education	11	36.4	27.3	18.2	0.0	18.2
Professional services	10	50.0	20.0	20.0	0.0	10.0
Financial	8	37.5	50.0	0.0	0.6	0.0
Wholesale	11	27.3	36.4	0.0	0.0	50.0
ICT	6	66.7	0.0	0.6	0.0	16.7
Agriculture	6	66.7	16.7	0.0	0.0	16.7
Electrical	3	66.7	33.3	0.0	0.0	0.0
Water supply	4	25.0	0.6	0.0	0.6	0.6
Hospitality	12	25.0	0.6	0.6	0.0	4.4
Health	5	40.0	0.6	0.0	0.0	1.3
Others	18	38.9	1.9	0.0	0.0	5.1
Total	158	36.1	18.4	9.5	2.5	33.5

3.3.2 Process innovation

Among the firms that reported to have successfully implemented innovations, 92.4% of them had implemented process innovations. The manufacturing sector posted 38.2% for new or significantly improved production methods (Table 3.7). This was followed by the education sector at 9.0%, professional services at 7.9% and financial services at 6.7%. Both health and hospitality sectors had the least at 1.1%.

Table 3.7: Distribution of process innovations by sector

Sector	New or significantly improved production methods (%)	New or significantly improved logistics/delivery methods (%)	New or significantly improved supporting activities (%)
Manufacturing	38.2	27.8	33.7
Education	9.0	10.1	9.0
Professional services	7.9	7.6	6.7
Financial	6.7	10.1	7.9
Wholesale	5.6	7.6	6.7
ICT	5.6	5.1	5.6
Agriculture	5.6	5.1	5.6
Electrical	3.4	2.5	3.4
Water supply	2.2	2.5	2.2
Hospitality	1.1	3.8	4.5
Health	1.1	3.8	4.5
Others	13.5	13.9	10.1

Process innovation activities involving logistics, delivery or distribution had major players in the manufacturing (27.8%), education (10.1%) and financial (10.1%) sectors. Electrical and water supply sectors had the least (2.5%) innovations related to delivery or distribution. A similar trend in supporting process innovation activities was observed where manufacturing sector recorded the highest innovation (33.7%) while the least innovations were within the electrical (3.4%) and water supply (2.2%) sectors.

A third of the firms in the manufacturing sector developed their own process innovations (Table 3.8). In the manufacturing (27.6%), financial (13.8%) and wholesale (13.8%) sectors, process innovations were mainly developed by own firms in collaboration with others. A quarter of the process innovations in the financial and water supply sector and half of the process innovations in the manufacturing sector were developed by other firms.

Table 3.8: Process innovations ownership by sector

Sector	Own Enterprise (%)	Own+ Other Enterprises (%)	Other Enterprises (%)
Manufacturing	33.3	27.6	50.0
Education	7.0	10.3	-
Professional services	8.8	6.9	-
Financial	5.3	13.8	25.0
Wholesale	5.3	13.8	-
ICT	7.0	-	-
Agriculture	7.0	3.4	-
Electrical	3.5	3.4	-
Water supply	1.8	3.4	25.0
Hospitality	5.3	3.4	-
Health	3.5	3.4	-
Others	12.3	6.9	-

3.3.3 Organizational and marketing Innovations

Firms provided data on their implementation of organizational and marketing innovations for the period under review. These innovations were categorized as either organizational innovations or marketing innovations. Organizational innovations captured belonged to business practices, work responsibilities and decision making and external relations of firms. Marketing innovations captured in sampled firms included changes in the design or packaging of the firms' products and sales or distribution methods.

3.3.3.1 Organizational Innovation

Table 3.9 shows the organizational innovation activities of sampled firms grouped in their respective sectors according to the ISIC classification. Firms from the manufacturing sector reported a 37% implementation rate of their business practices. On the other hand, they implemented low levels of work responsibilities, decision making (6%), and external relations (6%). Forty nine percent (49%) of firms from the education sector reported to have implemented work responsibilities and decision-making innovations, 22% implemented external relations and 9% implemented business practices innovations. The other sectors which included undifferentiated goods and services reported implementation of rates of business practices (19%), work responsibilities & decision making (21%), and external relations (19%) respectively.

Table 3.9: Organizational innovation by sector

Sector	Business practices (%)	Work responsibilities & decision making (%)	External relations (%)
Manufacturing	37	6	6
Education	9	49	22
Wholesale	8	10	7
Professional services	7	7	6
Agriculture	6	6	7
Hospitality	6	6	6
Financial	6	7	7
ICT	5	9	11
Other Services	19	21	19

3.3.4 Marketing Innovation

Market innovation activities were found to fall into two categories, changes in the design or packaging and sales or distribution methods. Table 3.10, presents the proportions of firms with marketing innovations categorized in their respective sector according to ISIC standards.

Table 3.10: Marketing innovation by sector

Sector	Change in the design or packaging	Sales or distribution methods
Manufacturing	27.7	36.1
Financial	9.6	9.6
Education	9.6	7.2
Hospitality	7.2	8.4
ICT	7.2	6.0
Professional services	6.0	3.6
Agriculture	4.8	4.8
Mining and quarrying	4.8	3.0
Water supply	3.6	1.2
Wholesale	3.6	7.2
Transport	3.6	2.4
Health	3.6	2.4
Others	8.4	7.2

Firms in the manufacturing sector had a high level of innovation activities. Out of the total surveyed firms, 27.7% implemented design or packaging changes to their goods, while 36.1% implemented innovations in regard to their sales or distribution methods. There was however only minor differences in the other remaining sectors, as all reported figures below 10%.

3.4 Innovation activities and expenditure

Innovation activities may be related to any scientific, technical, organizational, financial or commercial activities, including investment in new knowledge that leads to, or is intended to lead to, the implementation of innovations. The innovation activities measured by the survey included, among others, the acquisition of machinery, equipment and software, intramural (in-house) R&D, outsourced expenditure on acquisition of R&D and the acquisition of other external knowledge. Table 3.11 shows that the most innovative enterprises acquired new machinery, equipment or software as part of their innovation processes. Intramural (in-house) R&D was the second most important innovation activity with almost half of all innovative enterprises spending money on in-house R&D. Innovative enterprises spent KSh.24.7 billion on innovation activities, which represents about 5.5% of the total turnover (453.1 billion) of all enterprises in all sectors. Expenditure on innovation activities as a

percentage of the turnover of innovative enterprises in 2008 was 8.6% overall compared with 5.5% of the turnover in 2011.

Table 3.11 shows that in all sectors, the bulk of innovation expenditure was devoted to the acquisition of new machinery, equipment and software and was equivalent to about 2.2% of the expenditure by all enterprises and 39.7% of the turnover of innovative enterprises. Intramural and outsourced R&D accounted for 0.7% of the turnover of all enterprises and 1.3% of the turnover of innovative enterprises.

Table 3.11: Expenditure on innovation activities

Sector	Intramural (in-house) R&D ('000)	Acquisition of R&D ('000)	Acquisition of machinery, equipment & software ('000)	Acquisition of external knowledge ('000)	Total ('000)
Agriculture	11,762	12,073	31,212	400	55,448
Mining & quarrying	5,000	1,000	175,000	-	181,000
Manufacturing	238,430	57,309	8,226,723	34,390	8,556,851
Water supply	500	500	21,931	2,942	25,873
Wholesale	473	1,528	9,450	2,600	14,051
Transportation	5,000,000	3,000,000	150,000	5,000,000	13,150,000
Hospitality	50,000	3,800	99,573	30,000	183,373
ICT	3,405	-	4,795	120	8,320
Financial	1,256,000	5,000	380,000	15,000	1,656,000
Education	138,240	20,100	452,939	5,650	616,929
Health	3,000	5,000	200,000	10,000	218,000
Electricity	3,000	-	-	-	3,000
Others	325	15	50	10	400
Total	6,710,135	3,106,325	9,751,673	5,101,112	24,669,245

The manufacturing sector had the highest proportion (23.5%) of innovative enterprises undertaking continuous R&D, followed by the professional services sector (15.7%). The education and wholesale sectors had the third highest proportion of enterprises undertaking continuous R&D (9.8%). In total, 32.5% of innovative enterprises undertook R&D on a continuous basis, while 17.1% of innovative enterprises undertook R&D occasionally.

