

**INTELLECTUAL PROPERTY PROTECTION AND
INNOVATION PERFORMANCE OF PHARMACEUTICAL
MANUFACTURING FIRMS IN KENYA**

IBRAHIM DAAR BULLE

**A RESEARCH PROJECT SUBMITTED IN PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF
THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION,
SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI**

NOVEMBER, 2016

DECLARATION

This research project is my original work and to the best of my knowledge has not been submitted for the award of a degree in any other university.

Signature:

Date:

IBRAHIM DAAR BULLE

D61/60699/2013

This research project has been submitted for the award of degree of master of business administration with my approval as the University Supervisor.

Signed

Date

DR. JACKSON MAALU

Department of Business Administration

School of Business

University of Nairobi

DEDICATION

This study is dedicated to my family for their love, support, encouragement and prayer which saw me through the entire course.

ACKNOWLEDGEMENTS

The journey to completion of this course has been challenging and inspiring at the same time. The successful completion of this study has been achieved by combined efforts of some other people who helped me with their various talents, instructions, experience and above all their valuable time. I wish to express my sincere gratitude to the following individuals who in one way or another gave me valuable support during the study;

I thank our Almighty God for his grace and sustenance that has seen me complete this course successfully. I want to return praise to him for the free life he has given me, wonderful opportunities that I have had, the knowledge to share with others and the strength to write this research project. My sincere appreciation is extended to my family members for being respectful to and patient with me while pre-occupied with the entire Masters in Business Administration course.

I am extremely grateful to my Supervisor, Dr. Jackson Maalu for his invaluable advice, suggestions, criticisms and encouragements that he gave me during the research period. I sincerely thank him for creating time to ensure that not only did I get the best out of the research but also to anyone who reads this report. I am indebted to the University of Nairobi for accepting me to the Masters program in Business Administration, School of Business. Please keep up the good works.

ABSTRACT

The pharmaceutical manufacturing industry has significantly embraced the importance of intellectual property asset. This is due to the need to sustain competitive advantage and the fact that the industry is largely knowledge-intensive. The study was aimed to establish the practice of Intellectual Property protection by the pharmaceutical manufacturers in Kenya and to determine the relationship between Intellectual Property protection and innovation performance in the pharmaceutical manufacturing industry in Kenya. The study is based on four main theories namely utilitarian theory of intellectual property, theory of innovation, dynamic capabilities theory and theory of competition. The study involved a descriptive research design. The study targeted all pharmaceutical manufacturing firms listed by the pharmaceutical society of Kenya. Primary data was used in the study. The study used a structured questionnaire to collect the needed data. The questionnaire had three parts to help address the study objectives. Data analysis was guided by the research objectives. Data from the questionnaire was edited, coded and analyzed. Descriptive statistics was used to establish the practice of Intellectual Property policy in the pharmaceutical industry in Kenya. The study established that majority of the companies representing exploits image/brand and knows how. The companies also exploits both knowledge and business process. In another finding the study established that most of the companies realized increased revenue arising from intellectual property protection. Secondly, the findings the study shows that there is a strong positive relationship between the intellectual property protection and innovation performance. The study further found out that intellectual property protection influences innovation performance significantly. The study recommends the need for policy formulation on intellectual property protection by manufacturing companies in the pharmaceutical firms. The government of Kenya can use the findings of this research to get pragmatic approach and will realized the benefits of intellectual property policy framework and its significant role in the pharmaceutical industry in Kenya.

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LIST OF ABBREVIATIONS

ACA	Anti-Counterfeit Agency
BASCAP	Business Action to Stop Counterfeiting and Piracy
BSA	Business Software Alliance
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
ICC	International Chamber of Commerce
ICT	Information and Communications Technology
IP	Intellectual Property
IPM	Interface Public Members
IPR	Intellectual Property Rights
KAM	Kenya Association of Manufacturers
KCB	Kenya Copyright Board
KEBS	Kenya Bureau of Standards
KIPI	Kenya Industrial Property Institute
MOU	Memorandum of Understanding
OECD	Organization for Economic Co-operation and Development
R&D	Research and Development
SMEs	Small and Medium Sized Enterprises
TRIPS	Trade-Related Aspects of Intellectual Property Rights
WCO	World Customs Organization
WIPO	World Intellectual Property Organization

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Economic growth in many countries especially the developing economies depends heavily on the rate of innovation, invention and creativity. The intellectual assets have become significant in enhancing brand value and facilitating the general growth of the (Thomson, 2009). Intellectual assets are intangible in nature making them vulnerable to theft and malpractices. This has created the need for protection by both different Governments and non-Governmental agencies. Intellectual property theft largely takes the form of counterfeits and pirated products. These affect revenues of different companies, leads to increased unemployment and lead to reduced creativity, innovation and investment (Holyoak & Torremans, 2008). This calls for the need to protect intellectual property.

