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Republic of Kenya
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The Kenya Innovation Indicators Survey 2015

The Kenya Innovation Indicators Survey 2015

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Contacts:

Ministry of Education, Science and Technology

State Department of Higher Education

Jogoo House “B”, Harambee Avenue

P.O Box 9583-00200, Nairobi

E-mail: pshigher@education.go.ke

Website: www.education.go.ke

Design and layout— Scinnovent Centre publishing services, Nairobi

www.scinnovent.org

Email: Info@scinnovent.org

This report was authored by staff from the:
Directorate of Research Management and Development (DRMD)

Ms. Cecilia K. Nzau

Archbishop T. Z. Ingana

Mr. Richard Mavisi

Ms. Christine Kariuki

Mr. Bernard Mulatya

Mr. Frank S. Ndakala

Kenya National Bureau of Statistics (KNBS)

Ms. Rosemary Kongani

Mr. Bernard Obasi

Mr. Bernard Mworio

FOREWORD

Science, Technology and Innovation (ST&I) are crucial in the transformation of Kenya's economy from a factor-driven economy to an innovation-driven economy. It is therefore important to undertake regular measurements to better understand and improve the status of ST&I in the country in order to attain this desired goal. Through well coordinated measurements, the country can gather the 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 required to produce internationally comparable ST&I indicators. The generation of ST&I indicators in Kenya is a collaborative effort between the Ministry of Education, Science and Technology and the Kenya National Bureau of Statistics.

This report presents the results of the Second National Innovation Survey 2015 carried out to provide insights into the national system of innovation by measuring firm-level innovation. The findings of the survey are expected to inform evidence-based policy design and implementation. This will assist the country to configure the national system of innovation to respond to current development challenges and create an enabling environment to boost innovation in all sectors of the economy as envisaged in the Kenya Vision 2030 development blueprint.

The report provides statistical evidence on specific innovation indicators to inform the government and other stakeholders on the status of firm-level innovation in terms of performance, drivers and barriers to innovation and their policy implications. It is therefore anticipated that this evidence will trigger a national discourse on the state of innovation and help map the way forward on the development of policies and strategies needed to promote innovation in Kenya.

Prof. Collette A. Suda, PhD, FKNAS, EBS

PRINCIPAL SECRETARY, STATE DEPARTMENT OF UNIVERSITY (HIGHER)
EDUCATION

Table of contents

FOREWORD	i
LIST OF TABLES.....	iv
LIST OF FIGURES.....	iv
ACKNOWLEDGEMENTS.....	vi
ACRONYMS	vii
EXECUTIVE SUMMARY.....	viii
CHAPTER ONE: INTRODUCTION	1
1.0 Background	1
1.1 Role of Science, Technology and Innovation in National Development.....	1
1.2 Implementation of Innovation Policies and Economic Reforms	2
1.3 Science, Technology and Innovation Policy Measurements	3
1.4 Measuring Innovation	5
1.5 The ASTII Initiative in Kenya.....	6
1.6 Rationale for National Innovation Surveys.....	6
1.7 Concepts and Definitions.....	7
CHAPTER TWO: SURVEY METHODS	10
2.0 Introduction.....	10
2.1 Survey design and implementation.....	10
2.2. Survey Instrument.....	10
2.3. Sampling Procedure	10
2.4. Coverage	10
2.5. The National Steering Committee Meeting.....	11
2.6. Training	11
2.7. Sample Size	11
2.8. Data Processing and Analysis.....	12
2.9. Challenges encountered during the Survey.....	12
CHAPTER THREE: RESULTS.....	13
3.0 Introduction.....	13
3.1 Characteristics of Survey Enterprises	13
3.2. Types of Innovation, Novelty and Innovation Intensity.....	14
3.3. Cooperation and Partners	15

3.4.	Innovation and Financial Turnover	16
3.5.	Status of innovation Projects, Information Sources and Expenditures.....	17
3.6.	Objectives and outcomes of innovation	18
3.7.	Factors hampering innovation activities.....	19
3.8.	Intellectual Property Rights.....	20
CHAPTER FOUR: PAST AND PRESENT INNOVATION TRENDS.....		21
CHAPTER FIVE: CONCLUSIONS AND POLICY RECOMMENDATIONS.....		23
5.1	Conclusions	23
5.2	Policy Recommendations.....	23
REFERENCES.....		25
APPENDICES.....		27
Appendix I: Survey Questionnaire		27

List of Tables

Table 2.1: Response Rates per Region of Coverage.....	11
Table 3.1: Average Annual Turnover by Firm Size	17

List of Figures

Figure 3.1: Geographic Markets for Innovative Enterprises	13
Figure 3.2: Average Annual Number of Employees by Firm Size.....	14
Figure 3.3: Motivating Factors for Organization and Marketing Innovations.....	15
Figure 3.4: Cooperation in the Implementation of Product (A) and Process (B) Innovations.....	16
Figure 3.5: Cooperation and Partnerships on Innovation Activities	16
Figure 3.6: Highly Important Information Sources for Innovation Activities	17
Figure 3.7: Distribution of the most Important activities performed (A) and firms' expenditure on Innovation activities (B)	18
Figure 3.8: Highly important objectives for Innovation (A) and outcomes for Innovation (B).....	19
Figure 3.9: Degree of Importance of Factors Hampering Innovation	19
Figure 3.10: Status of Intellectual Property Rights.....	20

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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
ICC	International Chamber of Commerce
ISIC	International Standard of Industrial Classification
IPRs	Intellectual Property Rights
KNBS	Kenya National Bureau of Statistics
MDGs	Millennium Development Goals
MoEST	Ministry of Higher Education, Science and Technology
MSMEs	Micro, Small and Medium Enterprises
MTP	Medium Term Plan
NGO	Non-Governmental Organization
NEPAD	New Partnership for Africa's Development
NSI	National System of Innovation
OECD	Organization for Economic Co-operation and Development
R&D	Research and Experimental Development
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
ST&I	Science, Technology and Innovation

EXECUTIVE SUMMARY

This report presents the results of the Second National Innovation Indicators Survey undertaken from March to May 2015. The survey was designed to measure firm-level innovation over the reference period 2012 to 2014. It is based on a set of core innovation indicators that provide evidence to inform the design and implementation of policies that will help the country configure the national system of innovation to respond to socio-economic development challenges.

The survey adopted the methodological recommendations for the Community Innovation Survey based on the Oslo Manual by OECD. The survey was carried out in Nairobi, Mombasa, Kisumu, Nakuru and Nyeri. Stratified sampling was used to draw a total of 700 enterprises based on the ISIC classification with 70% of the enterprises from the manufacturing sector. The response rate was 53.7%.

The survey established that on average 45% of the enterprises successfully implemented product innovations while 40% implemented process innovations. Organizational and marketing innovations were implemented by 54% and 41% of the enterprises respectively. The overall innovation intensity over the reference period was 45%.

The business environment was found to be generally not supportive to innovation. Many barriers exist such as inadequate funding, high costs of implementing innovation and weak industry- knowledge based institution linkages. Knowledge-based institutions were not considered by many firms as key providers of information and ideas to support innovation activities and instead, customers were the main source of ideas for innovation. Public funding for innovation is largely inadequate and very few firms benefited from existing tax and financial support. Consequently, many innovation activities were either seriously delayed or abandoned due to lack of sufficient funds.

The uptake of intellectual property rights is very low (average of 12% of the firms). Nevertheless, firm-level innovation showed some positive trends that remained stable since the first innovation survey. Training was the most performed innovation activity. However, most of the firms spent a large proportion of their turnover to acquire machinery, equipment and software as one of the key innovation activities. Most firms engaged in innovation activities to improve the quality of goods or services.

A detailed analysis of the 2012 and 2015 trends shows that the innovation status has generally not changed. A number of policy recommendations are therefore proposed to address the key barriers to firm-level innovation and overall improvement in the innovation ecosystem in order to develop and sustain an innovation-driven economy.

Innovation is more important than ever. It is the key to good paying private-sector jobs for the American people
~ President Barack Obama, February 2012

CHAPTER ONE

INTRODUCTION

1.0 Background

Kenya has witnessed steady growth in the development and application of science, technology and innovation (ST&I) for socio-economic development since the pre-independence era. The Science and Technology (S&T) Act of 1977, Cap 250 of the Laws of Kenya, was enacted after the breakup of the original East African Community (EAC) in which S&T matters were tackled regionally. The S&T Act and its subsequent revisions guided the integration of ST&I into national socio-economic endeavours; including both the production and service sectors.

In 2012, the Ministry of Higher Education, Science and Technology (MoHEST), in consultation with stakeholders finalized the ST&I policy development process that resulted into the enactment of the ST&I Act, 2013. The main objective of the Act is to facilitate the promotion, co-ordination and regulation of the progress of ST&I; prioritize the development of ST&I; entrench ST&I into the national production system and integrate ST&I - which is one of the key foundation elements of Kenya Vision 2030 - into national development processes.

The ST&I Act, 2013 development process was partly informed by a set of ST&I indicators; mainly research and development (R&D) that resulted from the first national R&D indicators survey undertaken in 2009 under the African Science, Technology and Innovation Indicators (ASTII) Initiative. Since then, Kenya has institutionalized a system of ST&I indicators aimed at informing the status and progress made in policy implementation and also provide evidence to inform policy formulation, review, and, policy evaluation.

The institutionalization of the ST&I measurement framework is therefore expected to lead to the establishment of a National Observatory for Science, Technology and Innovation. The current national innovation indicators report is the second in a series of surveys undertaken by Kenya under the ASTII Initiative. The collective ASTII Initiative outputs by various participating African countries are published in the triennial African Innovation Outlook (AIO). Two editions (2010 and 2014) of the AIO have been published and the third edition is expected in 2017.

1.1 Role of Science, Technology and Innovation in National Development

Science, technology and innovation (ST&I) are essential elements for industrialization and sustainable development of nations (UNCTAD, 2015). The importance of these elements as crucial factors in national development and competitiveness of countries has been globalized through trade liberalization and the emergence of knowledge-based industries (UNCTAD, 2015).

According to the President of the United States of America, “We need to build a future in which our factories and workers are busy manufacturing the high tech products that will define the century... Doing that starts with continuing investment in the basic science and engineering and technology development from which new products, new businesses, and even new industries are formed.... Innovation is more important than ever. It is the key to good paying private-sector jobs for the American people” (President Barack Obama, February 2012).

Through enhanced investments in ST&I, Kenya can improve the ability of firms, large and small, to competitively produce goods and services. In line with this new global thinking, Kenya has developed a long-term national development blueprint; the Kenya Vision 2030. The Vision is motivated by a collective aspiration for a much better society for both current and future generations. By the year 2030, Kenya envisages of transforming into a rapidly industrializing middle-income nation with improved quality of life in a clean and secure environment for all its citizens. Further, in order to realize this Vision, there is need for intensified application of ST&I into national production systems supported by the social, economic and political pillars.

The successive 5-year Medium-Term Plans (MTPs) of Vision 2030 have had an impressive implementation since 2008. As MTP-II winds up, Kenya successfully prioritized policies, programmes and projects that endeavour to take advantage of ST&I to scale up the fight against poverty and inequality. A reliable set of ST&I indicators is crucial in monitoring and evaluating (M&E) progress towards attainment of the MTPs targets. Statistical measures concerning R&D and innovation are needed for development of policy-relevant indicators for tracking M&E

progress and the requirement for specific interventions based on the evidence gathered from the National System of Innovation (NSI).

Through effective M&E of relevant policies and experiences learnt, Kenya has readily realized improved interventions and measures aimed at achieving desired outcomes for Vision 2030 objectives and the Sustainable Development Goals (SDGs). Comprehensive ST&I indicators are of great significance for sustainable development of ST&I policies covering key economic sectors.

Currently, there are limited internationally comparable data aimed at providing indicators for investments to support innovation. The only indicators available are largely limited to R&D support. They include R&D government investments and the global OECD 'B' Index. Very few indicators developed for specific areas of policy involvement, such as programmes to improve the innovative capacity of SMEs, are in existence. This scenario calls for identification of indicators of innovation and designing of a systematic policy framework to address national development requirements. Examples include indicators that can directly measure policy investment, types of policies in use, level of effectiveness, overall impact of policies and economic returns. The evidence acquired through these measurements plays a wider role in fine tuning innovation policy instruments.