3.4.1 Financial support for innovation activities

Under this item, firms were required to indicate whether they received any financial support during the period under review. Financial support in this regard included tax credits or deductions, grants, subsidized loans, and loan guarantees but excluded research and other innovation activities conducted entirely for the public sector under contract. The results showed that 40.4% of the surveyed firms reported to have received financial support from foreign governments and/or other foreign public sources (Figure 3.1). 30.8% of the firms indicated to have received financial support from the National Government. National funding agencies like the National Council Science and Technology supported 23.1% of the firms. The local Government supported only 5.8 % of the surveyed firms.

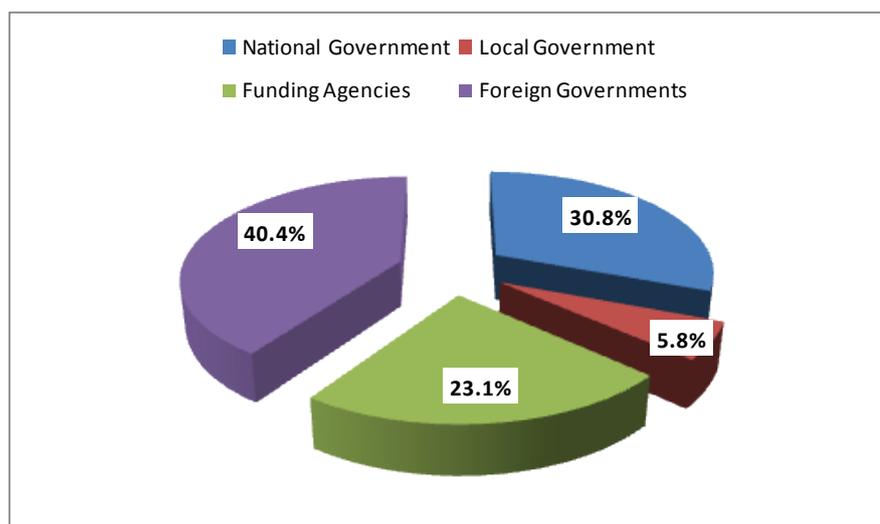


Figure 3.1: Public financial support for innovation activities

3.5 Ongoing and abandoned innovation activities

For the development and/or implementation of product or process innovations, firms undertook various innovation activities. Some of the specific activities include the acquisition of machinery, equipment, software and licenses, engineering and development work, training, marketing and, research and experimental development (R&D) – including basic R&D – that is specifically related to product and/or process innovations. The firms interviewed reported that, with regards to product or process innovations, some of their innovation activities had been abandoned during the period under review (2008 to 2011), before completion, while others were still on-going at the end of 2011. It is notable that a single firm could have reported affirmatively and/or negatively for the same and/or both categories of innovation outcomes depending on the types of product or process innovations involved and their level of implementation. Hence the total firms responding do not necessarily reflect the responses of discrete firms. The responses are therefore indicative of the level of engagement of firms in innovation activities both during the reference period from 2008 to 2011 for abandoned innovation activities, and after 2011 for on-going innovation activities.

Table 3.12: Innovation activities (%) ongoing or abandoned during 2008 to 2011 period

Sector	% Innovation activities still ongoing after 2011		% Innovation activities abandoned before completion	
	Yes	No	Yes	No
Manufacturing	32.5	50.0	40	39.2
Education	11.7	3.2	5	8.2
Professional Services	10.4	0	5	6.2
Financial	9.1	0	10	3.1
Wholesale	5.2	6.5	2.5	8.2
ICT	5.2	4.8	5	4.1
Agriculture	2.6	6.5	5	4.1
Electrical	1.3	1.6	5	1.0
Water supply	2.6	3.2	2.5	3.1
Hospitality	5.2	6.5	7.5	7.2
Health	5.2	1.6	2.5	3.1
Other	9.1	16.1	10	12.4

The manufacturing sector had the majority of firms at 32.5% with ongoing innovation activities for product or process innovations by the end of 2011. It was followed by education (11.7%), professional services (10.4%) and, financial and other sectors both at 9.1%. The electrical sector had the least respondents (1.3%) with innovation activities still going on. Half of the sectors had

ongoing innovation activities fewer than those that had stopped, i.e., the manufacturing, wholesale, agriculture, electrical, water supply and other sectors while the opposite, more firms with ongoing innovation activities than those that had stopped, was the case in the remaining sectors. Professional services and financial sectors reported having not stopped any ongoing innovation activities.

For product or process innovations, the manufacturing sector reported the highest abandoned innovation activities, at 40%, between 2008 and 2011 (Table 3.12). This was followed by the financial and other sectors which both had 10% while the hospitality sectors had 7.5%. The trend of having fewer respondents abandoning innovation activities compared to those that did not was reflected in the education, professional services, wholesale, water supply, health and other sectors while in the rest of the sectors, more firms had abandoned innovations compared to those that had not. The sectors with the least number of firms abandoning innovation activities during 2008 to 2011 were the wholesale, water supply and health sectors at 2.5%.

3.6 Factors hampering innovation activities or projects

3.6.1 Status of abandoned and delayed projects

All innovative enterprises experienced problems with certain innovation activities and reported that some of these activities were seriously delayed during the period 2008 – 2011 (Figure 3.2). With regards to this problems, 34% of the innovative enterprises reported abandoning innovation projects during the concept stage, while 31% indicated that they had abandoned innovation projects that had already begun. 50% of the innovative enterprises reported that their innovation activities were seriously delayed.

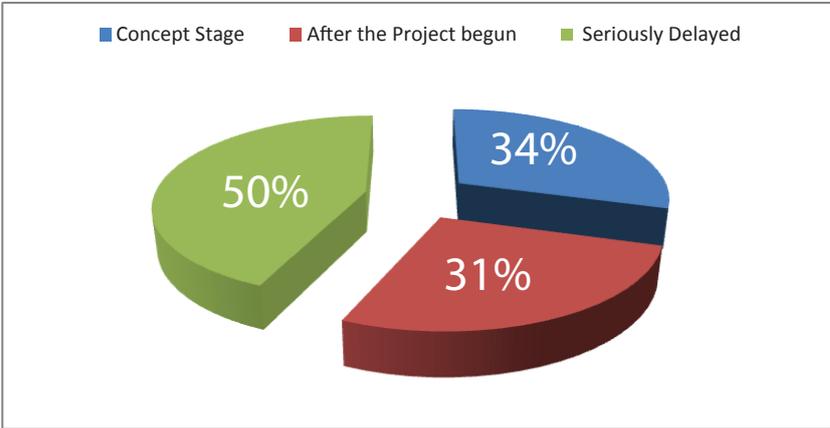


Figure 3.2: Status of innovations

3.6.2 Importance of the factors hampering innovation activities or projects

A number of factors likely to influence the implementation of innovation activities or projects were identified and firms were expected to rate the degree to which these factors hampered innovation (Table 3.13).

For the firms who gave a high degree of importance to hampering factors, cost factors (39.3%) were most important, followed by market factors (23.1%). Other factors (14.2%) and knowledge factors (13.0%) were less influential. A mere 2.8% felt there was no need to innovate. Within the cost factors, the high costs of innovation and lack of funds within the enterprise group were reported as the most prohibitive while in market factors, it was the ease of imitating the innovation(s) as well as market dominance by established enterprises.

For firms that gave a medium degree of importance to factors hampering innovation activities or projects, 31.5% reported knowledge factors as most important followed by 27.9% citing cost factors. 41.7% of the firms who gave low importance to hampering factors assigned other factors as most significant. Other factors included organizational rigidities, insufficient flexibility of regulations and limitation of science and technology public policies. Of the firms who had not experienced the hampering factors, the vast majority (42.1%) felt there was no need to innovate.

Table 3.13 Factors hampering innovation activities or projects

Factors	Degree of Importance (%)			
	High	Medium	Low	Not experienced
Cost	39.3	27.9	22.9	10.0
Knowledge	13.0	31.5	37.7	17.8
Market	23.1	2.7	37.1	18.2
Others	14.2	27.0	41.1	17.7
No need to innovate	2.8	14.5	40.7	42.1

3.7 Intellectual property rights

3.7.1 Securing of intellectual property rights

Intellectual Property Rights (IPR) are known to stimulate innovation activities within institutions and among individuals. Registration of patents and intellectual property assets enhances returns on rights issue as well as licenses. Firms that secure patents, trademarks and licenses benefit from innovations directly and are more likely to deliberately focus on innovations as a central activity.

Figure 3.3 shows the proportions of the surveyed firms that had intellectual property right issues. About 12.9 % reported to have secured a patent in Kenya as compared to 21.4 % of firms that got it from outside the country. The most likely reason why firms prefer getting patent rights outside the country is because they would like to benefit from the international markets. Likewise, only 14.2 % of the interviewed firms visited registered an industrial design as compared to 27.5 % of firms that had registered trade mark.