There are a number of theories regarding intellectual property protection and innovation performance. The study is specifically anchored on the utilitarian theory, the theory of innovation, dynamic capabilities theory and the theory of competition. Utilitarian theory observes that creators of new knowledge and inventors should be rewarded. Mechlup & penrose (1950) posit that the society had a moral obligation to compensate and to reward the inventors. Dynamic capabilities explains the internal capacity of a company to be creative and innovative (Helfat et al., 2007). Companies with internal capabilities can easily renew their competencies to match the changing business environment. This gives companies sustainable competitive advantage.

The significance of intellectual property has been widely accepted and practiced by the pharmaceutical manufacturing firms to maximize profits and to sustain competitive advantage of the firms. In this industry, protection of intellectual property rights helps to establish a strong and effective public health infrastructure (Pharmaceutical society of Kenya, 2012). It is reported that the pharmaceutical sector in Kenya is among the sectors most harmed by counterfeiting and piracy. This takes the form of increased manufacture and distribution of fake medicine hence the need to intensify intellectual property protection and enforcement actions (Anti-Counterfeit Agency of Kenya, 2015).

1.1.1 Intellectual Property Protection

Intellectual property means the creation of intellectual commitment and they include inventions, literary and artistic works, and symbols, names, and images used for commercial purposes (World Intellectual Property Organization (WIPO), 2015). According to Singh (2004) intellectual property arises from the original intellectual commitment of an individual inventor and creators of goods and services. Intellectual property can either be industrial property or copyrights. Industrial property is made up of patents, trademarks, industrial designs as well as geographical indications whereas copyrights includes literary works for example novels, poems and plays, films, musical works, artistic works for instance drawings, paintings, photographs and sculptures, and architectural designs. Intellectual property rights therefore exclusively confer rights on inventors and creators of literary work (WIPO, 2015).

Intellectual property rights (IPR) are legal and the aim is to protect the owner and grant them exclusive rights over the inventions and expressed ideas (Singh, 2004). The owners of IP can therefore enjoy monopoly profits that provide a financial incentive for the IP. This lays the basis upon which protection becomes a necessity. When adequate enforcement of IP protection is achieved, it would encourage inventors especially in the health sector which is vital for the growth of the economy. Health innovation involves broad variety of scientific, medical, economic and social issues. This would encourage discovery of new medicine, development of variety of drugs as well as improved distribution that enhances accessibility (NEPAD, 2010).

1.1.2 Innovation Performance

Innovation and creativity are addressed everywhere in the organization where by employees come up with new ideas that give the organizations competitive advantage over the others hence improved business performance (Edward & Roberts, 2007). Companies that are innovative have the ability to achieve and sustain competitive. Innovation means creating new products and services and this enhances performance and long term survival of an organization (Banbury & Mitchell, 1995). Brown & Eisenhardt (1995) further posit that innovation enables companies to become more efficient and adaptive to new market demands. Innovation performance is therefore

measured by increasing the number of fresh ideas, improvement in the quality of existing ideas and successful achievement of implementation of the quality ideas and enhanced business success achieved from the implementation of new ideas.

The resource based theory is of the view that companies that have significant underlying resources and capabilities can achieve and sustain innovation easily (Kusunoki, Nonaka & Nagata, 1998). Innovation is knowledge-based and therefore the existence of resources and internal capabilities leads to the ability of such companies to manage the process of knowledge management (Nonaka & Takeuchi, 1995). Companies must invest in their human capital who is major players in the process of knowledge management (Subramaniam & Youndt, 2005). The uniqueness of human skills and their application when developed and tapped adequately is likely to give a company a sustainable competitive advantage (Hitt, Bierman, Shimizu & Kochhar, 2001).

1.1.3 Pharmaceutical Manufacturing Industry in Kenya

The Kenya pharmaceutical industry according to the Federation of Kenya Manufacturers (FKPM, 2015) consists of 307 firms including pharmacy shops that produce or distributes many different pharmaceutical-related merchandise. This is inclusive of firms which are manufacturers of pharmaceutical products, subsidiaries of international firms, Pharmaceutical suppliers of international firms. Firms that manufacture and distribute pharmaceutical products are not generally integrated while the research oriented drug makers are partly integrated forward. The integration is however dependent on a number of factors as the firms reliance on other players vary on a significant way.