1.2 Implementation of Innovation Policies and Economic Reforms

The Government of Kenya (GOK) has been implementing the Kenya Vision 2030, whose long term goal is to transform the country into a globally competitive and prosperous nation with a high quality of life by the year 2030, since 2008. This will shift Kenya's status from a lower to an upper middle income country. The Kenya Vision 2030 is anchored on a number of key foundation elements, including ST&I, which envisages a modern economy in which new knowledge plays a central role in wealth creation, social welfare and international competitiveness. The overall goal of ST&I as one of the foundation elements, is to generate knowledge and innovation to drive Kenya's Vision 2030. The Second Medium Term Plan (2013-2017) focuses on increasing the pace of economic transformation in priority sectors under the economic and social pillars, diversifying agriculture, value addition and strategic support to the manufacturing sector.

The Constitution of Kenya, 2010 further recognizes the development and application of ST&I for national development and prosperity. Although

the Constitution emphasizes the importance of ST&I, investments undertaken by Kenya over the years since independence, science and technology infrastructure have not yielded commensurate improvements in economic growth; for example the rate of employment generation as a result of aggregate productivity is low whereas economic growth has largely remained stagnant since the 1970's. This can be attributed to a number of challenges that include inadequate funding; an uncoordinated and fragmented national innovation system (NIS) where synergies and networking among Government, research and training institutions, industry, the financial sector and professional groups is weak; lack of a harmonized national research policy agenda and priorities, and the poor state of infrastructure and equipment for research among others.

However, the enactment of the ST&I Act, 2013 provides an integrative policy framework to facilitate effective delivery and utilization of knowledge for the integration of ST&I into the economy. In addition, more emphasis on a systems approach to ST&I prioritization is expected to unleash the innovativeness of Kenyan firms in order to increase productivity, global competitiveness and provide high quality jobs to boost income and wealth generation. The GOK has also embarked on ambitious physical infrastructure projects that include the Modern Standard Gauge Railway, expanding and constructing new sea ports and international airports as well as the upgrading of roads and enhancing road networks. These initiatives are expected to improve Kenya's innovation ecosystem.

National economic performance has registered mixed results over the innovation review period. The Gross Domestic Product (GDP) expanded by 5.3 per cent in 2014 as compared to 5.7 per cent in 2013. The main contributors were agriculture and forestry (27.3%), manufacturing (10%), transport and storage (9.7%), real estate (8.3%) and education (8.2%). On the social scene, basic and tertiary education enrolment achieved impressive improvements. However, the creation of total new jobs in the modern sector decreased in 2014 as compared to those realized in 2013. Although the value of Kenya's exports grew in 2014, the country remains largely imports dependent. The manufacturing sector real output was 3.4% in 2014 compared to 5.6% in 2013. The use of mobile phones, mobile money transfers and the internet generally increased in 2014 (Kenya National Bureau of Statistics – KNBS, 2015).

According to the World Bank, the Kenyan economy is expected to grow by 6 percent in 2015; up from an earlier projection of 4.7 percent, as lower oil prices spur consumption and the government proceeds

with rail and energy projects. Generally, the Kenyan economy is growing faster than many of its peers in the region. Further projections by the World Bank indicate that the rise in real income is expected to trigger significant increases in private sector consumption - the engine of Kenya's economy, while higher aggregate demand is also likely to incentivize private investment, particularly in the manufacturing sector. The rebasing of the GDP in 2014 placed Kenya as a lower middle-income country thus making it the fifth-largest economy in sub-Saharan Africa. The World Bank Report (2014) on firm level innovation in Kenya emphasised the role of innovation in spurring economic growth, with the manufacturing sector offering the highest opportunity for growth, employment and export of textile products. The report established the innovation intensity within the firms to be 53%.

The Government of Kenya has initiated crucial policy interventions to spur growth in key sectors that contribute to the country's GDP. The implementation of relevant ST&I interventions are also key in ensuring a stable macroeconomic environment which will in turn support interventions in the economic, social and political pillars. The Government has therefore embraced a number of reforms to directly and indirectly improve the business environment for innovation and economic growth. Key among these is the introduction of Free Primary and Free Day Secondary Education programmes. University and Tertiary education sector has also rapidly expanded in the last decade.

The implication is that more young Kenyans have access to education and training opportunities in spite of the equity and quality concerns that still prevail as the key challenges facing the sector. This provides a platform for harnessing knowledge and skills in ST&I for global competitiveness and revitalization of the technical education subsector and the youth polytechnics. The Government through the Ministry of Education Science and Technology (MoEST) established a programme to improve technical training institutions and bridge the skills gap existing in the industrial and manufacturing sector.

Kenya has also placed high priority on the new globally adopted Sustainable Development Goals (SDGs) - the next international development phase after the Millennium Development Goals (MDGs); in a special way with associated reforms in the health sector (reducing child mortality, improving maternal health and combating HIV/AIDS, malaria and other diseases) and ensuring environmental sustainability in all sectors to enhance personal wellbeing; including ability to work, produce for self and others, conserve the environment, overcome extreme poverty and hunger, promote gender parity

and stimulate global partnerships for development.

It is also worth noting that policy makers have also become more informed on the role of framework conditions for innovation beyond the conventional ST&I policy to include issues like market competition and the regulatory environment among others. Many other stakeholders are also demanding integrated responses to societal challenges that cross disciplines and national borders. The Government must therefore fully embrace the concept of a national innovation system and adopt a systemic approach in order to successfully deal with these challenges. Initiatives like the triennial innovation surveys based on the Oslo Manual and the proposed National Observatory for ST&I; will go a long way in providing innovation performance metrics, knowledge and a policy platform for evidence-based policy-making, implementation and evaluation.

1.3 Science, Technology and Innovation Policy Measurements

The Kenyan innovation policy framework before 2013 was characterized by large institutional fragmentation and the absence of a strong co-coordinating institution to mobilize government efforts in ST&I. The ST&I Act 2013, was enacted to improve the institutional framework for ST&I; in line with the policy goals of Kenya Vision 2030 which is the current national development blueprint that clearly lays out the role of ST&I in economic growth; with particular focus on priority growth sectors. The ST&I Act, 2013 and the Vision 2030 Medium Term Plans (MTPs), currently on the second MTP, provide rationalization guidelines for both policy and institutional arrangements regarding innovation and technology within Kenya in order to align them with productivity and enterprise growth.

The ST&I Act of 2013 is an attempt to improve on the ST&I institutional framework, in a bid to complement the policy goals of Kenya Vision 2030. The ST&I Act, 2013 established the following institutions:

The National Commission for Science, Technology and Innovation (NACOSTI) which is an advisory agency charged with leading inter-agency efforts to develop policy on ST&I across all levels of government. It also assures the relevance and quality of ST&I programs, while keeping track of progress in the national research system.

The Kenya National Innovation Agency (KENIA) expected to institutionalize linkages between universities, research institutions, the private sector, the Government, and other actors in order to fully realize the innovation potential of the country. The



Credit: Thomas Mukoya/Reuters/Corbis

National Research Fund (NRF) will mobilize resources to develop the national research and innovation.

Innovation is seen as a principal driver of economic growth, leading to a view of innovation that centres on large-scale technical transformation of nations (Dosi et al. 1988). However, this type of innovation has supported the economic core not the periphery, and has fostered inequality and exclusion. This innovation has assisted large, formal firms' not informal microenterprises; has developed goods and services for rich not poor consumers; and has supported industrial economic development while innovation for wider societal problems has been neglected (OECD, 2013). In line with this point of view, the innovation policy measurement under consideration in this report mainly focuses on formal business enterprises but excludes the informal sector.

This approach does not provide a complete innovation outlook since in Kenya, like many developing countries, has large informal sectors that constitute

a substantial portion of the economy. Nevertheless, it is anticipated that the measurement should shift to inclusive innovation in order to understand the means by which new goods and services are developed for and by marginal groups (the poor, women, the disabled and ethnic minorities among others). Inclusive innovation is of increasing interest as nations look to use innovations to bring about more comprehensive and equitable development: improving the income, wellbeing and livelihoods of those outside the mainstream of economic growth; particularly those on lowest incomes.

The emergence of M-PESA - a mobile phone-based money transfer and micro financing service launched in 2007, is perhaps a good example of inclusive innovation in Kenya. The success story of M-PESA has demonstrated that innovation can help fight inequality and social exclusion. However, at present, there are too many barriers to this form of "inclusive innovation". New government policies are essential to reduce these barriers and new measures

are needed to drive inclusive innovation forward. These must encourage formal innovation systems to focus on the poor; help low-income actors to adapt, diffuse and use innovations; and work to address structural roadblocks (Foster & Heeks, 2015).

From the foregoing, appropriate measurement is therefore critical for policy to support innovation and help policy makers in accomplishing the following:

- Assessing the contribution of innovation to achieve social and economic objectives
- Understanding the determinants of and obstacles to innovation to design policies with higher chances of success
- Evaluating the effectiveness of different policy approaches and consequently adapting current policies or designing new ones
- Benchmarking innovation performance and conditions for innovation to those of other countries

Therefore, the types of measurement systems needed for innovation policy include:

- Determining factors for innovation - The measurement system should adopt a broad approach to innovation determinants
- Conceptual analyses - Measurements should go beyond targets and aggregates to an analysis level that will help understand why and how innovation happens in firms. Innovation surveys can increase knowledge about why and how innovation happens in firms
- Role of government - The measurement system should address the role of government, including central and local government and various agencies, in fostering innovation
- Capture of knowledge interactions - The production of new knowledge is often a collective process involving individuals and organizations within networks. These networks typically cluster in certain geographic location or around certain institutions.
- Measurement of social impacts - Beyond economic goals, this analysis should measure the social impacts of innovation by evaluating not only the contribution of innovation to economic performance, but also its impact on well-being and its contributions to achieving social goals

1.4 Measuring Innovation

It is widely acknowledged that innovation propels economic growth. It is therefore important to undertake regular and systematic innovation measurements

to better understand the dynamics of economic growth (Schramm et al., 2008). Institutionalizing the measurement of innovation provides reliable indicators to inform review of harmful policies and enact innovation-supportive policies. In constructing innovation indicators, the information needs of policy makers and analysts are a paramount consideration (OECD/Eurostat, 2005). In order to achieve the long term goal of measuring the impact of innovation on the economy, the government should create a coordinated emphasis on innovation measurement that involves the business community and academia.

Innovation is affected by a wide range of factors at multiple levels of analysis for example those determined at the firm, industry, region and country levels. At the firm level, for instance, determinants include not only R&D but multiple other complementary intangible assets, such as software, human capital and new organizational structures. It is therefore critical to go beyond conventional ST&I indicators and take into consideration wider innovation drivers like education, entrepreneurship, access to finance and labour market. Innovation surveys provide evidence and knowledge about why and how innovation happens at firm level by collecting information about innovation strategies, reasons for investing in innovation, focusing or combining certain types and modes of innovation, as well as quantitative data on sales from product innovations and expenditure on a range of innovation activities. Innovation surveys were therefore developed to increase knowledge about innovation at firm level with a view to developing effective innovation policies.

The nature, direction and intensity of policy actions that drive innovation at national and regional levels need to be measured in order to better understand the relevance of these policy actions in different innovation system contexts. Some of the issues to be addressed are for example, where innovation is dominated by business firms versus where public firms are the dominant players in innovation. In addition, innovation involves technologies developed through interdisciplinary research and often used across a broad range of industries. On the other hand, interactions across actors, locations, and technologies also need to be tracked as part of the innovation measurement framework.

The impact of innovation on socio-economic performance needs to be regularly monitored. Currently, formal innovation is widely measured using innovation surveys based on the guidelines documented in the Oslo Manual (OECD/Eurostat, 2005). The Oslo Manual provides a framework for countries to develop internationally comparable

innovation indicators. In Africa, the ASTII initiative of the African Union (AU) adopted the Oslo Manual as a guide for the implementation of innovation surveys.

Innovation surveys are therefore designed to measure and provide a breadth of information on the innovation process at the firm level. They can identify motives and obstacles to innovation, changes in the way firms operate, the kinds of innovation activity that they engage in, and the types of innovations that they implement. In terms of the innovation process as a system, innovation surveys can provide information on firms' linkages with other actors in the economy and on the methods they use to protect their innovations (Paragraph 122, OECD/Eurostat, 2005).