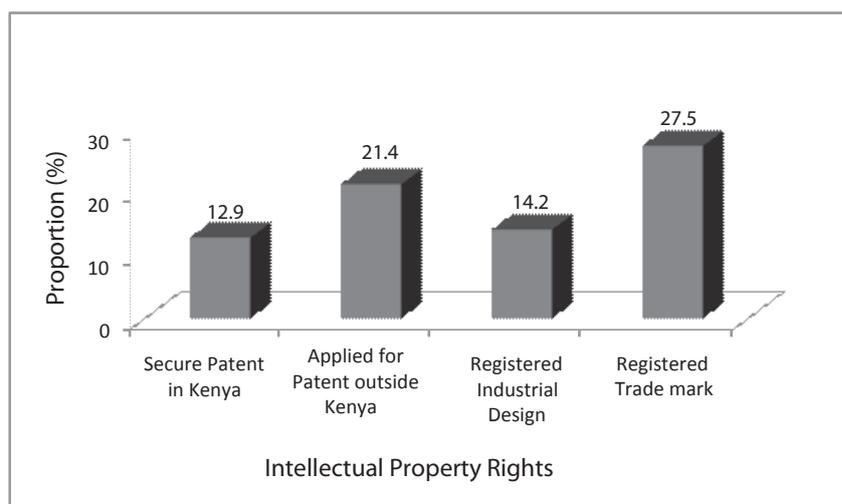


Figure 3.3: Proportion of innovative enterprises with intellectual property rights

3.7.2 Use of intellectual property rights

Only 7.9% reported that they had made use of the intellectual property rights. The reason why more firms do not use the rights may be attributed to unwillingness to invest in the patenting process due to high cost and also lack of knowledge regarding the use and benefits of intellectual property rights.

3.8 Sources of information and co-operation for innovation activities

3.8.1 Sources of information for innovation activities

The firms specified the source of information for innovation activities and also ranked the sources according to the degree of importance as high, medium, low and not used. The information sources were categorized as: internal sources, market sources, institutional sources and other sources.

According to the results (Figure 3.4), sources within an enterprise or enterprise group were highly rated. Out of the firms that indicated internal source as their source of information, 65.6% ranked this as a source with high degree of importance for innovation activities.

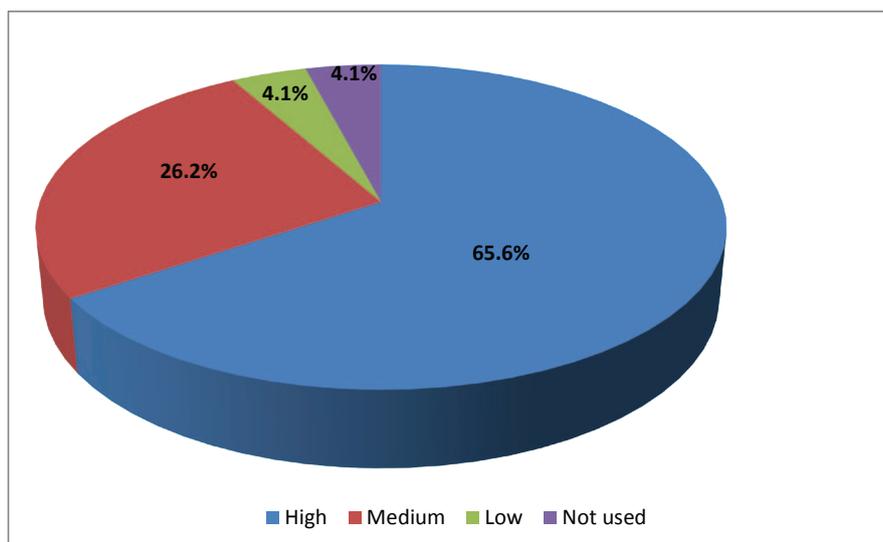


Figure 3.4: Firms reliance on internal sources for innovation ideas

Market sources comprised of suppliers, clients or customers, competitors and consultants. In this category, it was indicated that clients or customers were the most important source of information for innovation activities in firms. Clients or customers were recognized to be of high degree of importance by 62.9% of the firms which indicated use of this source of information. This is compared to suppliers, competitors and consultants whose recognition as high important source of information was recorded as 47.5 %, 36.3% and 18.5% of the firms, respectively (Figure 3.5).

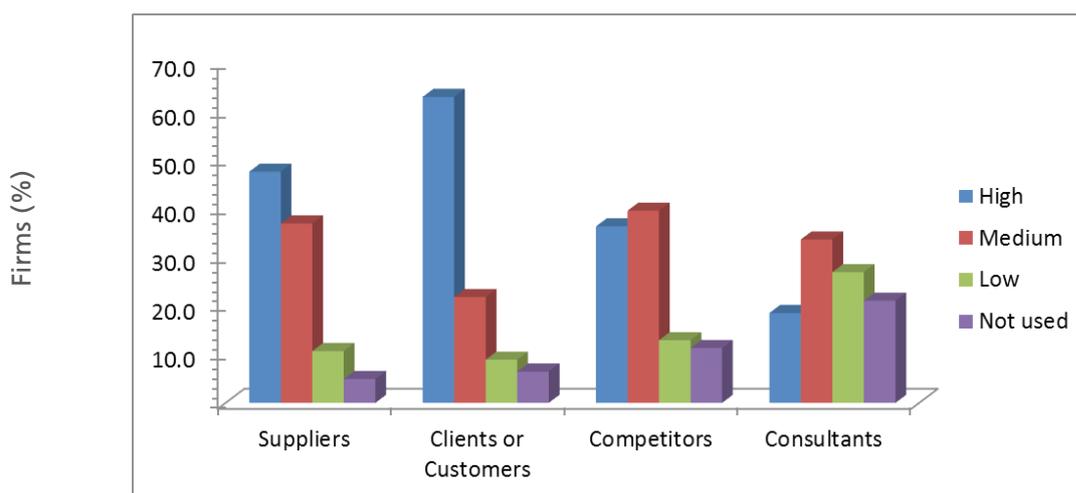


Figure 3.5: Firms reliance on market sources for innovation ideas

This survey indicated that knowledge-based institutions including universities or other higher education institutions and public research institutes were not highly rated as important sources information for innovation activities in the firms that participated. As indicated in Figure 3.6, universities/higher education institutions and public research institutes were considered to be sources of information for innovation activities of high degree of importance by only 16.4% and 20.5% of the firms, respectively.

Other cross cutting sources categorized as (i) conferences, trade fairs and exhibitions and (ii) scientific journals and trade/technical publications were also not relied on as highly important sources of information for innovation activities by firms in this survey. Indeed the scientific journals and trade publications were highly relied on as important sources of information for innovation activities by 29.5% whereas professional and industry associations were highly relied on by 27% of the firms (Figure 3.7).