The Kenyan Government spends about 8% of its GDP on health sector. The country is equally significant in exporting pharmaceutical products to the Africa's Common Market and COMESA (UNIDO, 2011). The pharmaceutical industry in Kenya is made up of companies involved in manufacturing, distribution and retailing of the products (PSK, 2010). Kenya supplies 50% of the pharmaceutical products to the common market for eastern and southern Africa market. The need for IP protection would therefore play a major role in ensuring that the country benefits economically

from not only supplying of such products but invention as well as investment in research on the same sector. The growth and development of the pharmaceutical sector would mean increased employment creation, improved GDP, improved health system. The main challenge facing the sector is the increasing cost of operations especially the cost involved in the development of new drugs. There has also been increased failure of candidate drugs on clinical trial (Pammolli & Riccaboni, 2008). These companies have also experienced a drop in their sales in the recent past (Jack, 2012). The need for IP protection is therefore very critical in ensuring the survival of the sector as well as improved participation in economic growth and development. This would help to take advantage of new markets, deal with competition and take advantage of growing move towards knowledge management (Jones, 2009).

1.2 Research Problem

The business environment is dynamic and turbulent, and for firms to have a competitive edge they have to be very innovative. Innovation is typically realized through the management decisions of those in the market to allocate resources to change the competitive posture of their firms on one or multiple dimensions of the existing business system. To a greater extent innovation has to be a strategy that the firm practices (Pettus, Kor & Mahoney, 2007). Companies that invest heavily in innovation are likely to gain competitive advantage because they are able to produce at low cost and in return offer lower prices with good value addition. This can only be achieved in an environment where intellectual property is protected.

According to Hardy (2013) posit that the formation, development and growth of innovative capacity facilitates the growth of the economy. Chen & Puttitanum (2004) show that innovation in a developing country increases with the protection of IPRs. In the pharmaceutical sector, a patent equal the product and protects the investment incurred in R&D and clinical trials. The cost required to produce a pharmaceutical product is high and this affects accessibility of the pharmaceutical products subsequently hindering the need to meet the demands of the public.

A number of relevant studies that have been done and have not addressed the specific area of intellectual property protection and innovation performance in the pharmaceutical industry in Kenya. Ngari and Kagiri (2013) found out that IP rights positively and significantly affect the performance of pharmaceutical firms. Mark & Robert (2014) also found out that knowledge management practices positively influence performance of pharmaceutical firms. In another study, Petrova (2014) found that pharmaceutical companies invest heavily in continuous innovation. This study however concentrated on the aspect of innovation without the analysis of performance index as well as the need for protection of innovation to encourage the innovators. Muthiani and Wanjau (2012) also found out that the increased number of fake drugs is due to poor legislation and brand popularity. This study equally did not address the main concern of protection of intellectual property. The aforementioned study therefore confirms the existing gap of the need to protect intellectual property due to high levels of counterfeiting. The current research therefore seeks to address the gap by answering the question; “What is the relationship between intellectual property protection and innovation performance in the pharmaceutical industry in Kenya?”

1.3 Research Objectives

The study will seek to achieve the following objectives:

- i. To establish the practice of Intellectual Property protection by the pharmaceutical manufacturers in Kenya.
- ii. To determine the relationship between Intellectual Property protection and innovation performance in the pharmaceutical manufacturing industry in Kenya.

1.4 Value of the Study

The study offers significant contribution to theory, practice and policy. The contribution to theory is immense. The concept of intellectual property protection will add value to the main arguments on the resource based theory and hence increase the existing knowledge on the key resources of a company. The study will also add valuable knowledge to the strategic management argument relating to competitive

advantage. It will help create debate regarding the key drivers of competitive advantage.

For practice, the study will benefit practicing staff and management of the pharmaceutical industry in Kenya and the relevant government institutions since it will shade light on the practice and administration of Intellectual Property policy by the government as embraced by the pharmaceutical industry in Kenya. This will also in the long run encourage pharmaceutical firms to protect their Intellectual Property Rights and therefore yield high innovation performance in the pharmaceutical companies in Kenya.

Finally, policy makers in the area of strategic management will use the findings of this research paper to come up with universally applicable innovation performance strategies. The government of Kenya will use the findings of this research to get pragmatic approach and will realized the benefits of intellectual property policy framework and its significant role in the pharmaceutical industry in Kenya. Lastly the findings will contribute to professional extension of the existing knowledge in the theory of strategic management by helping to understand the existence of intellectual property protection in Kenya and innovation performance in the pharmaceutical industry in Kenya.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter outlines the theoretical foundations of the study and opinions advanced by various writers, authors and scholars of Strategic Management. It also outlines the various studies done relevant to the current research.