Specifically, innovation measurement focuses on:

- Inputs to innovation: role of R&D and non-R&D inputs into the innovation process and how R&D interrelates with other innovation inputs
- Linkages and the role of diffusion: technological change and productivity growth.
- Incentives and obstacles to innovation
- The impact of innovation: the effect of innovation on output, productivity and employment at national level and in various sectors
- Role of human capital in innovation: knowledge and skills, quality of the education system and how it matches industry needs

1.5 The ASTII Initiative in Kenya

Kenya has participated in the African Science, Technology and Innovation Indicators (ASTII) Initiative since its inception in 2007. The ASTII Initiative stems from the Africa's Science and Technology Consolidated Plan of Action (CPA), which a predecessor of the current Science, Technology and Innovation Strategy for Africa until 2024 (STISA-2024). The focus of the STISA- 2024 is to address the aspirations identified under the African Union (AU) Agenda 2063. It will do this by linking the achievements realized under the CPA implementation with the current and future opportunities for ST&I development in the African continent. STISA-2024 is a short term strategy (1st decade incremental strategy) that is designed to address Africa's challenges with the ultimate goal of contributing significantly to the African Union vision. STISA-2024 is designed to respond to the demands for ST&I from various impact sectors including agriculture, health, infrastructure, mining, security, water, energy and environment among others. Robust and reliable indicators are therefore essential for effective implementation of ST&I

policies and strategies in these crucial sectors. These indicators are to be used to monitor global technological trends, conduct foresight exercises, and determine specific areas of investment. The ASTII Initiative is a mechanism first developed to promote the adaptation to and adoption of internationally comparable policy-relevant ST&I indicators and methodologies. It will thus build institutional capacities and develop an African network for ST&I indicators. In addition, through the ASTII Initiative, the African Observatory for Science Technology and Innovation (AOSTI) has been established to stimulate and promote the use of Science & Technology (S&T) in supporting sustainable development in Africa. AOSTI also functions as a repository for ST&I statistics and provides analytical support for evidence-based policy-making in the continent.

The implementation of the ASTII Initiative in Kenya is a collaborative effort between the Ministry of Education, Science and Technology (MoEST) and the Kenya National Bureau of Statistics (KNBS). The Government of Kenya (GOK) has been funding the implementation of national R&D and innovation surveys while the AU's New Partnership for Africa's Development (NEPAD) and the World Bank have provided support through capacity-building to lead persons who in turn train the national survey team.

1.6 Rationale for National Innovation Surveys

Since the inception of the ASTII Initiative, Kenya has undertaken two firm-level national innovation surveys covering three year periods each; the first in 2012 covered 2008 to 2011 and the current one in 2015 is for the period 2012 to 2014. The statistical unit for the survey is the enterprise whose size is defined by the number of employees; and therefore, only enterprises with at least ten (10) employees are considered.

The main aim of national innovation surveys is not to identify and document innovations happening in Kenyan industries but to understand the drivers and obstacles to innovation. The innovation surveys are therefore designed to highlight, among other things; the driving forces behind innovation, the importance not only of product and process innovations but also of marketing and organizational innovations, the role of linkages and diffusion, and the view of innovation as a system. Most importantly, these innovation surveys measure the degree of innovativeness at the firm level, and the resources; financial and human, devoted to innovation.

The innovation surveys provide critical innovation indicators to help policy-makers and researchers have a better understanding of national innovation processes. Generally, ST&I indicators are broadly

used to support policy learning. Specific uses include: monitoring, benchmarking, evaluation, foresight, provision of information about firm behaviour and provision of a basis for further analyses that leads to policy development. These indicators are used to monitor the national system of innovation and hence contribute to public policy debate on ST&I. According to Mairesse and Mohnen (2010), these indicators can be broadly categorized as:

a) Indicators of innovation output such as the introduction of new products and processes, organizational changes and marketing innovations, the percentage of sales due to products new to the firm or new to the market, and the share of products at various stages of the product lifecycle;

b) A wider range of innovation expenditures or activities other than R&D expenditures such as the acquisition of patents and licenses, product design, personnel training, trial production, and market analysis; and

c) Information about the way innovation proceeds, such as the sources of knowledge, the reasons for innovating, the perceived obstacles to innovation, the perceived strength of various appropriability mechanisms and the partners of research cooperation.

1.7 Concepts and Definitions

According to the third edition of the *Oslo Manual*, innovation refers to the implementation of a new or significantly improved product (good or service), process, marketing method or organizational method in business practices, workplace organization or external relations (OECD/Eurostat, 2005). Thus a firm is considered to be innovative if it implements a single significant change, or of a series of smaller incremental changes that together constitute a significant change.

Four types of innovations are identified in this definition, namely product, process, marketing and organizational innovations. The last two are included to expand the scope of what is considered to be innovation in recognition of the fact that innovation is more than just product and process innovation. This edition of the manual supports the inclusion of marketing and organizational innovations by pointing out that this 'creates a more complete framework, one that is better able to capture the changes that affect firm performance and contribute to the accumulation of knowledge' (Paragraph 10, OECD/Eurostat, 2005). It also 'allows for more extensive analysis of the interactions between different types of innovations, in particular the importance of implementing organizational changes in order to benefit from other types of

innovations' (Paragraph 12, OECD/Eurostat, 2005).

Product innovation relates to significant changes in the capabilities of goods or services and includes the introduction of new goods and services and significant improvements to existing products that are brought to the market. Examples of product innovations are significant changes in technical specifications, components and materials; incorporated software; and increased user-friendliness or other functional characteristics.

Process innovation refers to the use of new or significantly improved methods for the production and supply of goods and services. Innovation must be new to the firm but to varying degrees it may also be new to the industry sector or market.

Marketing innovations refer to the implementation of new marketing methods, including changes in product design and packaging in product promotion and placement, and in methods for pricing goods and services.

Organizational innovation refers to the implementation of new organizational methods. These can be changes in business practices, in workplace organization or in the firm's external relations' (Paragraph 23, OECD/Eurostat, 2005).

There are three 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.

An innovation is 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, domestic and international.

'New to the world' therefore implies a qualitatively greater degree of novelty than 'new to the market'.

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 (Paragraph 149, OECD/Eurostat, 2005).

Implementation of innovation comprises a number of activities not included in research and development such as later phases of development for pre-production, production and distribution, development activities with a lesser degree of novelty and support activities such as training and market preparations. Additional activities include development and implementation activities for non-product and non-process innovations such as new marketing methods or new organizational methods.

Innovation activities also include acquisitions of external knowledge or capital goods that are not part of research and development. In the same vein, activities financed or performed by enterprises are included as innovation activities. This includes total intramural and extramural research and development.

Research and experimental development comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications (OECD/Eurostat, 2002)

Innovation activities also involve the acquisition of capital goods. This includes both the acquisition of capital goods with improved technological performance and the acquisition of capital goods with no improvement in technological performance that are required for the implementation of new or improved products or processes. The category here only comprises the

acquisition of capital goods for innovation that are not included in research and development such as:

- Land and buildings; including the acquisition of land and buildings for product and process innovation activities like major improvements, modifications and repairs
- Machinery, instruments and equipment; including major instruments and equipment acquired for use in product and process innovation activities of the firm
- Computer software; including computer software, program descriptions and supporting materials for both systems and applications software for use in product and process innovation activities of the firm. The acquisition, development or extension of computer databases expected to be used for more than one year in product and process innovation activities of the firm are also included.

An innovation-active firm is one that has had innovation activities during the period under review, including those with ongoing and abandoned activities. In other words, firms that have had innovation activities during the period under review, regardless of whether the activity resulted in the implementation of an innovation, are innovation-active.

Implementation of an innovation is the introduction of the innovation to the market. New or significantly improved products, processes, marketing methods or organizational methods are therefore implemented when they are brought into actual use in the firm's operations.

A patent is a legal property right over an invention, which is granted by national patent offices.

Diffusion is the way in which innovations spread, through market or non-market channels, from their first worldwide implementation to different consumers, countries, regions, sectors, markets, and firms. Without diffusion, an innovation will have no economic impact.



Photo credit: Henry Kidiavai, NACOSTI



CHAPTER TWO

SURVEY METHODS

2.0 Introduction

This chapter presents the methods for the survey over the 2012 to 2014 period. In addition, other activities that facilitated the survey are also discussed in detail.

The Kenya Innovation Survey 2015 was based on the 'Guidelines for Collecting and Interpreting Innovation Data' commonly referred to as Organization for Economic Cooperation and Development's (OECD) *Oslo Manual* (OECD, 2005) and more specifically the Statistical Office of the European Commission (Eurostat) methodological approach for Community Innovation Surveys – CIS (CIS, 2006). The design of the instrument borrowed heavily from the CIS (2006) and the South African Innovation Survey questionnaires. The questionnaire was pre-tested and thereafter revised to address challenges emanating from the survey process in terms of collecting, analysing and disseminating data to various users both local and international.

2.1 Survey Design and Implementation

The survey design relied on guidelines developed by Eurostat and the structure of the Kenya National Bureau of Statistics (KNBS) Business Register. The study design outline was as follows:

- A stratified random sample (by sector and size of enterprise) abstracted from the Business Register Database at KNBS
- A Questionnaire-based key informant survey
- The extrapolation of the findings to the target population based on weighted samples

2.2. Survey Instrument

The survey instrument used was based on the third edition of the *Oslo Manual*, jointly developed by the OECD and Eurostat (OECD, 2005). The design of the instrument borrowed heavily from the CIS (2006) and the South African Innovation Survey questionnaires. After pre-testing, the questionnaire was revised to address emerging challenges from the survey process in terms of data collection, analyses and dissemination to various local and international users. The questionnaire (Appendix I) was divided into 10 parts as outlined below:

- Part 1: General information about the enterprise
- Part 2: Product innovation

- Part 3: Process innovation
- Part 4: On-going or abandoned innovation activities
- Part 5: The most important and performed innovation activities-related expenditures
- Part 6: Sources of information and co-operation for innovation activities
- Part 7: Outcomes and objectives of innovation
- Part 8: Factors hampering innovation activities
- Part 9: Intellectual Property Rights (IPR)
- Part 10: Organisational and marketing innovations

2.3. Sampling Procedure

The enterprises targeted for the survey were drawn based on the International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4 and comprised of Agriculture, forestry and fishing (Divisions 01-03), Mining and quarrying (Division 08 and 09), Manufacturing (all divisions), Construction, (divisions 41 & 42), Wholesale and retail trade, Repair of motor vehicles and motorcycles, Transport and storage, Accommodation and food service activities, Information and communication, and, Financial and insurance activities. The manufacturing sector constituted about 70% of the sample.

2.4. Coverage

The survey was organized in two phases. The first phase, running for fifteen days, covered the capital and commercial city Nairobi and its environs (including Machakos). The second phase covered firms in Mombasa, Kisumu, Nakuru, Nyeri and Eldoret over a duration of ten days. A total of 700 firms were targeted in this innovation survey. Out of these, 376 firms completed and returned the questionnaires, thus representing a 53.7% overall response rate. A detailed representation of the response rate is shown in Table 2.1 below.

Table 2.1: Response Rates per Region of Coverage

Region	Target Firms	Response	Non-Response	Response Rate (%)
Nairobi	300	168	132	56
Mombasa	100	45	55	45
Kisumu	100	67	33	67
Nakuru/Eldoret	100	40	60	40
Nyeri	100	56	44	56
Total	700	376	324	53.7

2.5. The National Steering Committee Meeting

A National Steering Committee, comprising of key stakeholders, was convened in February 2015 to launch the survey. The survey process and the instrument were presented to the committee for their input and ownership. The National Steering Committee had representation from the public and private sectors; including academia and business associations. The National Steering Committee is the highest administrative organ for the national surveys and the chair is the Principal Secretary, State Department of Science and Technology in the Ministry of Education Science and Technology (MoEST).

2.6. Training

The Ministry of Education Science and Technology and Kenya National Bureau of Statistics (KNBS) jointly conducted a two-day rigorous in-house training for the survey team. The trainers drawn from both organizations were trained through various capacities building workshops the ASTII Initiative. The *Oslo Manual* was the main training resource. The training workshop covered critical areas relating to innovation measurement i.e. the concept of innovation and its measurement, data processing, training exercises, the survey questionnaire and data collection simulation exercises to gauge the understanding of participants.

A total number of 25 technical staff drawn from of MoEST and KNBS participated in the training; with most of them having prior innovation survey experience from the first national innovation indicators survey. However, the actual data collection comprised of a team of 21 field personnel. The data collection personnel were organized into five teams, each with a team leader with all teams under the overall coordination of the Director of Research Management and Development in the Ministry; who is responsible for the overall implementation of the survey.