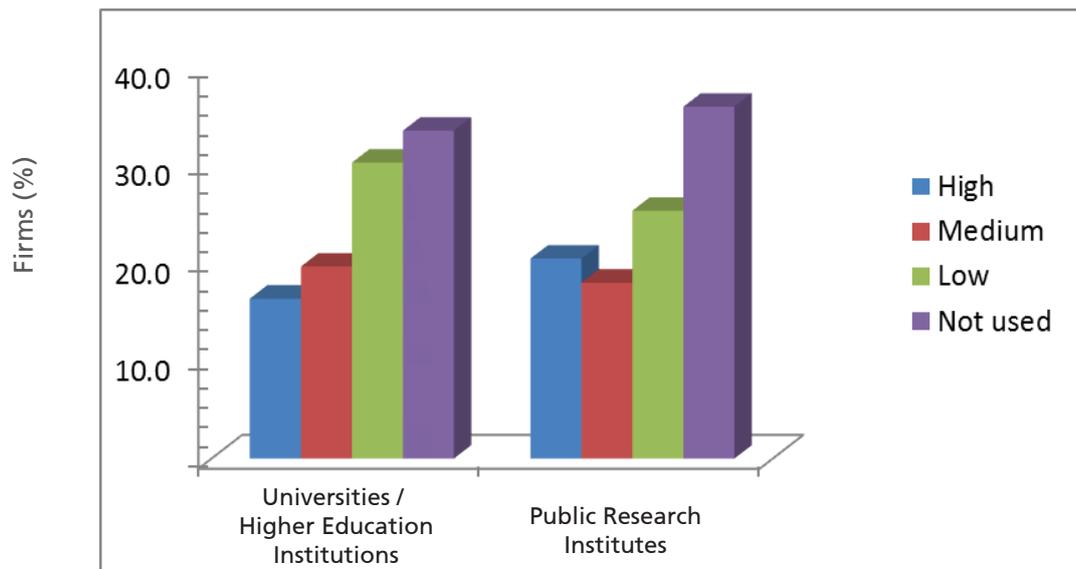


Figure 3.6: Firms reliance on institutional sources for innovation ideas

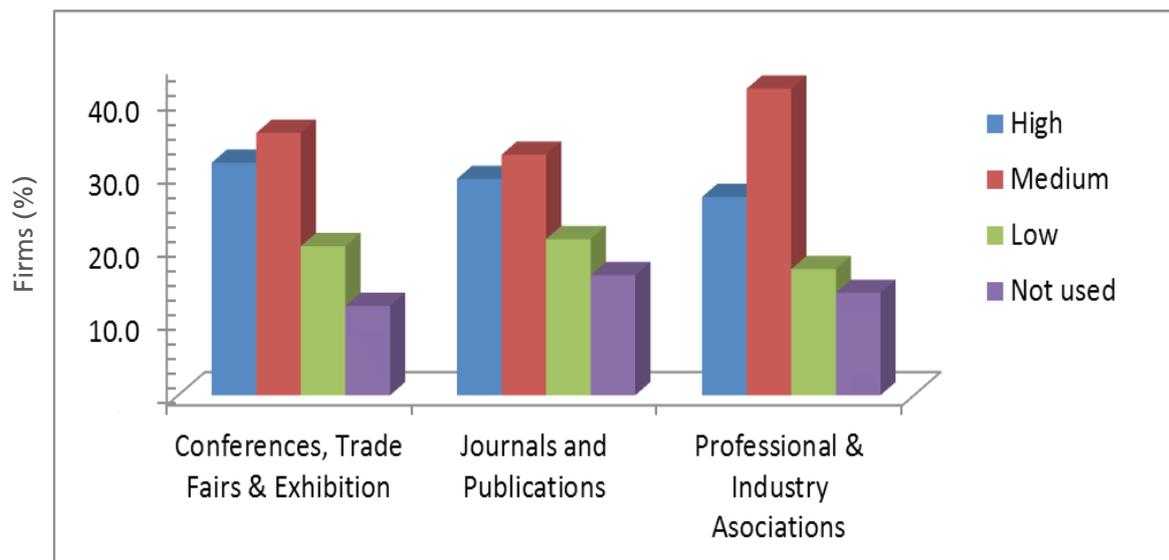


Figure 3.7: Firms reliance on other cross-cutting sources for innovation ideas

3.9 Co-operation for innovation activities

3.9.1 Co-operation with other enterprises or institutions

In this survey, 60.8% of the firms from various sectors indicated co-operation with other enterprises or institutions in their innovation activities during the period under review. Out of the firms which indicated co-operation in innovation activities with other enterprises or institutions, those in the manufacturing and education sectors showed higher responses of 27.4% and 13.7% respectively compared to all the other sectors (Figure 3.8). It was also observed that firms in all the other sectors had very low levels of co-operation in undertaking innovation activities.

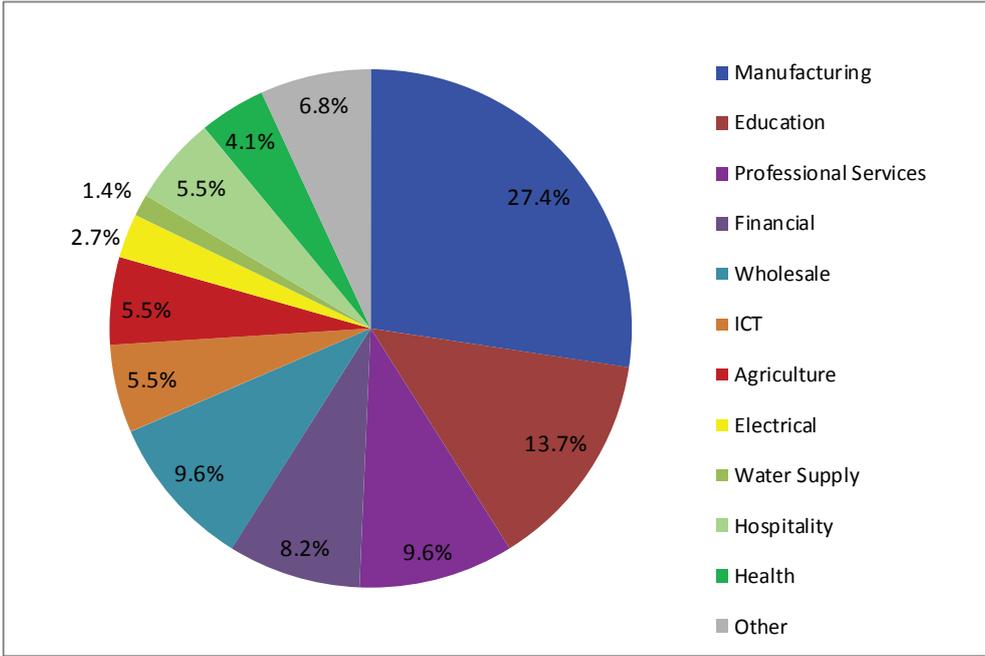


Figure 3.8: Firms co-operation with other enterprises or institutions by sector

3.9.2 Location and type of co-operation partner

Firms indicated the types of co-operation partners and their location. The co-operation partners were categorized in to: (i) other enterprises within enterprise group; (ii) suppliers; (iii) clients or customers; (iv) competitors; (v) consultants; (vi) universities/higher education institutions; and (vii) public research institutes. Locations were divided into six as follows: Kenya, rest of Africa, Europe, United States, Asia and other countries across the globe.

Among the surveyed firms, most of them indicated that there is high co-operation in innovation activities with partners in other enterprises within their enterprise group who are located in Kenya. Suppliers, clients/customers and consultants located in Kenya were also significantly cited by various firms as select co-operating partners for innovation activities. However, competitors, universities/higher education institutions and public institutions were only indicated by only a few of the surveyed firms as their select type of co-operating partners.

Innovation partnerships were mainly from within the country with limited linkage to partners in the rest of Africa and Europe in that order. The firms indicated they have had very few innovation partners in Asia, United States of America and other countries. The firms that participated in the survey were asked to indicate the most valuable co-operation partner in their innovation activities. About 17% of the firms reported that customers were their most valuable co-operation partner in their innovation activities, while 12% reported that suppliers were the most valued. It should be noted that a non-response rate of 50% was obtained for this question.

3.10 Objectives and effects of innovation

3.10.1 Objectives of innovation

The survey interrogated the level of importance of objectives for products and process innovations introduced during the period under review by the innovative firms. Among the various objectives, the objective rated as most highly important was improving quality of goods or services, which was cited by 69.2% of the firms (Table 3.14).

Table 3.14: Relevance of objectives for products and process innovations

Objectives	Firms Citing Relevance of Objectives for Innovations by Level of Importance (%)			
	High	Medium	Low	Not Relevant
Increase range of goods or services	61.7	25.0	6.7	6.7
Replace outdated products or processes	47.5	31.4	8.5	12.7
Enter new market s	53.0	23.1	11.1	12.8
Increase market share	57.5	24.2	10.0	8.3
Improve quality of goods or services	69.2	25.8	0.8	4.2
Improve flexibility for producing goods or services	61.2	25.9	9.5	3.4
Increase capacity for producing goods or services	61.0	24.6	8.5	5.9
Reduce production costs per unit	45.8	33.1	14.4	6.8
Improve working conditions on health and safety	59.7	26.9	9.2	4.2

Other objectives which were cited as highly important included: (i) increase in goods and services, 61.7%; (ii) improve flexibility for producing goods and services, 61.2%; and (iii) increase capacity for producing goods and services, 61.0%. In comparison, reducing production costs per unit output and replacing of outdated products or processes were not considered as highly important objectives for innovations, with each being rated at 45.8% and 47.5% respectively. For global competitiveness, it would have been expected that the objectives to “enter new markets” and “increase market share” to be cited as highly important objectives for product and process innovations. However, the two objectives were highly rated by slightly over half of the firms.