2.2 Theoretical Foundation of the Study

The study is based on four main theories namely utilitarian theory of intellectual property, theory of innovation, dynamic capabilities theory and theory of competition.

2.2.1 Utilitarian Theory of Intellectual Property

Utilitarian theory focuses on the question of whether Government created intellectual property rights should exist (Merges, 1995). This is because, in the recent past there has been the need to put in place rules, regulations and institutions governing intellectual property. During the early mercantilist period, different countries had the need to increase their wealth and power through increased manufacturing and trading. This led to the increased need for intellectual property rights.

The theory is of the view that intellectual property rights should be assigned to those involved in the creation, invention and discovery of new products and services. (Farrel, 2009). This would enable the creators to enjoy monopoly gains over their creativity and hence serve as a way of motivating them and subsequently increased. This will also help to improve quality and quantity of output. The society therefore has a moral obligation to compensate and to reward the inventors and creators of new knowledge. This should be championed by the Government through regulations and institutionalization of IP rights.

2.2.2 Theory of Innovation

It was developed by Schumpeter (1934). According to the theory, innovation is includes activities such as launching of new products, the use of new methods in production and selling; identification of new markets and the identification of new sources of raw materials and other inputs. He argued that innovation is the sure way to make and sustain profitability. This is because it increases the productivity of operations and activities. According to Hanush & Pyka (2007) innovation is a

mechanism through which organizations achieve and sustain competitive advantage and a means of achieving improved economic growth. Schumpeter (1942) on the other hand posit that through innovation, an economic restructuring is achieved as new mechanisms of achieving economic growth are adopted.

Tidd (2006) is of the view that success in innovation relies on how well the new technology is adopted and the process is institutionalized. This requires the need to invest in knowledge creation through research and development. Companies must learn to exploit existing knowledge as a strategic resource as a form of innovation. (Lin & Chen, 2007). Intellectual property protection would help companies to create new knowledge and be able to protect it effectively for competitive advantage purposes.

2.2.3 Dynamic Capabilities Theory

Dynamic capabilities mean the ability of a company to come up with new internal mechanisms for achieving and sustaining its competitive advantages despite the dynamism in the environment of business. It is the ability to adapt and survive in a constantly changing environment of business (Teece, Pisano & Shuen, 1997). It enables companies to involve in the creation or modification of its approach to resource use. It emphasizes on the utilization of internal capabilities that enables a company to compete effectively despite the frequent changes in the business environment. It is therefore the utilization of internal capacities as resource for survival (Barney, 2001).

Companies build internal capabilities over time through effective reorganization and reengineering of internal processes and putting into effective use the available resources (Makadok, 2001). Organizations build internal capabilities through the use of knowledge management approaches. This is by ensuring that effective learning takes place to enhance the capacity of the workforce (Simon & Hitt, 2003). Generally, internal capacity of a firm relies on knowledge management which means its ability to reconfigure, leverage, learn and integrate (Bowman & Ambrosini, 2003). All the four main processes underlie the basis of innovation performance through intellectual property protection (Winter, 2003).

2.2.4 Theory of Competition

The ability of a firm to remain competitive depends on its ability to be unique in its products and services (Barney, 1991). A firm is therefore said to have competitive advantage over another if it capable of achieving and sustaining high profits (Grant, 1996). The essence of competition is that two or more companies are focusing on the same market or the same target customers. Companies that can survive this competitive battle are said to have competitive advantage. According to Porter (1979) firms must be aware of the sources of competition and hence come up with the best strategies to deal with it.

Hax & Majluf (1996) are of the view that companies can only achieve and sustain competitive advantage when they develop uniqueness in their goods and service provision. This helps to reduce the threat of existence of substitute goods and services. Exclusive advantages over their invention and newly created goods and services. Protection of intellectual property is therefore a sure way to accord companies the competitive advantage based on their innovation.

2.3 Empirical Literature Review

A number of studies have been conducted in the area of intellectual property protection. Ngari & Kagiri (2013) studied structural capital and business performance of pharmaceutical firms in Kenya. The objectives of the study were to determine whether systems and programs influence business performance of pharmaceutical firms, to determine whether intellectual property rights influence business performance of pharmaceutical firms and to determine whether research and development influence business performance of pharmaceutical firms in Kenya. The study adopted descriptive research design. Data was collected from 19 pharmaceutical firms in Kenya. The findings indicated that structural capital positively and significantly influence the performance of pharmaceutical firms.

Mark & Robert (2014) also studied how human capital influence performance of pharmaceutical firms in Kenya. The study was based on the need to test the relationship of the components of Human capital with the Business performance of the pharmaceutical companies in Kenya. The study used data from 19 firms. A

correlation analysis was performed and the study found out that learning and education, experience and expertise, innovation and creation have positive and significance relationship with business performance of pharmaceutical firms’.