2.7. Sample Size

Innovation surveys usually require a very high response rate of 70% in order to ensure representative findings. Due to limited resources in terms of funds, personnel and time available for the survey, a stratified random sample of 2,000 firms with appropriate weights for manufacturing and other firms was obtained from KNBS, which also provided detailed documentation on the sampled enterprises (KNBS, 2014).

The sample population was classified into two broad regions; namely Nairobi region (Nairobi County and its environs and other regions (counties outside Nairobi). To avoid bias, two sets of weights were applied for the two sampling populations. To calculate the sample size representative of 18,517 firms registered in Nairobi, sampling weights of 3.7 and 35.5 were used for firms classified as manufacturing (3,618) and firms in other sectors (14,899) respectively. Therefore, sample sizes were approximately 980 (3,618/3.7) firms representing the manufacturing sector and 420 (14,899/35.5) representing firms in other sectors. In total 1,400 firms representative of 18,517 firms in Nairobi were realised.

To calculate the sample size representative of 4,247 firms registered in sectors outside Nairobi, sampling weights of 1.5 and 20 were applied for firms classified as manufacturing (640) and firms in other sectors (3,607) respectively. Sample sizes were approximated as 427 (640/1.5) firms representing the manufacturing sector and 180 (3,607/20) firms representing other sectors in counties outside Nairobi. In total, 607 firms representative of 4,247 firms in other regions were realised. The overall sample size was therefore 2,007 firms representing 22,764 enterprises in both manufacturing and other sectors in Kenya.

Subsequent confirmation of the accuracy of addresses and contact details in the sample and identification of contact persons from the 2,007 firms, all non-valid firms (i.e. branches, firms not identifiable or traceable, duplicates, and inactive entities) were removed from the sampling frame. Sampling instruments were dispatched to 700 firms that were realised.

2.8. Data Processing and Analysis

Data processing started immediately after the completion of field work. A total of 10 personnel were utilised for data processing. The completed questionnaires were serialized and coded according to the areas of coverage and later assigned the ISIC section and division codes to for ease of analysis. The Census and Survey Programme (CSPPro) was used for data capture, editing, validation and tabulation. The Statistical Package for Social Sciences (SPSS) software was also used for further analysis and tabulation.

2.9. Challenges encountered during the Survey

Several challenges encountered during the survey affected the overall response rate. Most business firms were reluctant to participate in the survey due to the perception that the survey was concerned with issues already known to the government and that previous related studies had not had any positive impact on the business environment in general. This respondent apathy was expressed in various forms ranging from total refusal to respond to the questionnaire, deliberate omission of some information especially on the firm's turnover and failure to honour appointments with the data collection personnel. Other challenges involved firms that had either relocated to other regions of the country or to other countries.



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CHAPTER THREE

RESULTS

3.0 Introduction

The following results show various innovation indicators obtained from firms sampled for the survey.

3.1 Characteristics of Survey Enterprises

For the purpose of the survey, data on the enterprises' subsidiaries or parent enterprises outside Kenya were not considered for this survey. Therefore, the results presented in this chapter only concern enterprises within Kenya. The survey mostly covered small and medium enterprises, 32% of which were under common ownership.

The survey established that Kenyan enterprises sold their goods and services in the following geographic markets; Kenya (47.2%), East African region (23.2%),

rest of Africa (10.5%), Europe (7.3%), North America (4.1%), South America (1.8%) and Asia (5.9%). The findings indicate that Kenya and the East African Community constituted the largest geographic market (70%) for innovative and non-innovative enterprises (Figure 3.1).

There was a drastic decline in the proportion of firms that sell goods or services in South and North America. These findings could be attributed to inadequate capability of the surveyed enterprises to position themselves as strong and competitive players in the global arena. Further, the fact that both innovative and non-innovative firms were at par in terms of access to markets could be a pointer that the innovative activities reported by these enterprises were not specifically for implementation of new goods or services.

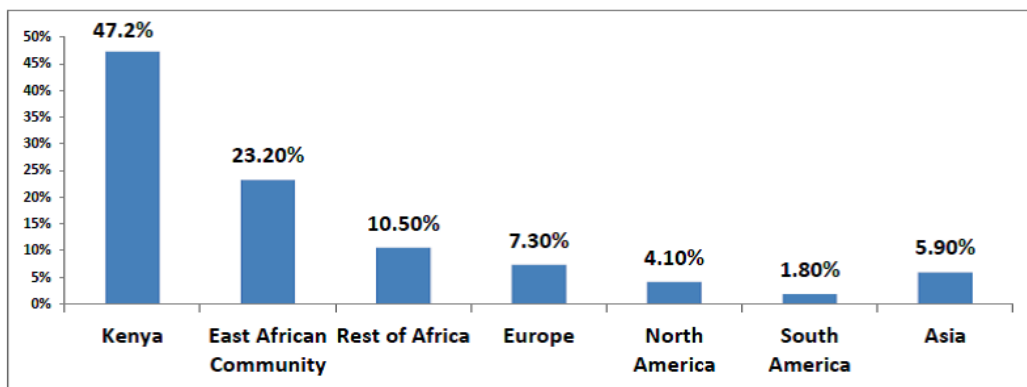


Figure 3.1: Geographic Markets for Innovative Enterprises

Of all the employees working in firms that were surveyed, 26% had a university degree, 34% had diplomas and 40% had certificates in craft and technical skills. The results suggest that firms in all sectors prefer to hire staff with diploma and certificate qualifications (74% of the labour force) hence leading to the present exponential expansion of middle level colleges across the country. The percentage of employees for the year 2012, 2013 and 2014 was 49%, 53% and 55% respectively for firms in the wholesale and retail sector. This is in line with Kenya's growth in the technical education sub-sector where currently the number of institutions offering certificate and diploma courses stands at 64. Simultaneously, 60 more institutions are under construction

that will admit students from early 2016.

In addition, 70 more institutions are earmarked for construction. The percentages of employees in other sectors for 2012, 2013 and 2014 were: hospitality (22%, 20% & 21%), ICT, (22%, 20% & 21%) manufacturing (14%, 12%, & 12%) and financial (9%, 8% & 8%), respectively. The other sectors constituted less than 2% of the total employees. Large enterprises employed the highest number of employees reaching the peak at the end of 2014. However, the number of employees in micro, small and medium enterprises stagnated during the same period (Figure 3.2).

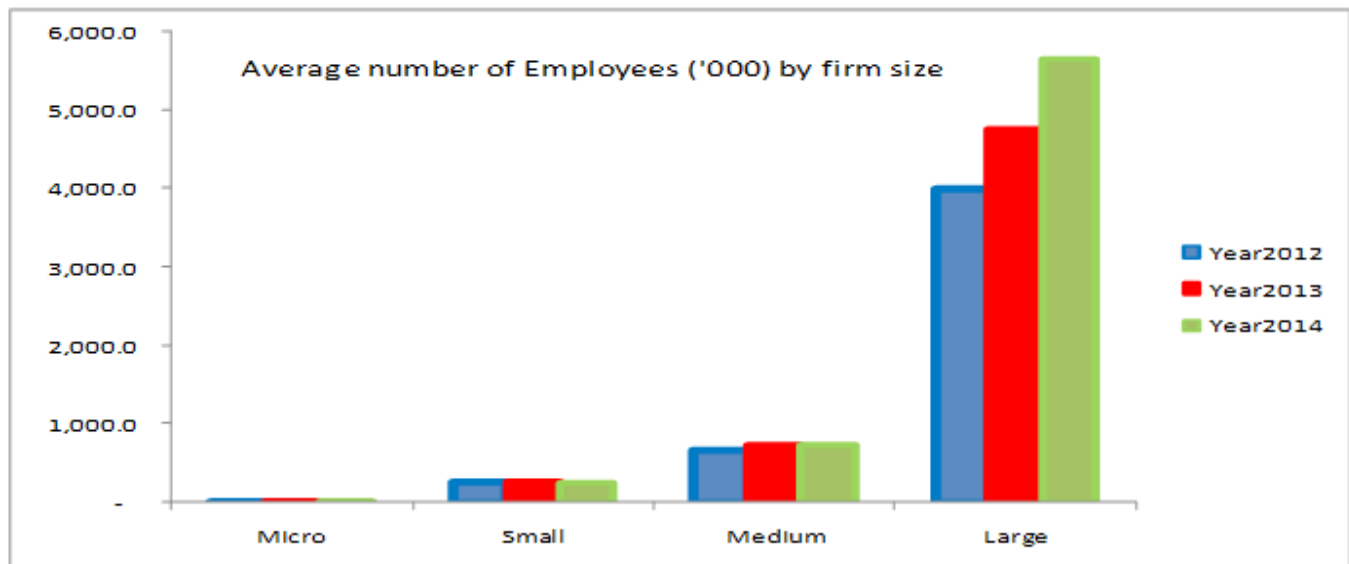


Figure 3.2: Average Annual Number of Employees by Firm Size.

3.2. Types of Innovation, Novelty and Innovation Intensity

About 52% of the firms surveyed introduced goods and services that were new to the market while 12% of the firms introduced goods and services that were new to the world. Products innovations developed competitors were implemented by 83% of the firms. Forty one percent of the enterprises implemented or used new or significantly improved processes or methods of manufacturing goods and services. This was followed by 40.7% of firms that utilized new or significantly improved supporting activities and 39.2% that used new or significantly improved logistics, delivery or distribution methods. A number of the innovations were new to the enterprises, but were not necessarily new to the industry sectors or markets. To avoid double coverage, purely organizational innovations like changes in firm structure or management practice impacting on the final product were excluded. Consequently the percentage of innovative firms was found to be less than 50% of the surveyed firms. Therefore, the level of methods of manufacturing/producing goods or services, new or significantly improved logistics, delivery or distribution methods; and new or significantly improved supporting activities was approximately 40%.

During 2012 to 2014, about 43.9% of the firms introduced new or significantly improved goods, while 46.4% of the firms introduced new or significantly improved services (product innovations). Also, the survey established that 79% of the process innovations were new to the firms, 41% were new to the market while only 6% were new to the world. This means that most firms prefer to use processes or methods that are already available from other enterprises in their markets in producing and distributing goods or

services and undertaking other supporting activities. As an upshot of process innovations, firms mostly claimed gains in increased capacity of production and provision of services, improved flexibility in their production, reduction in labour cost and reduction in the uptake of material and energy per unit output. As a result of innovation, firms benefited from reduction in environmental impacts, meeting governmental standards and addressing social issues.

The survey established that most of the firms (68.6%), while implementing organizational innovations, also carried out new or significant improvements in work responsibilities and decision-making. This entailed issues like the first use of a new system of organizing employee responsibilities, team work, decentralization, and integrating/de-integrating different departments or activities and education/training systems. The implementation of new business practices for organizing procedures i.e. aspects pertaining to supply chain management, business re-engineering, knowledge management, lean production, quality management among others were reported by 49.1% of the firms. Comparatively, a small proportion of the firms (42.5%) implemented new methods of organizing external relations with other firms or public institutions, for example, the first use of alliances, partnerships, outsourcing or sub-contracting among others.