3.10.2 Effects of innovations

For product-oriented effects, improved quality of goods and services was cited as the highly important level of success of outcomes by 66.4% of the firms (Table 3.15). In comparison increased range of goods and services, entering new markets and increased market shares, were ranked to be of high importance by 42.4 % of the firms.

Table 3.15: Importance of various innovation effects/outcomes by level of success

Outcomes/Effects	Firms citing importance of Outcomes by Level of Success (%)			
	High	Medium	Low	No effect
Product-oriented effects				
Increased range of goods and services	47.9	37.8	6.7	7.6
Entered new markets	36.2	34.5	19.8	9.5
Increased market share	43.1	36.2	10.3	10.3
Improved quality of goods or services	66.4	27.0	3.3	3.3
Process-oriented effects				
Improved flexibility of production or service provision	48.7	36.5	8.7	6.1
Increased capacity of production or service provision	56.7	29.2	7.5	6.7
Reduced production costs per unit of labour, materials, energy	45.8	33.1	14.4	6.8
Other effects				
Reduced environmental impacts	35.0	39.2	15.8	10.0
Improved working conditions on health and safety	50.8	33.3	9.2	6.7
Met governmental regulatory requirements	60.3	26.4	5.0	8.3

On the other hand, the process-oriented effects were not cited as a highly important level of success of outcomes with the most important effect being increased capacity of production or service provision; indicated by 56.7% of the firms as of high importance to the level of success of outcomes. Other effects including, (i) reduced environmental impact; (ii) Improved working conditions on health and safety; and (iii) met government regulatory requirements, were also cited to be of important level of success of outcomes. In this other effects, it was expected that enterprises would have considered the outcomes to reduce environmental impacts and to improve working conditions on health and safety to be of high level of success but instead only the effects of meeting government regulatory requirements were the most highly ranked in the highest degree of importance by 60.3% of the firms.

CHAPTER FOUR

DISCUSSION

This survey indicates that 89.9% of the surveyed firms successfully implemented innovations at the minimum threshold of the lowest degree of novelty “new to the firm”. This is an indication that most firms are now conscious of the importance of innovation. Further, 15.8% of the total firms surveyed had introduced innovations that were new to the Kenyan market, while 1.9% of the participating firms had introduced innovations that were new to the world. According to the Global Competitiveness Report 2011-2012, Kenya’s innovative capacity is ranked 52 out of 142 economies. There is need for Kenya to upscale this potential through institutional reforms. In broad terms, this innovation potential is influenced by the scope of R&D, which determines the stock of inventions and innovations to be commercialized; the quantity and quality of human resources available for R&D, which depend on the number of universities and research institutions, and quality of education; regulatory and institutional environment conducive to innovation, including stable property rights; independence of the judiciary; transparent and simple rules, and low costs governing the registration and operation of enterprises; and the wide use of information and communication technologies. These factors taken into consideration influence the business climate in which the innovation-based enterprises operate, and thus determine the demand for innovation (UNECE, 2012).

The survey further shows that there is limited number of firms involved in product innovation or having innovations that are new to the world. Therefore the number of positive spin-offs will be minimal as well as level of global competitiveness. This leads to limited range and quality of products available to the country. Kenya therefore needs to spur local innovations by applying relevant strategic measures and maintaining a well-balanced adoption of imported innovations (from innovative firms in both Africa and the rest of the world) or improved goods and services.

From the findings of the survey, it is clear that there exists a high level of innovation in the manufacturing sector, whereas other key sectors like education, ICT, health etc. recorded low innovation rates. The presence of more innovations in the manufacturing sector is perhaps an indicator for tight competition for new markets in the region, which requires the firms to undertake continuous product and process developments. Many firms in other sectors surveyed indicated not to have or implement innovations. This could be attributed to various factors including; lack of incentives to be innovative, lack of capacity, cost of innovation due to various factors and firms’ consideration of the innovations available being disruptive. It was also noted that some firms felt there was no need to innovate, probably for the same aforementioned reasons.

Most firms across board recorded as having their innovations developed within the organization and as sourcing for new ideas mainly from clients and suppliers. This kind of scenario does not encourage collaboration, with a view of pooling and sharing scarce resources, unless innovation-sharing relationships with clients and suppliers are formalized as a start. The manufacturing firms recorded a higher degree of shared ownership but many of their innovations were owned by the individual firms. On one hand knowledge based institutions including universities and research institutions, which are expected to be sources of new knowledge and innovations, recorded low shared ownership of innovations. For the manufacturing sector to get a boost in product innovation or in having innovations that are new to the world there is a great need for manufacturing sector to collaborate closely with universities and research institutions. Kenya’s economic growth largely depends on the agriculture and recently, ICT sector has emerged as a key driver of economic growth. The country must therefore spur innovation in such sectors in order to enhance value addition and in turn have a positive effect in national economic growth.

Organizational innovation refers to the implementation of new organizational methods. These can be changes in the business practices, in workplace organization or in the firm’s external relations. In the manufacturing sector, business practices were the most favourable method of organizational innovation. This is attributed to the stiff competition in the manufacturing sector whereby similar goods are manufactured within each specialization, for the same set of customers hence manufacturers constantly strive to have an edge over their competitors. Work responsibilities and decision-making was the preferred organizational innovation method by the education sector. For the education sector to succeed, teamwork by the integration of different departments and responsibilities is essential for the meeting of their targets. To improve their performance, the sector also has to form strategic and innovative partnerships based on well developed assignment of roles and responsibilities. For the ICT sector, external relations were the preferred organizational innovation method. In ICT, this reflects the dependence on external technology and content in the initial stages of the establishment of ICT firms. Nevertheless, it has been observed that with the growth of this sector in Kenya, there is increasing and innovative customization of content and demand for the suitable support technologies. This is giving rise to the creation of private innovation hubs where gifted young people are creating and networking to provide local ICT solutions to a myriad of content and technological issues. From

this it is clear that innovative organizational methods often lie in optimizing daily routines. The low organizational innovations in the other sectors indicates that there is need to tackle organizational factors identified that hamper innovation such as organizational rigidities within the firm, insufficient flexibility of regulations or standards and limitations of public science and technology policies.

Marketing innovations involve the implementation of new marketing methods. This can include changes in the product design and packaging, in product promotion and placement, and in methods of pricing goods and services. In this survey, compared to the other sectors, the manufacturing sector was outstanding in the two marketing innovations surveyed, that is, in terms of change in the design or packaging and sales or distribution methods. This sector is prolific in terms of product (goods and services) innovations for designated markets both locally and abroad. At the same time since many firms in the manufacturing sector produce similar products, they have to come up with very creative ways of winning customers/clients over their close competitors. This leads to the constant employment of innovative ways of marketing their goods and services. This should be encouraged as it has greatly enhanced the quality of locally manufactured goods and services. The performance of the rest of the sectors is quite poor indicating a need for better marketing skills targeting increased sales and turnover. Some of the market factors that were found to hamper innovations were market domination by established firms, uncertain demand for innovative goods and services and innovations that are easily imitated. The little knowledge about marketing and other innovations could have led to some firms feeling there was no need to innovate.

Of the factors given that hamper innovation activities or projects including cost, market, knowledge and other factors, firms indicated that whatever the degree of importance given to the factors, they could assign and rank specific causes. Although these factors may be tackled by the innovating firms themselves, external interventions are often necessary as facilitators. This includes a proper innovation environment to foster the tackling of major and minor bottlenecks, including weak intellectual property regimes, experienced by innovative firms at any level, and promote innovation in non-innovative firms. As shown in this survey, there is a link between innovative activity and a firm's turnover.

The acquisition of new machinery equipment or software was reported by most firms as the most important innovation activity across all sectors both in terms of performance and expenditure. In-house (intramural) R&D as opposed to outsourced (extramural) R&D was also indicated as the second most important innovation activity with a total expenditure of KES 24.7 billion which represents on average 7% of the total turnover reported by all firms. It is therefore important for the government to put in place mechanisms to support the performance of innovation activities to enhance the innovation intensity in all sectors of the economy. However, the preference by firms to dedicate a significant portion of their financial resources to in-house R&D is perhaps an indication of lack of close working relations with universities and public research institutions that are expected to provide the much need knowledge and human capacities. In general, 32.5 % of the innovative firms undertook R&D on a continuous basis while 17.1 of the innovative firms carried out R&D occasionally. According to Cohen et al, 2002, the investment in firms' own R&D as well as in innovation management facilitates the comprehension of the results of externally performed R&D on the one hand, and implementation of the resulting technological opportunities, on the other.