Petrova (2014) studied innovation in the pharmaceutical industry. The study was based on the underlying argument that pharmaceutical companies can only survive if they continuously invest in innovation. This would help to come up with new products to fulfill the ever demanding health needs. Finally, Muthiani & Wanjau (2012) studied factors that influence increased in the number of fake medicine in Nairobi. A descriptive survey design was adopted and the study sampled firms from the list of registered pharmaceutical importing companies. A questionnaire was used to collect primary data. The data analysis involved both quantitative and qualitative approaches. Factor analysis, correlation analysis and regression analysis were used to determine the relationship between the independent variables. According to the study, the existence of fake drugs is due to weak legislations and pricing of drugs.

2.4 Summary of Research Gaps

A review of literature indicates that the concepts in this study have been used in various other studies. However, there are still unanswered issues which constitute conceptual, contextual and methodological knowledge gaps. Notably, the variables seem to have been studied over time, but contradictions exist on some of the relationships while other relationships are yet to be tested empirically. Conceptual gaps include those regarding how the variables have conceptually related in previous studies. Contextual gaps include gaps in studies done on Kenyan SCs while methodological gaps are gaps unearthed on previous study designs, choice of population, sampling, analysis and interpretation of findings.

The study by Ngari & Kagiri (2013) studied structural capital while Mark & Robert (2014) also conducted a study on the influence of human capital on performance of pharmaceutical firms in Kenya. Petrova (2014) on the other hand did not address the issue of protection. Muthiani & Wanjau (2012) conducted a study on factors influencing the influx of counterfeit medicines. Petrova (2014) concentrated on the aspect of innovation without the analysis of performance index as well as the need for protection of innovation to encourage the innovators. Muthiani & Wanjau (2012)

equally did not address the main concern of protection of intellectual property. These gaps will be addressed by the current study.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research design, the population, the sample, the type of data needed and the source of the data. It also explains how the data will be analyzed.

3.2 Research Design

The study adopted a cross sectional descriptive research design. Mugenda and Mugenda (2003) asserts that descriptive survey research helps to determine and report the way things are and it helps in establishing the current status of the population under study. This design is the most appropriate since it gives an accurate account of characteristics of a particular individual, event or group in real life situation. Cross sectional survey approach was adopted because data was collected across a large number of organizations once at a particular point in time. Cooper and Schindler (2006) posit that cross sectional studies are carried out once and represent a snap shot of one point in time. In a descriptive cross sectional survey either the entire population or a subset thereof is selected, and from these individuals data are collected to help answer the research question of interest.

3.3 Population of the Study

The study targeted all pharmaceutical manufacturing firms listed by the pharmaceutical society of Kenya. There are 32 manufacturing pharmaceutical companies licensed by the pharmacy and poisons board by February 2016 (Soft Kenya, 2016). The study therefore involved a census of all the firms because of the small number. The list of the firms is given in (appendix II).

3.4 Data Collection

Primary data was used in the study. The data collection was done using a structured questionnaire which was used to gather realistic information using a likert scale of 1 to 5. The questionnaire had three parts to help address the objectives of the study. Part A of the questionnaire addresses the background information, part B helped to establish intellectual property protection profile of the companies while part C helped to assess the relationship between intellectual property protection and innovation

performance of the companies. The questionnaire was administered using drop-and-pick-later method.

The questionnaire targeted the production managers or managers in charge of research and development drawn from the pharmaceutical manufacturer's population. Two managers per every organization was targeted as respondents. The managers are generally well-informed of the overall situation of their firms regarding innovation performance resulting from intellectual property protection.

3.5 Data Analysis

Data analysis was guided by the research objectives. Data from the questionnaire was edited, coded and analyzed. Descriptive statistics was used to establish the practice of Intellectual Property policy in the pharmaceutical industry in Kenya. Qualitative analysis was then done involving coding and organizing collected data into themes and concepts that address the research questions. Quantitative data analysis was then conducted consisting of measuring values which was analyzed using descriptive analysis such as central tendencies like mean, median and mode and measures of dispersion such as range, standard deviation and variance.

To test the relationships between intellectual property protection and innovation performance, data coded was extracted using factor analysis method to condense the information contained in a number of original variables into a smaller set of dimensions with a minimum loss of information. Correlation analysis was then used. The following regression model will be used:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + \epsilon,$$

Where:

Y = Innovation performance index (Dependent variable).

a = Constant

b₁, b₂, b₃ and b₄ are constants.