Under marketing innovation, 40.4% of the firms implemented significant changes to the design or packaging of goods or services while 43.4% implemented new or significant changes to their sales or distribution methods. It was established that 63% of the firms carried out organizational and market innovations to improve the quality of their products and services while 54.2% wanted to reduce

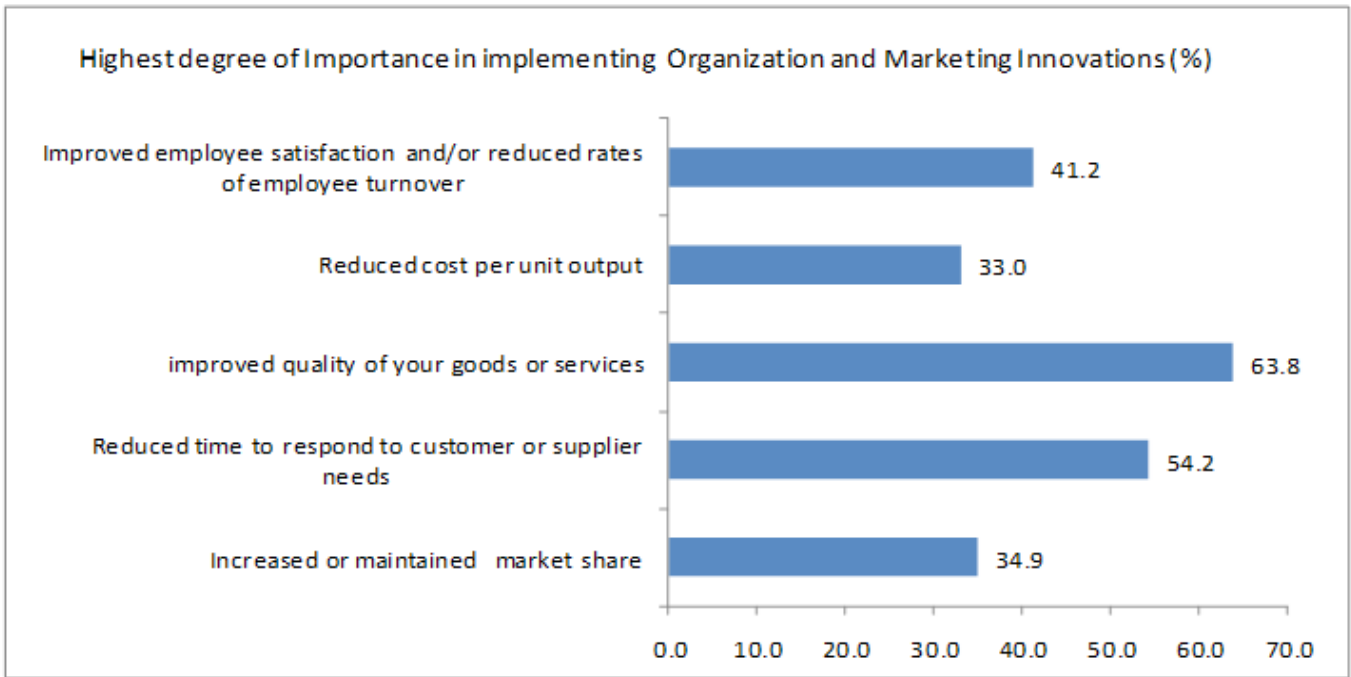


Figure 3.3: Motivating Factors for Organization and Marketing Innovations.

on the time used in addressing the needs of their customers and suppliers (Figure 3.3). The innovation intensity over reference period 2012 to 2014 was 45%.

This figure compares favorably with the World Bank enterprise survey over the 2010 to 2012 reference period that established the innovation intensity to be at 53%. It should be noted that the two surveys did not involve exactly the same firms and that there was a significant difference on sectoral emphasis.

3.3. Cooperation and Partners

There was minimal cooperation by firms in developing both product and process innovations. The development of innovations was undertaken either independently by adapting or modifying products originally developed by other enterprises or by cooperating with other enterprises, universities and research institutes. A majority of enterprises implemented product (56.2%) and process (50.4%) innovations independently (Figure 3.4).

Furthermore, the survey established that only 2.7% of the enterprises cooperated with universities and research institutions in implementing product innovations.

Inadequate cooperation with knowledge-based institutions contributes to low absorption of new technologies and low levels of innovativeness in these institutions. These findings suggest the existence of low levels of linkage or collaboration between enterprises and universities/research institution.

Therefore, the much vouched for Triple-helix Model

for collaboration involving academia/research institutions, the private sector and Government has not picked up. For enterprises to register 50.4% on stand-alone process innovation, it means they prefer undertaking process innovations alone. They hardly collaborate with universities and other institutions. It can also be stated that making new collaborations and attracting funding from elsewhere are not the strong points of innovative firms in Kenya.

Most firms cooperated with partners from Kenya, with very low level cooperation beyond national borders. Collaborations within the East African Community were equally low despite the ongoing regional economic integration process (Figure 3.5). However, within Kenya, the firms mostly collaborate with competitors of other enterprises within the same sector (84%); followed by government or public research institutions (75%) and consultants, commercial labs or private R&D institutes (64%). More than half of the firms indicated to have cooperated with universities or other higher education institutions whereas suppliers of equipment, materials, components or software cooperated with 32% of the firms.

Most firms cooperated with suppliers of equipment, materials and components of software from Asia (14%) and Europe (12%) compared to those from Africa (15%), North America (<4%) and South America (<4%). These results confirm the increased importation of technologies from Asia, but at the same point towards the need for East African countries to accelerate regional economic integration especially in regard to the implementation of protocols governing regional trade and free movement of labour and capital.

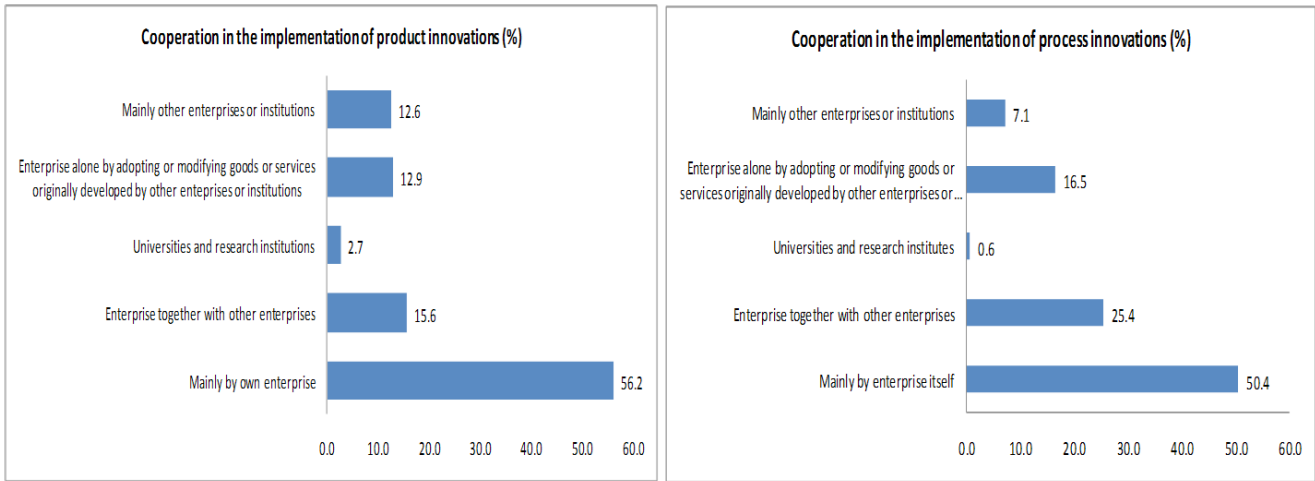


Figure 3.4: Cooperation in the Implementation of Product (A) and Process (B) Innovations

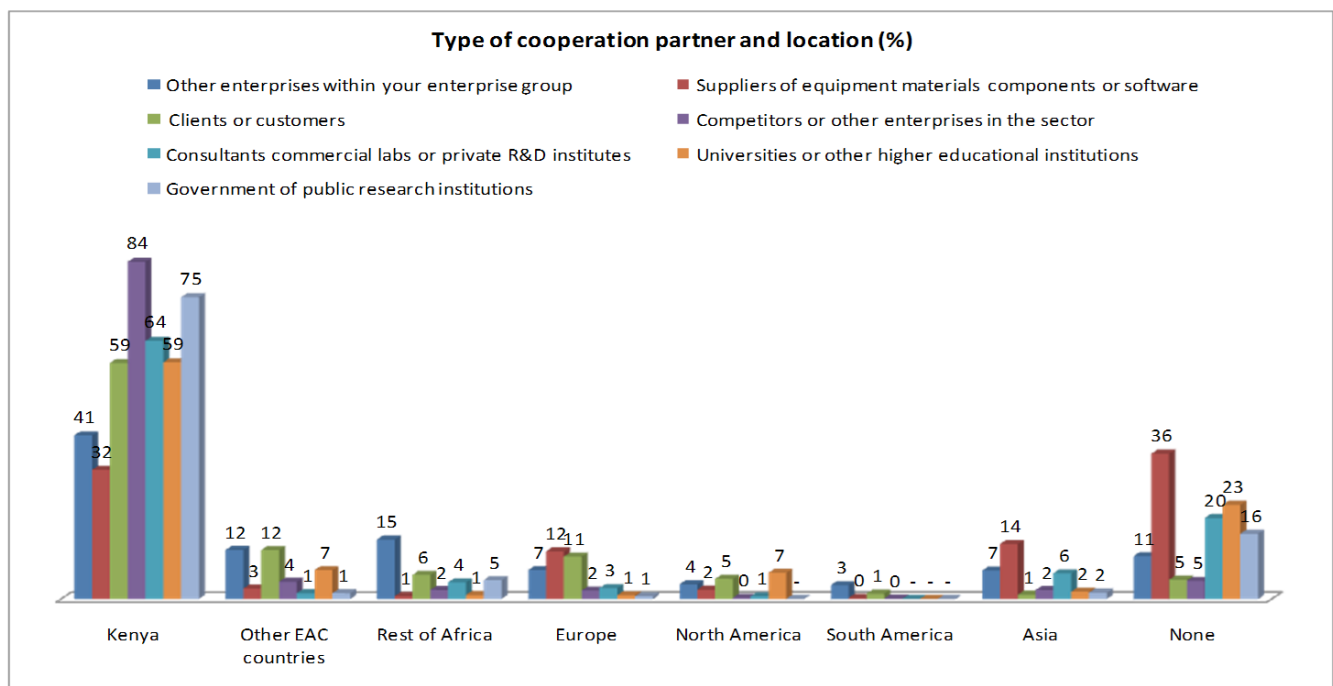


Figure 3.5: Cooperation and partnerships on innovation activities

3.4. Innovation and Financial Turnover

Contrary to the international standards of practice where the assessment of firm size is based on the workforce, turnover data in this survey was informed by the respondents. The goods and services that remained unchanged over the survey period accounted for 45% of the turnover. This was followed by goods and services that were marginally modified (27%), goods and services that were both new to the firm (11%) and new to the market (17%).

The results indicate that most of the firms continued to sell goods and services that were established in the market since they contributed a bigger share of their total turnover than those that were innovations (new or significantly modified goods and services).

The financial and insurance activities sector had

the largest proportion (52%) of the total financial turnover from 2012 to 2014. There was a 50-56% turnover growth by the end of 2014. Specifically, the financial sector had the highest turnover rate of 50%, 51% & 56%, followed by hospitality (21%, 21% & 19%), ICT (21%, 21% & 19%), whole sale and retail (5%, 5% & 4%) and manufacturing (2%, 2% & 17%) for 2012, 2013 and 2014 respectively.

From these results, the financial sector had the highest productivity which suggests it was basically driven by technological advancements and innovations, since with a lean number of employees, financial firms have drastically enhanced their ability to provide a wide range of services.

Large-sized firms accounted for considerable growth of the average annual financial turnover over the survey period (Table 3.1). On the contrary, the micro, small and medium enterprises (MSMEs) show insignificant growth in terms of average annual financial turnover. The combined average annual financial turnover for the MSMEs is less than 20 Billion Kenya Shillings. This is an issue of concern because MSMEs contribute significant employment opportunities for the Kenyan population.

Table 3.1: Average Annual Turnover by Firm Size

Category of the Firm	2012	2013	2014
Micro	6,997,778,457	8,942,311,434	10,798,905,558
Small	1,076,845,452,307	1,196,944,055,782	1,159,842,977,220
Medium	1,860,642,202,448	1,861,320,357,786	1,839,689,155,268
Large	84,117,836,301,689	98,500,004,459,220	129,859,932,986,638

3.5. Status of Innovation Projects, Information Sources and Expenditures

At the end of the year 2014, about 40% of the firms were still implementing some innovation activities to support the development of innovations. The innovation activities covered acquisition of machinery equipment, software and licenses, engineering and development work, training, marketing and research in addition to R&D. About 12% of the firms reported to have abandoned innovation projects before their completion planned for the development of product or process innovations. About 20.7% of the firms had innovation projects abandoned at concept stage, 17.8% of the firms had innovation projects abandoned after initiation while 38.8% of the firms had their innovation projects seriously delayed.

Out of 36% of the firms that cooperated in implementing innovation activities, 64.4% relied on sources within the enterprise or enterprise group as highly important sources of information for new innovation activities or projects (Figure 3.6).

Generally, there was more preference by firms to use internal and market sources as their most preferred sources of information with a high impact to their innovation activities. On the other hand, the uptake of information from consultants, commercial laboratories or private R&D institutions were lowly ranked at 18% whereas suppliers of equipment, materials, components and software were rated at 43%. The survey also established that firms did not source a lot of information from institutions. Thus, 12% of the firms utilized information sources from universities and other institutions of higher learning, while 16% used information from government or public research institutes (Figure 3.6).

Out of the firms engaged in innovation activities, a majority of firms (80%) had internal and external training as their most important innovation activity (Figure 3.7A). The aim was to build requisite human resource capacity needed for development and/or introduction of new or significantly improved products and processes.