Internal or market sources (customers, suppliers, consultants and competitors) were rated by most firms as their most important sources of ideas for their innovations while universities and public research institutions were the least important sources. This is an indication of weak linkages with the knowledge-based institutions (KBIs) that are expected to play a leading role in driving innovation within the country. A similar observation has been made by Eurostat that raised the question of why innovative enterprises do not make more use of knowledge generated by universities and public research institutes and asked whether the research generated by such institutions is too theoretical to be applied for industrial purposes, or whether public research is too expensive for industry to afford (European Communities, 2007). Utilization of public procurement can raise R&D intensity in industry and stimulate the development of research and innovation-intensive products and services. This is a catalytic action different from the "usual" supply of research and development services through grants or contracts (European Commission, 2006).

In addition, co-operation among firms in undertaking innovation was generally not a very common practice, thus a very small number indicated to have engaged in any co-operation. This again portends a serious gap and weakness within the national system of innovation, particularly involving enterprises that are expected to be the actual generators of employment and wealth. Firms were found to be rather 'inward looking' whereas there are a lot of opportunities in terms of partnerships and linkages outside around which to strategize on in terms of innovation; and firms can gain significantly from collaborations. Public policy intervention to provide incentives in this regard are therefore necessary.

The most important effect of innovation cited by firms was improvement in quality of goods and services. However, most of the innovations were seriously delayed due to lack of adequate financial resources within enterprises. There was also a general feeling among firms that the cost of undertaking innovation was too high in addition to an environment dominated by established enterprises. Whereas one would expect the leading sectors in the number of firms reporting innovation to have registered the highest turnover increase, and given the fact that there were insufficient grounds to associate the total increase in turnover to innovation activities; the only possible factor that could be spurring innovation is the quality of innovations that were implemented in terms of their economic value and adoption by the consumers in the market.

The results of the survey have shown that there is limited public financial support for innovation activities in Kenya. It is worth noting that direct measures of innovation support are likely to lead to the development of relationships between government, industry and third parties such as higher education institutions. Majority of the firms indicated not to have received any form of financial support from national/local and/or foreign sources of funding. This situation has however greatly affected the level of innovation in Kenya. In a recent study carried out in Spain, it was found that in the mid-2000s public financing produced stronger positive effects on R&D in small firms than in large ones. At the same time, the results were better in low-technology industries (such as timber or light industry) than in high technology sectors. The study argues that public financing induces and Small Medium Enterprises (SME's) to perform research that would not have been carried out in the absence of such funding (Gonzalez and Pazo, 2008).

The survey also established that in-country innovation is the most prominent driving force for innovation activities. Priority should therefore be directed at creating a favourable national innovation climate that will attract actors from all parts of the world to bolster the national system of innovation. The dominance of the manufacturing and education sectors in terms of co-operation for innovation activity across the board points to the importance of external sources of knowledge in these two sectors. However, this needs to be leveraged by the creation of sustainable linkages between the two sectors for a stronger growth-oriented national system of innovation.

There exists significant co-operation on innovation activities in the manufacturing sector as compared to other sectors. This is important because collaboration is one way that firms can use to implement dramatic innovation activities by leveraging on their various strengths. However, the existence of a large number of manufacturing firms that did not engage in any co-operation is indicative of the suspicion that exists in terms of trade secrets and lack of legal frameworks to guide sharing of benefits that might arise out of successful innovations. Co-operation in the education sector is a common practice as indicated by the results. However, most business firms are not practicing co-operation on innovation activities probably due to fear of losing intellectual property rights (IPR). This calls for strengthening of the IPR regime to guide engagement of firms in collaborative innovation activities. This will lead to regulated wealth creation while utilizing IPR rights inherent in innovations. It was further established that there exists low levels of intellectual property assets. More awareness creation on IPR issues needs to be done and local enterprises encouraged to apply and register intellectual property assets to benefit from the rights and spur innovation. Despite its limitations as a measure of local technology generating efforts or innovations, there is now much consensus on the fact that patents are a good and convenient indicator of this activity (Mani, 2007).

This innovation survey has established baseline data and valuable experiences that will greatly inform the planning and execution of subsequent national innovation survey to be carried out in the coming year. The survey has provided extremely interesting and invaluable results to stir informed public debate with regards to policy implications surrounding identified trends and possible targeted interventions.

This being the first attempt for Kenya to conduct a national innovation survey, it is thus an extremely important step for the country in developing national innovation indicators. Sustaining these efforts will provide the much needed evidence to configure the national system of innovation to support the delivery of the Vision 2030 goals and objectives within the context of a knowledge-based economy.

It is worth noting that since the start of the implementation of Vision 2030 in 2008, there has been no study to measure the activity of innovation in regard to the progress being taken to intensify the application of ST&I to raise productivity across the three pillars – that is, economical, social and political. It is therefore important, to use the results of this survey, to give a general status of innovation in selected key sectors identified under each of the three pillars in order to provide a better understanding and enable the development of evidence-based policy interventions to set the country towards attaining an innovation-driven development status.

CHAPTER FIVE

CONCLUSIONS AND POLICY RECOMMENDATIONS

The results of the national innovation survey have highlighted important trends in regard to the innovation capacity of the country and implications to attainment of Vision 2030 goals and objectives. The main purpose of the first national innovation survey was to act as the frontrunner to the main survey. The experiences gained from this survey will thus assist the Ministry in charge of science, technology and innovation, in collaboration with the Kenya National Bureau of Statistics, to roll out a national survey at a later date. It is worth noting that the results presented in this report should be aligned to the broader economic trends over the period under review in order to arrive at accurate conclusions.

This study established that most firms in the country have embraced innovation as a key driver of their competitiveness. This is evident as exhibited by the high prevalence of innovation activities in a significant number of the surveyed firms, though at the lowest level of novelty "new to the firm". This is a sign that the culture of innovation is taking root.

The linkages within the system are weak. Knowledge-based institutions are not actively involved as a key information source for innovation. This has a significant impact on the country's endeavour to become a knowledge economy. The actors in the national system of innovation should take advantage of the enthusiasm among firms to enhance co-operation for mutual benefits. The stakeholders of the innovation process – research institutions and producers, as well as regulatory government agencies – have to establish links and collaborate, enabling the process of innovation and commercialization to function. There is need to create awareness among innovation actors to work in a systemic manner because innovation does not occur in isolation and that benefits arising out of successful innovation have profound effects beyond their origins.

Despite existence of positive trends with respect to innovation, there is still need to conduct a more comprehensive survey, possibly involving a much larger population of firms in order to accurately capture these trends.

Nevertheless, the results of the survey could be used to make initial policy recommendations based on the emerging trends. It will also be a basis to engage actors in the national system of innovation to use the results to evaluate their performance and make appropriate adjustments based on the evidence presented.

The following policy recommendations are therefore proposed for consideration in order to stimulate economic growth through innovation.

1. The government to put in place mechanisms for implementing tax incentives to support high tech innovations.
2. Provide for better coordination of the various actors in the national innovation system to address the existing disjointed efforts especially among the core players.
3. Improve the business environment especially the cost of doing business.
4. Involve other key players such as the Kenya Association of Manufacturers (KAM), the Kenya Private Sector Alliance (KEPSA) and the Linking Industry with Academia (LIWA) Trust among others, in subsequent innovation surveys.
5. Develop a policy framework for supporting and sustaining innovation in priority sectors of the economy.
6. Encourage the adaptability and application of ICT in innovation.
7. Identify and recognize firms that excel in innovative activities as a part of the process of promoting innovation.
8. Initiate national programmes to tap and develop human resources for innovation.
9. Support and expand innovation hubs/centres for different categories of innovation.

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Appendix 1: Survey questionnaire

STRICTLY CONFIDENTIAL



Serial Number:.....

REPUBLIC OF KENYA

MINISTRY OF HIGHER EDUCATION, SCIENCE AND TECHNOLOGY

NATIONAL INNOVATION SURVEY 2012**SCIENCE TECHNOLOGY AND INNOVATION INDICATORS INITIATIVE****About this survey**

This survey collects information about product and process innovation as well as organisational and marketing innovation during the 2008/2009 to 2010/ 2011 financial years or the nearest financial years.

Scope

The statistical unit for the survey is the enterprise. An enterprise refers to a business, company or firm and can range from a very small concern with only one or two employees to a much larger and more formal business or firm.

Authority

The Ministry of Higher Education Science and Technology (MOHEST) working in collaboration with the Kenya National Bureau of Statistics (KNBS) are responsible for conducting the survey.