X₁ = Patents protection.

X_2 = Protection of business secrets.

X_3 = Trademarks protection.

X_4 = Copyrights protection.

ε = Error term.

The multiple correlation coefficient R was used to test the strength of the relationship between the independent variables and the dependent variable.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

5 This chapter presents research results and findings and then concludes by presenting detailed analysis and discussion of the research objectives. Descriptive statistics was used. The objectives of the study were to establish the practice of Intellectual Property protection by the pharmaceutical manufacturers in Kenya and determine the relationship between Intellectual Property protection and innovation performance in the pharmaceutical manufacturing industry in Kenya.

4.2 Profile of the Firms

Pharmaceutical manufacturing companies have to invest in innovation as a way to sustain competitive advantage, especially in global value chains where success depends on supplying a good or service that is not easily replicable by a commercial rival. Companies that have been in operation for many years are likely to have engaged in innovation on a wider scale with significant registration for intellectual property protection. The table 4.1 below shows that majority of the companies of up to 30% have operated for duration of above 15 years followed by 26.7% having been in the business for between 5 – 10 years. 23.3% have between 10 – 15 years and 20% have been in business for between 1 – 5 years. This finding shows that the firms have been in business enough to develop intellectual property and establish adequate innovation programme.

4.2.1 Years in Operation

Pharmaceutical manufacturing companies have to invest in innovation as a way to sustain competitive advantage, especially in global value chains where success depends on supplying a good or service that is not easily replicable by a commercial rival. Companies that have been in operation for many years are likely to have engaged in innovations on a wider scale with significant registration for intellectual

property protection. The table 4.1 below shows that majority of the companies of up to 30% have operated for duration of above 15 years followed by 26.7% having been in the business for between 5 – 10 years. 23.3% have between 10 – 15 years and 20% have been in business for between 1 – 5 years. This finding shows that the firms have been in business enough to develop intellectual property and establish adequate innovation programme.

Table 4.1 Years of Operation

Years	Frequency	Percent
1-5	6	20.0
5-10	8	26.7
10-15	7	23.3
Above 15	9	30.0
Total	30	100.0

Source: Research Data

4.2.2 Years of Membership with the Pharmacy and Poison Board

Companies that have been members of the board for many years are likely to have registered for IP protection. This is because membership with the board would facilitate protection of intellectual property. The years of membership by the companies is shown in the table 4.2 below:

Table 4.2: Years of Membership with Pharmacy and Poisons Board

Years	Frequency	Percent
1-5	6	20.0
5-10	8	26.7
10-15	7	23.3
Above 15	9	30.0
Total	30	100.0

Source: Research Data

The table 4.2 above shows that majority of the firms have been registered with pharmacy and poisons board for more than 5 years representing 80%. Only a small number of firms representing 20% have been with the board for between 1 – 5 years.

4.2.3 Number of Registered Patents and Trademarks

The number of patent applications is considered a calculation proxy of innovative output. Firms register for protection due to competitive pressure. Pharmaceutical companies are therefore forced to file for patent protection on drug candidates very early in the development process. The number of registered patents and trademarks in many cases depend on the number of years the firms have been in operation. The analysis is given in the table 4.3 below:

Table 4.3: Number of Registered Patents and Trademarks

Number	Frequency	Percent
1-5	6	20.0
5-10	8	26.7
10-15	7	23.3
Above 15	9	30.0
Total	30	100.0

The table 4.3 above shows that majority of the firms of up to 85% have registered 11 and above patents and trademarks.

4.3 Intellectual Property Protection Profile

The intellectual property protection profile for the pharmaceutical manufacturing industry in Kenya in the case of this study is based on the types of IP rights that the companies own or make use of; the percentage of the organizations total turnover spent on research and development; the types of intellectual assets that the organizations actively exploit; the number of new varieties of products that the companies generated in 2015 and the percentage of the total revenue of the year 2015 that arose from new products. It also covers the importance of intellectual property and whether the organizations seek to obtain additional income by commercializing their IPs. The analysis is as follows:

4.3.1 IP Rights the organization own or make

Intellectual property rights deals with a wide range of subjects including, patents, copyrights, trademarks and trade secrets. Intellectual property rights are very diverse because of increased investment in innovation. The IP rights that the pharmaceutical manufacturing companies are given in the table 4.4 below:

Table 4.4: IP Rights the organization own or make

IP Rights	Frequency	Valid Percent
Patents	6	20.0
Trademarks	9	30.0
Registered designs	7	23.3
Copyrights	6	20.0
Database rights	2	6.7
Total	30	100.0

Source: Research Data (2016)

The tables 4.4 above shows that majority of the companies own or make trademarks representing 30% followed by registered designs at a percentage of 23.3%. The least IP rights owned or made by the companies was database rights representing 6.7%.