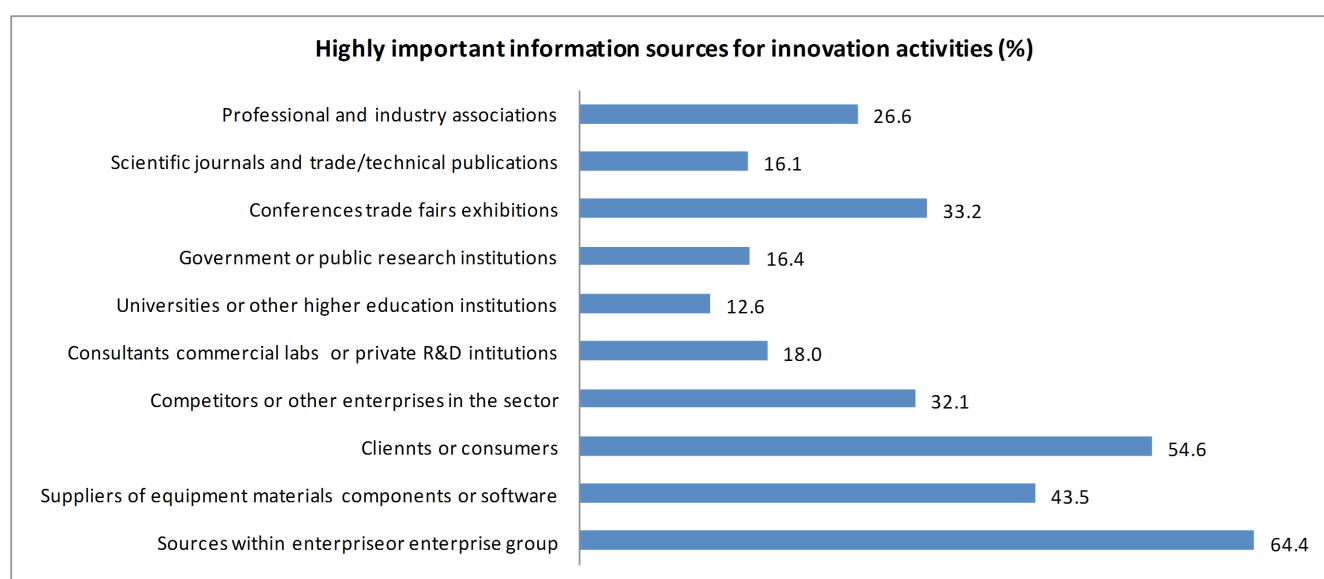


Figure 3.6: Highly Important Information Sources for Innovation Activities

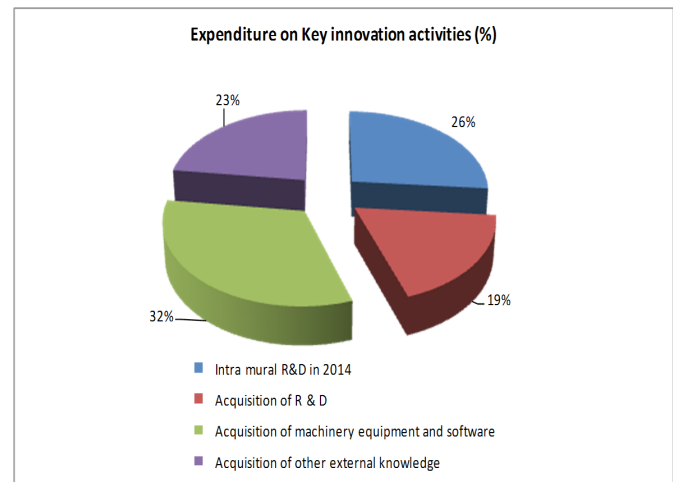
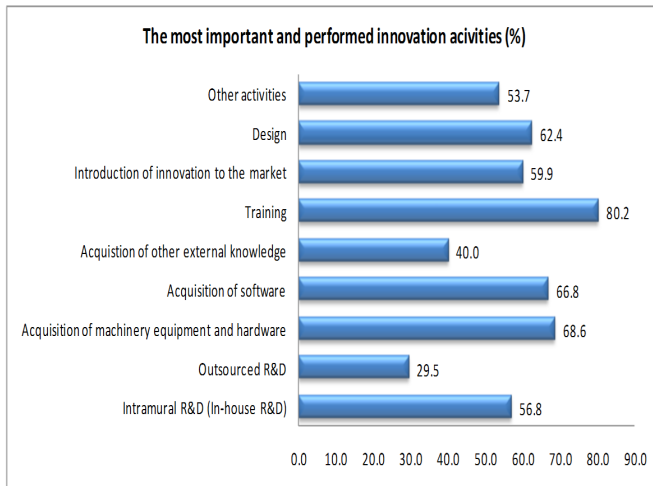


Figure 3.7: Distribution of the most Important activities performed (A) and firms' expenditure on Innovation activities (B)

In terms of R&D, in-house R&D was performed by 56.8% of the firms while outsourced R&D (29.5%) was the least performed innovation activity among innovative firms (Figure 3.7A). This scenario could be attributed to the fact that since R&D is an expensive undertaking, majority of the firms have established in-house R&D units to cut on the high costs associated with outsourcing this function to other agencies like universities and public research institutions. Thus, these findings further support the existence of weak linkages between universities, research institutions and firms which are the net consumers of R&D outputs. With regards to expenditures on key innovation activities, majority of firms devoted about 32% of their income towards the acquisition of machinery, equipment and software (Figure 3.7B). Firms spend the least amount of revenue (19%) on acquisition of R&D.

Majority of the firms indicated that they did not receive public financial support for innovation activities. Less than 5% of firms receive financial support from public sources particularly county governments (1.3%), national government (0.9%) and national funding agencies (0.7%). Approximately 4.2% of firms indicated foreign governments and other foreign entities as their sources of financial support for innovation activities.

It is apparent that financial support facilities designed to support firms in terms of tax credits or deductions, grants, subsidized loans, and loan grants from county and national governments and national funding agencies are inadequate. Few firms (1%) indicated having received support from these sources. Therefore, there is a need for the government at all levels to design public financial instruments to support the growth and development of innovation at firm level.

3.6. Objectives and Outcomes of Innovation

Kenyan firms that engaged in product and process innovations during 2012 to 2014 were motivated by various objectives (Figure 3.8A). The most important objective for firms that implemented product and process innovations was to improve the quality of goods or services (73.6%), followed by increasing the range of goods and services (60.4%) as well as to replace outdated products (60.4%). The least important objective was to reduce production costs per unit output (33.9%).

For product and process innovations, there were varying effects and outcomes of innovation during 2012 to 2014 (Figure 3.8B).

Effects were broadly categorized into product-oriented, process-oriented and other effects. These were further broken down into specific outcomes for each effect. The highest outcome achieved during the survey period was improved quality of goods or services (61.1%) (Figure 3.8B). This was followed by improved flexibility of production or service provision (54.3%), increased range of goods or services (53.5%) and met government regulatory requirements (53.1%). There was less success from increased capacity of production or service provision (48.3%) and improved working conditions (42.8%). Success from outcomes of reduced environmental impact (35%) and reduced production costs per unit of labour, materials and energy (34%) were low. The least successful product and process innovation outcomes were increased market share (29.5%) and entry to new markets (24.7%).

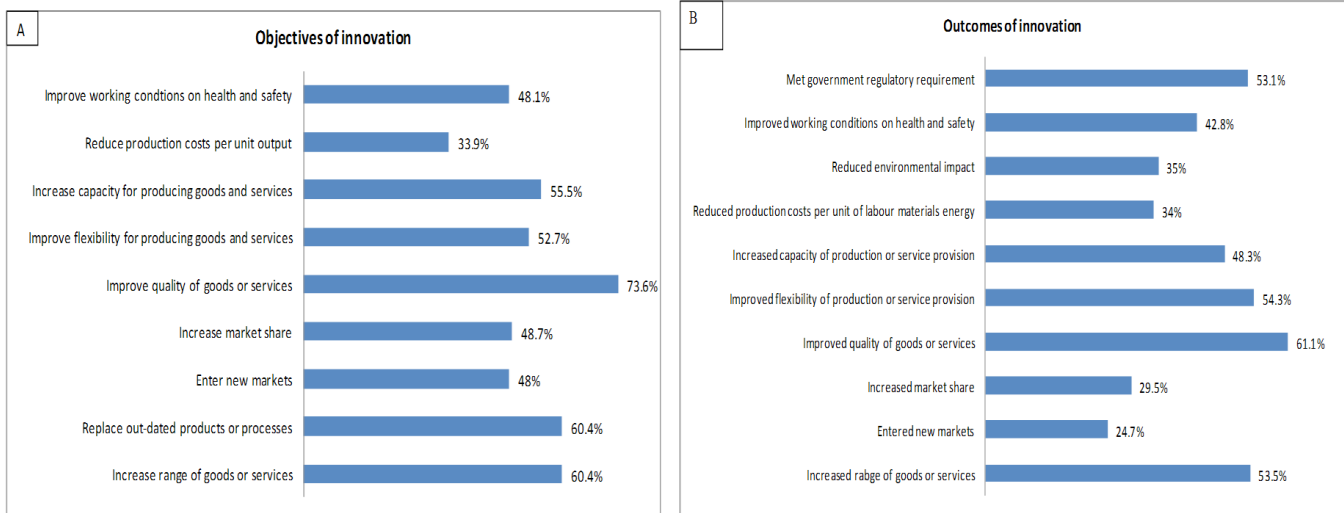


Figure 3.8: Highly important objectives for Innovation (A) and outcomes for Innovation (B)

3.7. Factors hampering Innovation Activities

Several factors were indicated by firms to have hampered their innovation activities as shown in Figure 3.9. These factors were broadly categorized as cost, knowledge, market, other general factors as well as the lack of need to innovate.

Among the key factors that hampered innovation activities were reported to be high costs associated with innovation activities (41.8%) and lack of funds within the enterprise group (40.7%). The market being dominated by established enterprises (33.3%) and lack of funds from sources outside the enterprise group (30.6%) were equally important hampering factors.

In addition, other factors were established as follows: innovation is easy to imitate (28.8%), economic risk is perceived as excessive (27.9%) and there is an uncertain demand for goods and services (22.3%), organizational rigidities within the enterprise (17.1%), lack of qualified personnel (17.0%), difficulty in finding co-operation partners for innovation (13.8%), insufficient flexibilities of regulations and standards (13.4%) and limitation of science and technology policies (10.8%). On the other hand, factors that least hampered innovation activities were reported as follows: no need to innovate due to prior innovations (7.7%), lack of information on technology (7.6%) and no need to innovate due to lack of demand for innovations (7.2%).

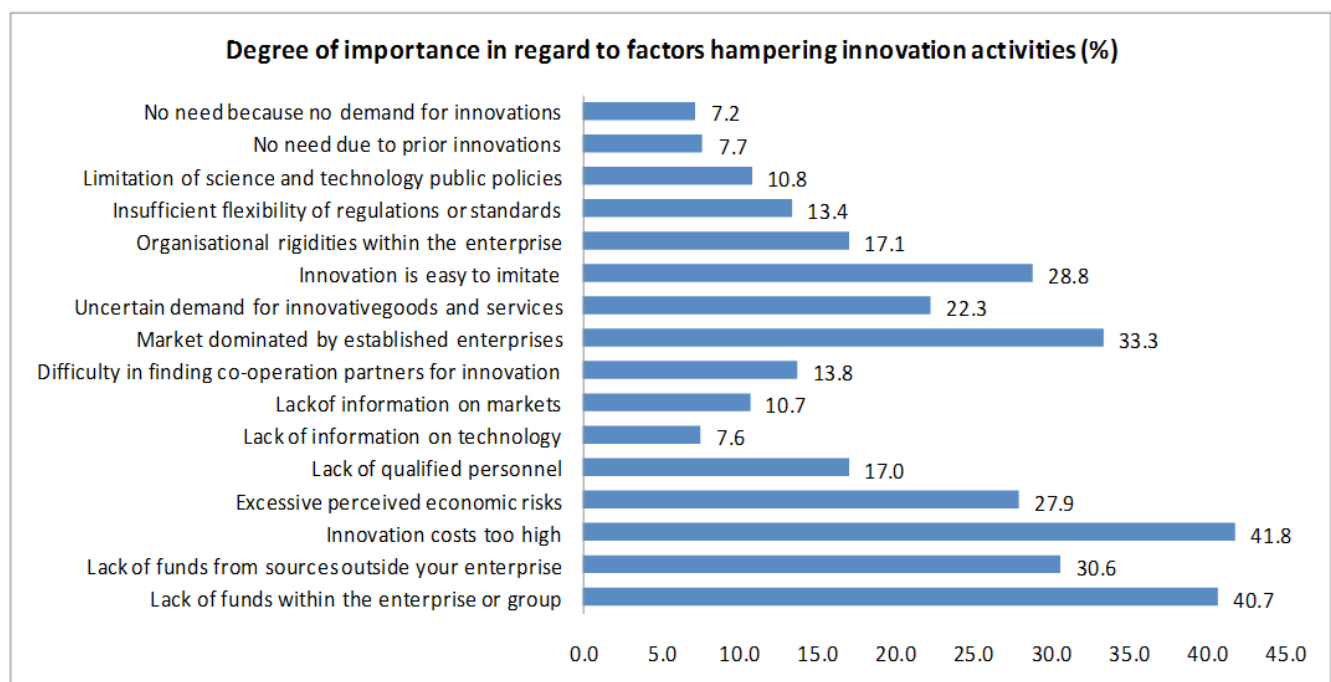


Figure 3.9: Degree of importance of factors hampering innovation

3.8. Intellectual Property Rights

Intellectual Property Rights (IPRs) create ownership of intellectual property by giving innovators the legally enforceable power to prevent others from using an intellectual creation or to set the terms on which it can be used. That is, IPRs encourage innovation by granting successful inventors temporary monopoly power over their innovations. The consequent monopoly profits provide the return on successful investment in R&D (Breitwieser & Foster, 2012).