Confidentiality

All information gathered by this survey will be held in strictest confidence. Under no circumstances will MOHEST or KNBS publish, release or disclose any information identifiable with individual firms or business units participating in this survey. The information collected will ONLY be used to inform public policies for national development.

Enquiries/Assistance

If you have any problems in completing this questionnaire and/or meeting the due date, please do not hesitate to contact the following persons

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Director, Directorate of Research Management & Development (DRMD)	2219420	directordrmd@scienceandtechnology.go.ke
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Richard Mavisi Liahona	0720877502	mavisi@scienceandtechnology.go.ke or mliahona@yahoo.com

PART 1: General information about the enterprise, business, company or firm

1.0.	Name of enterprise: Physical Address: Telephone: Email: Main economic activity : Year of establishment:			
1.1	Short description of your main economic activity:			
1.2	Is your enterprise part of a larger group? <i>A group consists of two or more legally defined enterprises under common ownership. Each enterprise in the group may serve different markets, as with national or regional subsidiaries, or serve different product markets. The head office is also part of an enterprise group.</i>	Yes	No	
		In which country is the head office of your group located?		
<i>If your enterprise is part of an enterprise group, please answer all further questions with respect to your enterprise in Kenya only. Do not include results for subsidiaries or parent enterprises outside Kenya</i>				
1.3	In which geographic markets did your enterprise sell goods or services during the period under review (2008 to 2011)?	Yes	No	(specify if necessary and applicable but not compulsory)
	Kenya			
	Nairobi			
	Central			
	Coast			
	Eastern			
	North Eastern			
	Nyanza			
	Rift Valley			
	Western			
	Rest of Africa			
	Europe			
	United States			
	Asia			
	Other countries			
1.4	What was your enterprise's total number of employees in 2008 and 2011? Annual average number of employees, both full-time and part-time. If not available, give the number of employees at the end of each year.			
	2008			
	2011			
1.4.1	What was the number of employees in 2011 with a university degree?			
1.5	What was your enterprise's approximate total turnover for 2008 and 2011?			
	2008	KSh.		
	2011	KSh.....		

PART 2: Product (goods or services) innovation

A product innovation is the introduction to the market of a new or significantly improved good or service with respect to its capabilities, such as improved user-friendliness, components, software or sub-systems. The innovation (new or improved) must be new to your enterprise, but it does not need to be new to your industry sector or market. It does not matter if the innovation was originally developed by your enterprise or by other enterprises.

Please note: The latest terminology classifies "products" as consisting of both "goods" and "services". For example a firm in the financial services sector may talk of a "new financial product". The provision of innovative services is of increasing importance in competitive economies and the survey aims to cover both manufacturing and services orientated firms.

2.1	During the period under review (2008 to 2011), did your enterprise introduce:	Yes	No
	1. New or significantly improved goods. <i>Exclude the simple resale of new goods purchased from other enterprises and minor changes that only alter the appearance of the product.</i>		
	2. New or significantly improved services.		
			If NO to both questions, please go to question 3.1.
2.2	By whom were these product (goods and services) innovations developed?		
	1. Mainly your enterprise itself		Select the single most appropriate option only
	2. Your enterprise together with other enterprises (independent enterprises plus other part of your enterprise group (such as subsidiaries, sister enterprises, head office, etc.) or institutions (universities, research institutes, non-profit, etc)		
	3. Your enterprise by adapting or modifying goods or services originally developed by other enterprises or institutions		
	4. Mainly other enterprises or institutions		
2.2.1	Did these innovations originate mainly in Kenya or abroad?		
	Kenya	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Do not know
	Rest of Africa	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Do not know
	Europe	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Do not know
	United States	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Do not know
	Asia	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Do not know
	Other countries	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Do not know
2.3	Were any of your goods and service innovations during the period under review (2008 to 2011) new to your market or new to your firm?	Yes	No
	1. New to your market? <i>Your enterprise introduced a new or significantly improved good or service onto your market before your competitors (it may have already been available in other markets).</i>		
	2. Only new to your firm? <i>Your enterprise introduced a new or significantly improved good or service that was already available from your competitors in your market.</i>		

2.4	Please estimate the total turnover in 2011 of goods and service innovations introduced during 2008 to 2011 that were:	2011 turnover distribution (KSh.)
	1. New to your market	
	2. New to your firm	
	3. Unchanged or only marginally modified <i>Include the resale of new goods or services purchased from other enterprises.</i>	
	Total turnover in 2011	

PART 3: Process innovation

Process innovation is the use or implementation of new or significantly improved process or method for the production or distribution of goods or services or supporting activity. The innovation (new or improved) must be new to your enterprise, but it does not need to be new to your industry sector or market. It does not matter if the innovation was originally developed by your enterprise or by other enterprises.

Exclude purely organisational innovations such as changes in firm structure or management practice impacting on the final product– these are covered in question 10.

3.1	During the period under review (2008 to 2011), did your enterprise introduce any:	Yes	No	
	1. New or significantly improved methods of manufacturing or producing goods or services?			
	2. New or significantly improved logistics, delivery or distribution methods for your inputs, goods or service?			
	3. New or significantly improved supporting activities for your processes, such as maintenance and operating systems for purchasing, accounting or computing?			
			If No to all questions, please go to section 4.	
3.2	By whom were these process innovations developed?			
	1. Mainly your enterprise by itself			Select the single most appropriate option only
	2. Your enterprise together with other enterprises (independent enterprises plus other part of your enterprise group such as subsidiaries, sister enterprises, head office, etc.) or institutions (universities, research institutes, non-profit, etc)			
	3. Your enterprise together with other enterprises or institutions			
	4. Mainly other enterprises or institutions			
3.2.1	Were any of your process innovations introduced during the period under review (2008 to 2011) new to your market?			
	Yes No Do not know			

PART 4: On-going or abandoned innovation activities

Innovation activities include the acquisition of machinery, equipment, software and licenses; engineering and development work, training, marketing and research and experimental development (R&D) [Basic R&D not specifically related to product and/or process innovation should be included] when they are specifically undertaken to develop and/or implement a product or process innovation.

4.1	During the period under review (2008 to 2011) did your enterprise have any innovation activities to develop product or process innovations that were	Yes	No	
	1. Abandoned during the period under review (2008 to 2011) before completion			
	2. Still ongoing at the end of 2011			
			If your enterprise also had no product or process innovations or innovation activity during 2008 to 2010 (NO to ALL options in questions 2.1, 3.1, and 4.1), please go to question 8.2. Otherwise, please proceed to question 5.1.	

PART 5: The most important and performed innovation activities and expenditures

5.1	During the period under review (2008 to 2011), did your enterprise engage in the following innovation activities?	Yes	No
A	Intramural or in-house Research and Experimental Development (R&D) <i>Creative work undertaken on a systematic basis within your enterprise to increase the stock of knowledge and its use to devise new and improved products and processes (including software development in-house that meets this requirement).</i>		
	If yes, did your firm perform R&D during 2008 to 2011:		
	Continuously?		
	Occasionally?		
B	Extramural or outsourced R&D <i>Same activities as above, but purchased by your enterprise and performed by other companies (including other enterprises within your group) or by public or private research organisations.</i>		
C	1. Acquisition of machinery, equipment and hardware <i>Acquisition of advanced machinery, equipment and computer hardware to produce new or significantly improved products and processes.</i>		
	2. Acquisition of software <i>Acquisition of software to produce new or significantly improved products and processes.</i>		
D	Acquisition of other external knowledge <i>Purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other enterprises or organisations.</i>		
E	Training <i>Internal or external training for your personnel specifically for the development and/or introduction of new or significantly improved products and processes.</i>		

F	Market introduction of innovations Activities for the market introduction of your new or significantly improved goods and services, including market research and launch advertising.		
G	Design Activities to design, improve or change the shape or appearance of new or significantly improved goods or services		
H	Other activities Implementation of new or significantly improved products and process such as feasibility studies, testing, routine software development, tooling up, industrial engineering, etc.		