4.3.2 Percentage of Total Turnover spent on Research and Development

Research and development costs vary widely from one new drug to the next and from one company to another. Those costs depend on the type of drug being developed, the likelihood of failure, and whether the drug is completely new or instead is an incremental modification of an existing drug. Companies therefore spend varied percentage of their total revenue as shown in the table 4.5 below:

Table 4.5: Spending on Research and Development (%)

Percentage	Frequency	Valid Percent
<5	3	10.0
5-9	6	20.0
10-14	4	13.3
15-19	5	16.7
20-24	12	40.0
Total	30	100.0

Source: Research Data (2016)

From the table 4.5 above, majority of the companies spent between 20-24% on research and developments represented by 40%. This was followed by 20% of the companies that spent between 5-9%. The lowest was 10% that spent less than 5% on research and development.

4.3.3 Intellectual Assets exploited by the Organization

Intellectual assets are a source of competitive advantage making them significant for knowledge-intensive and research-intensive industry like pharmaceuticals manufacturing. This makes the industry to largely depend on intellectual capital relying on human intervention and the application of technology. The analyses of the intellectual assets exploited by the pharmaceutical manufacturing companies are shown in the table 4.6 below:

Table 4.6: Intellectual Assets exploited by the Organization

Intellectual Assets	Frequency	Valid Percent
Know how	7	23.3
Knowledge	5	16.7
Business process	5	16.7
Image/brand	12	40.0
Others	1	3.3
Total	30	100.0

Source: Research Data (2016)

The table 4.6 above shows that majority of the companies representing 40% exploits image/brand while 23.3% exploits know how. This is followed by 16.7% that exploits both knowledge and business process. A small percentage of 3.3% exploits others.

4.3.4 New Varieties of Products generated by the Company in 2015

Through the exploitation of intellectual assets by the pharmaceutical manufacturing companies, a number of new varieties of products were generated by the companies in 2015 as shown in the table 4.7 below:

Table 4.7: New Varieties of Products Generated by the Company in 2015

Varieties	Frequency	Valid Percent
1-20	19	63.3
21-30	5	16.7
31-40	2	6.7
41-50	2	6.7
above 50	2	6.7
Total	30	100.0

Source: Research Data (2016)

The table 4.7 above shows that majority of the companies representing 63.3% had generated new varieties of products between 1 – 20 in the year 2015. This was followed by 16.7% of the companies generating between 21 – 30 new varieties. The

other companies generated an equal percentage of 6.7% of between 31–40, 41–50 and above 50 respectively.

4.3.5 Percentage of Total Revenue

The respondents were asked to state the percentage of total revenue of the year 2015 that arose from new products. A number of companies have realized different percentages of total revenue in the year 2015. The response is summarized in the table 4.8 below:

Table 4.8: Percentage of Total Revenue

Percentage	Frequency	Valid Percent
0-10%	3	10.0
10-20%	17	56.7
20-30%	5	16.7
30-40%	5	16.7
Total	30	100.0

Source: Research Data (2016)

The table 4.8 above shows that 56.7% of the companies realized 10-20% revenue while 16.7% realized 20-30% and 30-40% respectively. Only 10% of the companies realized 0-10% total revenue.

4.3.6 Importance of Intellectual Property

The respondents were asked how important are the following types of intellectual assets to the success of their organization. The response is as shown in the table 4.9 below:

Table 4.9: Importance of Intellectual Property

Intellectual Property	Frequency	Valid Percent
Patents	7	23.3
Trade marks	4	13.3

Registered designs	6	20.0
Copyright	2	6.7
Database rights	4	13.3
Trade secrets	3	10.0
Technical knowledge	1	3.3
Image/brand	3	10.0
Total	30	100.0

Source: Research Data (2016)

The table 4.9 above shows that patents are important to the success of their organizations representing 23.3%. This is followed by registered designs and then trademarks representing 20% and 13.3% respectively. According to the respondents, technical knowledge had the least importance at 3.3%.

4.3.7 Commercialization of Intellectual Property

The respondents were asked whether their organization seek to obtain additional income by commercializing it IP. The response is as given in the table 4.10 below:

Table 4.10: Commercialization of Intellectual Property

	Frequency	Valid Percent
YES	16	53.3
NO	10	33.3
Don't know	4	13.3
Total	30	100.0

Source: Research Data (2016)

The table 4.10 above shows that majority representing 53.3% agreed that their organizations seek to obtain additional income by commercializing intellectual property. 33.3% of the respondents however were of the contrary opinion while 13.3% did not know.