The survey established that the intellectual property rights incidence was relatively low as shown in Figure 3.23 below. Most of the firms (25.5%) reported to have of registered a trademark while 18.1% of the firms secured patents in Kenya. Those that claimed copyrights stood at 12.1% whereas 10.2% registered industrial designs. It was generally established that less than 10% of the firms had applied for a patent outside Kenya, secured a utility model or granted a license on innovation-related IPRs (Figure 3.10).

In recognizing the potential benefits of stronger IPRs protection, Kenya has made progress in improving its IPRs protection regime. In 2008, the Kenyan Parliament enacted the Anti-Counterfeit Act which established the Anti-Counterfeiting Agency. Kenya has also taken steps at regional and international levels through its commitment to several IPRs regimes; but challenges in enforcement remain.

The International Chamber of Commerce (ICC) reports that the strength of a country's IPR regime is one of the factors influencing decision of producers and firms to transfer technology or invest in a country. For example, the OECD has found that the strength of a country's patent rights is positively correlated to inward Foreign Direct Investment (FDI), holding other factors constant. Economists found that a 1% increase in a country's patent protection correlates to a 2.8% increase in FDI, and a 1% improvement in trademark and copyright protection increases FDI by 3.8% and 6.8%, respectively. According to a series of studies, a weak IPR environment reduces investment in the computer software and pharmaceutical sectors and it presents a significant barrier to international technology licensing. At least 25% of American, German, and Japanese high-tech firms refused to invest directly or through joint ventures in developing countries with weak IPRs (Mansfield, 1995; Lee and Mansfield, 1996). Multinational firms are more likely to export, increase sales from existing foreign operations, increase investment, and transfer technology directly in response to stronger IPRs, as an important complement to market liberalization, technology development and competition policies (Maskus, 2000).

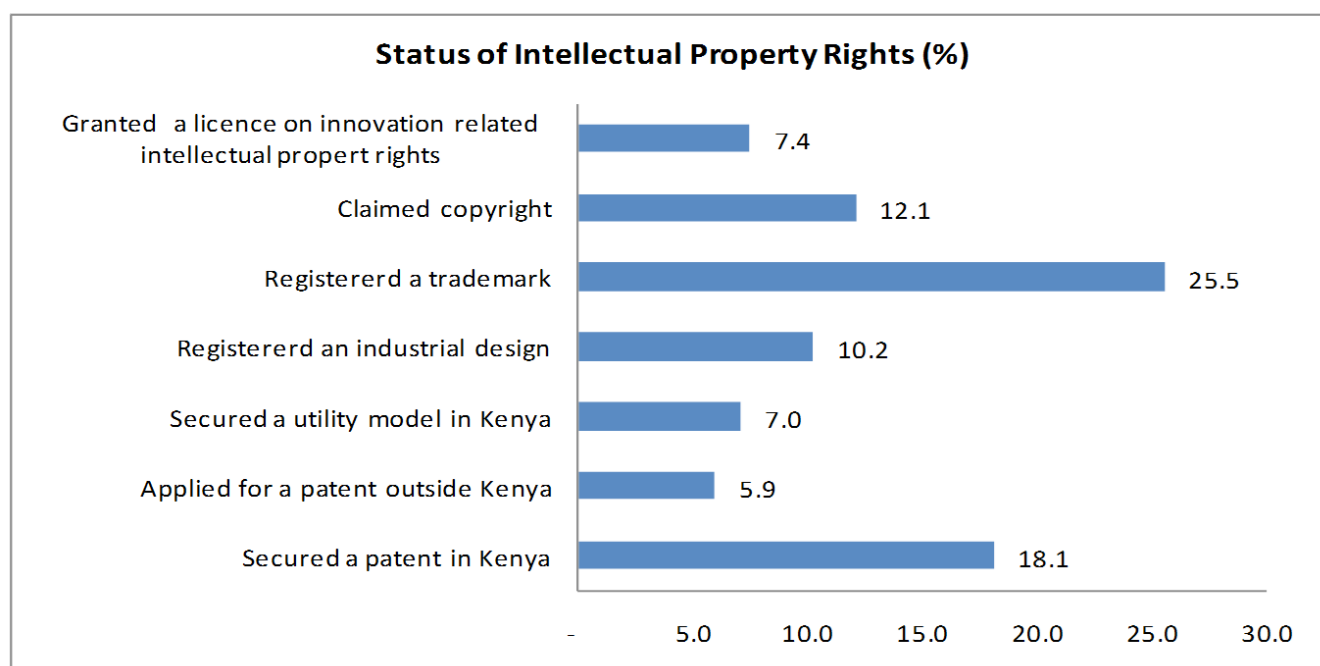


Figure 3.10: Status of intellectual property rights

CHAPTER FOUR

PAST AND PRESENT INNOVATION TRENDS

Kenya, like a number of African countries, has recognized the need for an effective national ST&I system of indicators to support evidence-based policy formulation for national development. Kenya's participation in the ASTII Initiative has strengthened its capacity to conduct regular ST&I indicators surveys as a way of monitoring and evaluating of progress attained in achieving national development goals. The measurement of innovation in Kenya as presented in the first national innovation survey of 2012 and the second survey of 2015 provides significant trends in key sectors with regard to innovation capacity of the country and its implications to the attainment of Kenya Vision 2030 development goals. These trends are important in understanding the status of innovation in Kenya and its impact on economic growth and therefore inform the development of targeted policy interventions to stimulate and accelerate innovation in Kenya.

The innovation intensity for Kenya during the 2012 survey was 89.9% whereas in 2015 it was established at 45%. This large difference could attribute to improvement in measurement by minimizing over-measuring. The innovation intensity of 2015 compares favourably to the World Bank Enterprise Survey (2013) and its linked innovation module over the 2010 to 2012 reference period; the innovation intensity was established to be 53%. It is therefore necessary to continuously improve innovation measurement in Kenya and achieve stability in the long run in order to accurately measure and track the contribution of innovation to economic growth.

The trends show that Kenya and the EAC are major for geographic markets for the sale of goods and services by business enterprises being markets for both innovative and non-innovative firms. From 2012 to 2014 the average employees' growth in large firms was more than that realized by the MSMEs. The number of employees with university degrees in business enterprises continues to be minimal at slightly more than a quarter of the total employees (>25%) while about 75% of the employees possess technical (diplomas/certificates) qualifications. In both the 2012 and 2015 innovation surveys, the finance and insurance sector registered the highest gross financial turnover (52%) and the sector also

registered a steady increase in growth changes over the survey period. This trend is a result of financial deepening policies and strategies instituted by the Government in addition to the stiff competition in the financial and insurance sector where innovation is a key driver for competitiveness. Thus, through innovation, the sector is able to rapidly increase its financial transaction volumes.

The 2012 survey established that in regard to product innovations, goods were more than services whereas the 2015 shows that service innovations exceeded goods. This is due to the rapid growth in of services sectors, which is the major contributor to GDPs as evident in most African countries. Product innovations are mainly development-oriented and sustained by individual firms. It is also worth noting that the modification of goods or services developed by other enterprises was higher in 2015 than 2012. Furthermore, there was more firm-level co-operation with firms within Kenya for product innovations as compared to the rest of Africa and the world. The low external cooperation among Kenyan firms calls for more exposure through exhibitions and technology exchange initiatives to increase cooperation opportunities.

Regarding knowledge diffusion and information exchange, both the 2012 and 2015 surveys show that Kenyan universities and research institutions offered inadequate contribution that could drive firm-level innovation. Training was the most important performed innovation activity, followed by the acquisition of machinery/equipment and software according to the 2015 survey. However, the acquisition of machinery, equipment and software comprised the highest expenditure (39.7% of the turnover in 2012 and 32% in 2015). In 2015, expenditure on in-house R&D accounted for 26% and 19% for outsourced R&D. The acquisition of other external knowledge consumed 23% of the total turnover.

Inadequate financial assistance to firms is a persistent problem and the situation has not changed since 2015. A small proportion of the firms (less than 5%) indicated having received financial support from existing local mechanisms.

Generally, one percent of the firms received financial support from facilities such as tax credits or deductions, grants, subsidized loans, and loan grants designed to support local firms. Similarly, 4.2% of the firms' received financial support from foreign sources. However, the 2012 survey results indicated that 40.4% of the firms received financial support from foreign sources, 30.8% were supported by government sources. Further, in 2012, 50% of innovation projects were seriously delayed, 34% were abandoned at concept stage while 31% were abandoned after the project begun. On the other hand, in 2015, 38.8% of the projects were seriously delayed, 20.7% were abandoned at concept stage while 17.8% were abandoned after initiation.

In 2012, firms mainly relied on market sources (suppliers, clients/customers, competitors and consultants) for information and ideas to support their innovation initiatives and clients/customers were the most important sources (62%). The 2015 indicates that information sources within enterprises and by extension the associated enterprise groups were the highly important a reported by 64.4 % of the firms whereas clients/customers were valued by 54.6% of the firms. This shows a slight shift regarding how the firms made use of various information sources. However, in 2012 and 2015, universities or institutions of higher learning were highly ranked sources of information by 16.4% and 12.6% of the firms, respectively,

while public research institutions were ranked by 20.5% and 16.4% of the firms, respectively, as highly important sources of information and ideas to support firm-level innovation activities. This trend indicates weak linkages among key players within the innovation system.

The most important objective that drives firms to innovate has remained the same in 2012 and 2015; this being improvement in the quality of products or services as reported by 69.5% and 73.6% of the firms, respectively. Additionally, in 2012 and 2015, reducing production costs per unit output was considered a highly important objective by 45.5% and 33.9 % of the firms, respectively. Similarly, in 2012 and 2015, improved quality of goods or services (36.2%) was also ranked by most firms as highly important whereas entering new markets was considered by the least important outcome of innovation by 24.7% of the firms.

In regard to factors hampering innovation, the trend remains the same where cost and funding remained critical. Similarly, most firms were keen to innovate despite uncertainty concerning demand for innovations. The use of Intellectual Property Rights (IPR) has remained relatively low in 2012 and 2015 at an average of about 14% and 12%, respectively. The use of trademarks (about 27% in 2012 and 26% in 2015) is the most common form of IPR protection.



Photo credit: Henry Kidiavai, NACOSTI

CHAPTER FIVE

CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Conclusions

The 2015 innovation survey indicates that there was overall improvement in the measurement of innovation. A total of 700 firms were targeted for the survey compared to 293 firms in 2012 with an average response rate of 54%. Due to the improvement in the measurement, the innovation intensity established to be 45% which compares favourably by the World Bank Enterprise Survey 2013. This is a clear trend that there is need to continuously refine the measurement and also the involvement of more key stakeholders that include the Government, academia and industry.

Innovation in Kenyan firms is largely incremental and has minimal effect on the performance of the firms in terms of productivity. Thus, the average annual MSMEs turnover from innovative goods and services did not significantly contribute to an increase in turnover from innovation. However, the greatest proportion of turnover was realized from goods and services that remained unchanged over the survey period. This shows that most MSMEs undertake survival innovative activities rather than those aimed at enhancing their growth and competitiveness.