5.2	Please estimate the amount of expenditure in 2011 only for the first four innovation activities mentioned in 5.1 (A to D). Include personnel and related costs.	STRICTLY CONFIDENTIAL [KSh.]
A.	Intramural (in-house) R&D in 2011. <i>Include labour costs, capital expenditures on buildings and equipment specifically for R&D.</i>	
B.	Acquisition of R&D. <i>Extramural or outsourced R&D.</i>	
C.	Acquisition of machinery, equipment and software. <i>Exclude expenditures on equipment for R&D.</i>	
D.	Acquisition of other external knowledge.	
	Total of these four innovation expenditure categories (A+B+C+D)	

5.3	During the period under review (2008 to 2011), did your enterprise receive any public financial support for innovation activities from the following sources? <i>Include financial support via tax credits or deductions, grants, subsidised loans, and loan guarantees. Exclude research and other innovation activities conducted entirely for the public sector under contract.</i>	Yes	No
	1. Local Government (City Councils, Municipalities etc)		
	2. Central/National government (<i>Budgetary allocations</i>)		
	3. National funding agencies e.g NCST		
	4. Foreign government and/or other foreign public sources (e.g. European Commission, USAID, SIDA etc)		

PART 6: Sources of information and co-operation for innovation activities

6.1	During the period under review (2008 to 2011), how important to your enterprise's innovation activities were each of the following information sources? <i>Please identify information sources that provided information for new innovation activities/projects or contributed to the completion of existing innovation activities/projects.</i>					
	Information sources		Degree of importance Tick 'N/A' if no information was obtained from a source.			
			High	Medium	Low	N/A
a	Internal sources	Sources within your enterprise or enterprise group				
b	Market resources	1. Suppliers of equipment, materials, components or software				
		2. Clients or customers				
		3. Competitors or other enterprises in your sector				
		4. Consultants, commercial labs or private R&D institutes				
c	Institutional sources	1. Universities or other higher education institutions				
		2. Government or public research institutes				
d	Other sources	1. Conferences, trade fairs, exhibitions				
		2. Scientific journals and trade/technical publications				
		3. Professional and industry associations				
6.2	During the period under review (2008 to 2011), did your enterprise co-operate on any of your innovation activities with other enterprises or institutions? <i>Innovation co-operation is active participation with other enterprises or non-commercial institutions on innovation activities. Both partners do not need to benefit commercially. Exclude pure contracting out of work with no active co-operation.</i>				Yes	No ↓
						If no, please go to question 7.1

6.3		Please indicate the type of co-operation partner and location.					
	Type of co-operation partner	Location Tick all that apply.					
		Kenya	Rest of Africa	Europe	United States	Asia	Other countries
A.	Other enterprises within your enterprise group						
B.	Suppliers of equipment, materials, components or software						
C.	Clients or customers						
D.	Competitors or other enterprises in your sector						
E.	Consultants, commercial labs or private R&D institutes						
F.	Universities or other higher education institutions						
G.	Government or public research institutes (e.g. Research councils)						
6.4	Which type of co-operation partner was the most valuable for your enterprise's innovation activities? Give corresponding letter from 6.3. For example, clients or customers = 'C'						

PART 7: Effects/Objectives of innovation during 2008–2011

7.1 How important or successful were each of the following types of outcomes for your products (goods or services) and process innovations introduced during the period under review (2008 to 2011)?						
Outcomes/Effects			Level of success of outcomes Tick "No effect" if there were no innovation outcomes.			
			High	Medium	Low	No effect
a.	Product-oriented effects	1.Increased range of goods or services				
		2.Entered new markets				
		3.Increased market share				
		4.Improved quality of goods or services				
b.	Process-oriented effects	1.Improved flexibility of production or service provision				
		2.Increased capacity of production or service provision				
		3.Reduced production costs per unit of labour, materials, energy				
c.	Other effects	1.Reduced environmental impacts				
		2.Improved working conditions on health and safety				
		3.Met governmental regulatory requirements				
7.2 How important were each of the following objectives for your products (goods or services) and process innovations introduced during the period under review (2008 to 2011)?						
Objectives			Importance of objectives Tick "Not relevant" if there were no innovation objectives.			
			High	Medium	Low	Not relevant
7.2.1	Increase range of goods or services					
7.2.2	Replace outdated products or processes					
7.2.3	Enter new markets					
7.2.4	Increase market share					
7.2.5	Improve quality of goods or services					
7.2.6	Improve flexibility for producing goods or services					
7.2.7	Increase capacity for producing goods and services					
7.2.8	Reduce production (labour, materials, energy) costs per unit output					
7.2.9	Improve working conditions on health and safety					

PART 8: Factors hampering innovation activities

8.1	During the period under review (2008 to 2011), were any of your innovation activities or projects:		Yes	No		
	1. Abandoned in the concept stage					
	2. Abandoned after the activity or project was begun					
	3. Seriously delayed					
QUESTIONS 8.2, 9 and 10 TO BE ANSWERED BY ALL ENTERPRISES:						
8.2	During the period under review (2008 to 2011), how important were the following factors in hampering your innovation activities or projects or influencing a decision not to innovate?					
	Hampering factors		Degree of importance <i>Please also indicate particular factors that were not experienced.</i>			
			High	Medium	Low	Factor not experienced
a.	Cost factors	1. Lack of funds within your enterprise or group				
		2. Lack of finance from sources outside your enterprise				
		3. Innovation costs too high				
		4. Excessive perceived economic risks				
b.	Knowledge factors	1. Lack of qualified personnel				
		2. Lack of information on technology				
		3. Lack of information on markets				
		4. Difficulty in finding co-operation partners for innovation				
c.	Market factors	1. Market dominated by established enterprises				
		2. Uncertain demand for innovative goods or services				
		3. Innovation is easy to imitate				
d.	Other factors	1. Organisational rigidities within the enterprise				
		2. Insufficient flexibility of regulations or standards				
		3. Limitations of science and technology public policies				
e.	No need to innovate	1. No need due to prior innovations				
		2. No need because of no demand for innovations				

PART 9: Intellectual property rights

9.1	During the period under review (2008 to 2011), did your enterprise:		
	1. Secure a patent in Kenya?	Yes	No
	2. Apply for a patent outside Kenya?	Yes	No
	3. Register an industrial design?	Yes	No
	4. Register a trademark?	Yes	No
	5. Claim copyright?	Yes	No
	6. Grant a licence on any intellectual property rights resulting from innovation?	Yes	No

PART 10: Organisational and marketing innovation

An organisational innovation refers to the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations in firm structure or management methods that are intended to improve your firm's use of knowledge, the quality of your goods and services, or the efficiency of work flows.

A marketing innovation is the "Implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing" or sales methods to increase the appeal of your goods and services or to enter new markets.

10.1	During the period under review (2008 to 2011), did your enterprise introduce:		
	Organisational innovations		
a.	Business practices: <i>New business practices for organising procedures (i.e. supply chain management, business re-engineering, knowledge management, lean production, quality management, etc)</i> Exclude routine upgrades.	Yes	No
b.	Work responsibilities and decision making: <i>New methods of organising work responsibilities and decision making (i.e. first use of a new system of employee responsibilities, team work, decentralisation, integrating/deintegrating different departments or activities, education/training systems)</i>	Yes	No
c.	External relations: <i>New methods of organising external relations with other firms or public institutions (i.e. first use of alliances, partnerships, outsourcing or sub-contracting, etc)</i>	Yes	No
10.2	Marketing innovations		
a.	Significant changes to the design or packaging of a good or service. <i>Exclude routine/seasonal changes such as clothing fashions.</i>	Yes	No
b.	New or significantly changed sales or distribution methods, such as internet sales, franchising, direct sales or distribution licenses.	Yes	No
10.3	If your enterprise introduced an organisational innovation during the period under review (2008 to 2011), how important were each of the following results or effects?		

	Results	Degree of importance			
		High	Medium	Low	No results
	1. Increased or maintained market share				
	2. Reduced time to respond to customer or supplier needs				
	3. Improved quality of your goods or services				
	4. Reduced costs per unit output				
	5. Improved employee satisfaction and/or reduced rates of employee turnover				

PART 11: Specific innovations by your enterprise

11.1	During the period under review (2008-2011), were any of your innovations:			
	1. A first in Kenya?	Yes	No	Don't know
	2. A world first?	Yes	No	Don't know
	3. New or significant changes in your external relations with other firms or public institutions, such as through alliances, partnerships, outsourcing or sub-contracting	Yes	No	Don't know
11.2	If any of your answer to Question 11.1 was 'YES' then please give a short descriptions of these innovations (or attach separate pages or promotional brochures)			
11.3	Please list other significant innovations in your enterprise in the last three years (or attach separate page or promotional brochures etc)			

Thank you for your participation. It is sincerely appreciated

Name of Respondent:

Position:.....

Telephone:.....
.....

Email Address:.....

Signature:.....Date:.....

Name of interviewer:.....

Signature.....Date:.....

Team Leader:.....

Signature.....Date:.....

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