Generally, there is no significant change in the innovation indicators since the first innovation survey undertaken in 2012. Most of the barriers to innovation still remain. These barriers include inadequate public financial support, high costs to undertake innovation activities and general lack of funding for the enterprises to engage in innovation activities. Further, public financial incentive mechanisms that include tax credits or deductions, grants, subsidized loans, and loan guarantees among others are grossly inadequate and about 5% of the firms benefited. In addition, enterprises have continued to rely on their internal sources and feedback from clients to undertake innovation projects, whereas, the academia and public research institutions play an insignificant role in terms of providing knowledge to drive innovation in industry.

The uptake of IPR is very low at about 12% and the use of trademarks is the predominant form of IPR. Despite the strengthening of the IPR regime in Kenya through the establishment of the Anti-Counterfeit Act, enforcement remains a big challenge. This situation is likely to have a negative impact in regard

to the willingness of high-tech firms from developed countries to invest directly or through joint ventures if the IPR regime is not adequately strengthened.

It is worth noting that the overall innovation ecosystem is undergoing reforms. One of these reforms is the development of the National ICT Master Plan 2013–2018 that is expected to play a vital role in harnessing innovations based on deployed digital infrastructure. The success of these reforms will largely depend on policy coherence—in particular those aimed at enhancing education and skills, foreign investment and international trade. In addition, priorities for dedicated innovation policies should focus on linking business and knowledge-based institutions, capture and maximize positive spillovers to the local economy and to steer innovation and research towards finding context-specific solutions to local socio-economic challenges.

5.2 Policy Recommendations

Based on the findings of the Second National Innovation Indicators Survey 2015, the following policy recommendations are proposed:

Given the significant role of innovation in economic development as envisaged in the Kenya Vision 2030, the Government with other stakeholders (business community, research and academia) should embark on measuring the impact of innovation on the economy particularly in terms of productivity growth and enhanced competitiveness.

1. Develop and implement a national innovation support framework to ensure growth and survival of high-technology innovative firms across all sectors with special emphasis on MSMEs.
2. Identify and recognize innovative firms as a way of promoting innovation.
3. Identify and promote indigenous knowledge to spur innovation.
4. Promote skills-based training in cooperation with the industry.
5. Strengthen the Intellectual Property Rights (IPR) regime to encourage technology transfer through foreign direct investments.

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REPUBLIC OF KENYA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

NATIONAL INNOVATION SURVEY 2015

SCIENCE TECHNOLOGY AND INNOVATION INDICATORS INITIATIVE



About this survey

This survey collects information about product and process innovations as well as organisational and marketing innovation covering the period **2012 to 2014**.

Scope

The statistical unit for the survey is the **enterprise**.

Authority

The Ministry of Education Science and Technology (MoEST) 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 with **utmost confidence**. Under no circumstances will MoEST 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:

Name	Telephone	E-mail
Director, Directorate of Research Management & Development (DRMD)	+254 20 2219420	directordrmd@scienceandtechnology.go.ke
Cecilia K. Nzau	+254 722 380778	nzau@scienceandtechnology.go.ke or nzaucecilia@yahoo.com
Richard Mavisi Liahona	+254 720 877502	mavisi@scienceandtechnology.go.ke or mliahona@yahoo.com

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

1.0.	Name of enterprise: Year of establishment: Physical Address: Telephone: Email:		
1.1	Main economic activity : Short description of your main economic activity:		

FOR OFFICIAL USE:			
ISIC Section name and Code:			
ISIC Division name and Code:			

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?			

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

1.3	In which geographic markets did your enterprise sell goods or services during the period (2012 to 2014)?	Yes	No	Specify the product (Optional)
	Kenya			
	East African Community			
	Rest of Africa			
	Europe			
	North America			
	South America			
	Asia			

1.4	What was your enterprise's annual total number of employees for the period 2012 to 2014 ? 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.	
	2012	
	2013	
	2014	

1.4.1	What was the number of employees in 2014 with:	
a	University degree	
b	Diploma Certificates	
c	Technical Certificates including Craft	

1.5	What was your enterprise's approximate financial turnover for 2012 to 2014 ?
	2012 KSh.
	2013 KSh.
	2014 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 (2012 to 2014), 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 who were these product (goods and services) innovations developed?				
	1. Mainly your own enterprise				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.)				
	3. Universities and research institutes				
	4. Your enterprise alone by adapting or modifying goods or services originally developed by other enterprises or institutions				
	5. Mainly other enterprises or institutions				
2.2.1	Where did these product Innovations originate?				
	Kenya	Yes	No	Do not know	
	Other East African Countries	Yes	No	Do not know	
	Rest of Africa	Yes	No	Do not know	
	Europe	Yes	No	Do not know	
	North America	Yes	No	Do not know	
	South America	Yes	No	Do not know	
	Asia	Yes	No	Do not know	
2 . 3	Were any of your goods and service innovations during the period (2012 to 2014):	Yes	No		
	1. New to your firm? <i>i.e Your enterprise introduced a new or significantly improved good or service that was already available from your competitors in your market.</i>				
	2. New to your market? <i>i.e Your enterprise introduced a new or significantly improved good or service onto your market before your competitors (even if it may have been available in other markets).</i>				
	3. New to the World <i>i.e Your enterprise introduced a new or significantly improved good or service for all markets and industries both domestic and international.</i>				
2 . 4	Please estimate the total turnover in 2014 of goods and service innovations introduced during 2012 to 2014 that were:	2014 Turnover distribution (KSh.)			
	1. New to your market				
	2. New to your firm				
	3. Unchanged (Include the resale of new goods or services purchased from other enterprises)				
	4. Marginally modified (Include the resale of new goods or services purchased from other enterprises)				
	Total turnover in 2014				

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 (2012 to 2014), 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.)		
	3. Universities, and research institutes		
	4. Your enterprise alone by adapting or modifying goods or services originally developed by other enterprises or institutions		
	5. Mainly other enterprises or institutions		

3.2.1	Were any of your Process innovations implemented during (2012 to 2014):	Yes	No
	1. New to your firm? i.e Your enterprise introduced a new or significantly process that was already available from your competitors in your market.		
	2. New to your market? i.e Your enterprise introduced a new or significantly improved process onto your market before your competitors (even if it may have been available in other markets).		
	3. New to the World i.e Your enterprise introduced a new or significantly improved process for all markets and industries both domestic and international.		

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 (2012 to 2014) did your enterprise have any innovation activities to develop product or process innovations:	Yes	No
	1. Abandoned before completion		
	2. Still on-going at the end of 2014		
If your enterprise also had no product or process innovations or innovation activity during 2012 to 2014 (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 (2012 to 2014), did your enterprise engage in the following innovation activities?	Yes	No
A	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:		
	a. Continuously?		
	b. Occasionally?		
B	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	Introduction of innovations to the market <i>Activities to facilitate introduction of your new or significantly improved goods and services to the market, including market research and launch advertising.</i>		
G	Design <i>Activities to design, improve or change the shape or appearance of new or significantly improved goods or services</i>		
H	Other activities <i>Implementation of new or significantly improved products and process such as feasibility studies, testing, routine software development, tooling up, industrial engineering, etc.</i>		

5.2	Please estimate the amount of expenditure in 2014 only for the first four innovation activities mentioned in 5.1 (A to D). Include personnel and related costs.	STRICTLY CONFIDENTIAL
		[KSh.]
A	(In-house) R&D in 2014. <i>Include labour costs, capital expenditures on buildings and equipment specifically for R&D.</i>	
B	Acquisition of R&D. <i>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 (2012 to 2014), did your enterprise receive any public financial support for innovation activities from the following sources?	Yes	No
	<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>		
	1.County Government		
	2.National government		
	3.National funding agencies		
	4.Foreign governments 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	<p>During the period (2012 to 2014), how important to your enterprise's innovation activities were each of the following information sources?</p> <p><i>Please identify information sources that provided information for new innovation activities/projects or contributed to the completion of existing innovation activities/projects.</i></p>							
A B C D	Information sources		Degree of importance Tick 'N/A' if no information was obtained from a source.					
			High	Medium	Low	N/A		
	Internal sources	Sources within your enterprise or enterprise group						
	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						
	Institutional sources	1. Universities or other higher education institutions						
		2. Government or public research institutes						
	Other sources	1. Conferences, trade fairs, exhibitions						
2. Scientific journals and trade/technical publications								
3. Professional and industry associations								
6.2	<p>During the period under review (2012 to 2014), did your enterprise co-operate on any of your innovation activities with other enterprises or institutions?</p> <p><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.</i></p> <p><i>Exclude pure contracting out of work with no active co-operation.</i></p>					Yes	No	
<p>If No, please go to question 7.1</p>								
6.3	<p>Please indicate the type of co-operation partner and location.</p>							
	Type of co-operation partner		Location					
		Kenya	Other EAC countries	Rest of Africa	Europe	North America	South America	Asia
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	<p>Which type of co-operation partner was the most valuable for your enterprise's innovation activities?</p> <p>Give corresponding letter from 6.3. For example, clients or customers = 'C'</p>							

PART 7: Outcomes and objectives of innovation during 2012 to 2014

7.1	<p>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 (2012 to 2014)?</p>							
	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 factors in the development of your products (goods or services) and process innovations introduced during the period (2012 to 2014)?					
	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 out-dated 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 (2012 to 2014), were any of your innovations or projects:	Yes	No
	1.Abandoned at concept stage		
	2.Abandoned after the project begun		
	3.Seriously delayed		

QUESTIONS 8.2, 9 and 10 TO BE ANSWERED BY ALL ENTERPRISES:

8.2	During the period (2012 to 2014), how important were the following factors in hampering your innovation activities or projects or influence your 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 funds 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

1. A **patent** is a right granted to the owner of an invention that prevents others from making, using, importing or selling the invention without his permission. A patentable invention can be a product or a process that gives a new technical solution to a problem.

2. **A utility model** is similar to a patent in that it provides a monopoly right for an invention. However, utility models are much cheaper to obtain, the requirements for grant of utility model are usually less stringent and the term is shorter.
3. **Industrial design** registration grants exclusive, legally-enforceable rights for a period of time that restrains others from making or selling the design without the permission of the owner. **Industrial designs** are product features that make it appealing to buyers hence gives the product a competitive edge by setting it apart from other similar products in the market
4. **A trade mark** is a sign that you can use to distinguish your business' goods or services from those of other traders.
5. **Copyright** is a legal right created by law that grants the creator of an original work exclusive rights to its use and distribution, usually for a limited time, with the intention of enabling the creator (e.g. the photographer of a photograph or the author of a book) to receive compensation for their intellectual effort.

9.1 During the period (2012 to 2014), did your enterprise:			
	1. Secure a patent in Kenya?	Yes	No
	2. Apply for a patent outside Kenya?	Yes	No
	3. Secure a utility model in Kenya?	Yes	No
	4. Register an industrial design?	Yes	No
	5. Register a trademark?	Yes	No
	6. Claim copyright?	Yes	No
	7. Grant a licence on any intellectual property rights resulting from your 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 (2012 to 2014), did your enterprise introduce:				
10.1.1	Organisational innovations			
A.	Business practices: New business practices for organising procedures (i.e. supply chain management, business re-engineering, knowledge management, lean production, quality management, etc) Exclude routine upgrades.	Yes	No	
B.	Work responsibilities and decision-making: New methods of organising work responsibilities and decision-making (i.e. first use of a new system of employee responsibilities, team work, decentralisation, integrating/de-integrating different departments or activities, education/training systems)	Yes	No	
C.	External relations: New methods of organising external relations with other firms or public institutions (i.e. first use of alliances, partnerships, outsourcing or sub-contracting, etc)	Yes	No	
10.1.2	Marketing innovations			
a.	Significant changes to the design or packaging of a good or service. Exclude routine/seasonal changes such as clothing fashions.	Yes	No	
b.	New or significantly changed sales or distribution methods, such as internet sales, franchising, direct sales or distribution licenses.	Yes	No	
10.1.3	If your enterprise introduced an organisational innovation during the period (2012 to 2014), how important were each of the following factors in the development of your innovation?			
	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			

Thank you for your participation. It is sincerely appreciated.

THE RESPONDENT

Name of Respondent:.....

Position:.....

Telephone:.....

Email Address:.....

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

THE INTERVIEWER AND TEAM LEADER

Name of interviewer:.....

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

Team Leader:

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

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