4.4 Relationship between Intellectual Property Protection and Innovation Performance

The respondents were asked to indicate their level of agreement regarding whether intellectual property protection would lead to achievement of each of them by using the scale of 1-5 where 1= Not at all; 2 = Small extent; 3 = Moderate extent; 4 = Great extent & 5 = Very great extent. The extent of how intellectual property protection leads to innovation performance is summarized in the table 4.11 below:

Table 4.11: Intellectual Property Protection and Innovation Performance

Operational Performance	N	Mean	Std. Deviation
Increased number of new products	30	3.67	1.24
Increased number of varieties of products	30	3.50	1.22
Increased revenue due to new products	30	3.27	1.31
Increase in the number of registered trademarks and patents	30	3.33	1.09
Reduced cost of operation	30	3.93	1.34
Increase in the number of new ideas per employee	30	3.30	1.09
High percentage of new ideas selected for funding	30	3.40	1.22
Increase in the percentage of market share	30	3.87	1.04
Growth in sales	30	3.97	1.19
Success rates in new product launches	30	3.77	1.33
Valid N (Listwise)	30	3.60	1.21

Source: Research Data (2016)

The table 4.11 above shows that intellectual property protection influences operational performance with a mean of 3.60. Growth in sales had the highest mean of 3.97 followed by reduced cost of operation with a mean of 3.93 and then increase in the percentage of market share with a mean of 3.87. Success rates in new product launches had a mean of 3.77 while increased number of new products had a mean of 3.67. Increased revenue due to new products had the lowest mean of 3.27.

To test the relationships between intellectual property protection and innovation performance, a regression analysis was conducted and the regression model summary is given in the table 4.12 below:

Table 4.12: Regression Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.630 ^a	.397	.287	.38653232

From table 4.12; Adjusted R² is 0.287 which means that there was 28.7% positive variation in performance index due to changes in independent variables and 71.3% is variation of the dependent variable due to other factors not in the model. The study found that the correlation coefficient was 0.630 thus there was a strong positive correlation between intellectual property protection and innovation performance of pharmaceutical manufacturing firms in Kenya.

Table 4.13: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.243	6	.540	3.617	.007 ^a
	Residual	4.930	33	.149		
	Total	8.173	39			

From ANOVA table the significant value for the model was 0.007 which means that the model was statistically significant since it is lower than 0.05.

Table 4.14: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.529	.682		1.083	.287	-.649	2.126
	Patents Protection (X ₁)	.413	.159	.368	1.968	.058	-.011	.637
	Protection of business secrets (X ₂)	.320	.115	.161	.957	.345	-.124	.343
	Trademarks protection (X ₃)	.658	.185	.043	.258	.798	-.328	.423
	Copyright protection (X ₄)	.255	.159	.201	1.162	.253	-.139	.509

Source: Research data

From the table 5.6 the following regression equation was established

$$Y = 0.529 + 0.413X_1 + 0.320X_2 + 0.658X_3 + 0.255X_4$$

The result indicate that a factor increase in relationship with patents protection would lead to an increase in innovation performance by factor of 0.413, a unit increase in protection of business secrets would lead to an increase in innovation performance by 0.658 and an increase in copyright protection by a factor of one would lead to an increase of 0.255 in the innovation performance of pharmaceuticals manufacturing firms. This information shows that there's a positive relationship between the independent variables and innovation performance.

4.5 Discussion of Findings

This study was meant to establish the practice of Intellectual Property protection by the pharmaceutical manufacturers in Kenya and to determine the relationship between Intellectual Property protection and innovation performance in the pharmaceutical manufacturing industry in Kenya.

Regarding the practice of Intellectual Property protection by the pharmaceutical manufacturers in Kenya, it was established that majority of the companies own or make trademarks representing 30% followed by registered designs at a percentage of 23.3%. The least IP rights owned or made by the companies was database rights representing 6.7%. It was also established majority of the companies spent between 20-24% on research and developments represented by 40%. This was followed by 20% of the companies that spent between 5-9%. The lowest was 10% that spent less than 5% on research and development.

Regarding intellectual assets exploited by the organization, it was established that majority of the companies representing 40% exploits image/brand while 23.3% exploits know how. This is followed by 16.7% that exploits both knowledge and business process. A small percentage of 3.3% exploits others. The study also shows that majority of the companies representing 63.3% had generated new varieties of products between 1 – 20 in the year 2015. This was followed by 16.7% of the companies generating between 21 – 30 new varieties. The other companies generated an equal percentage of 6.7% of between; 31–40, 41–50 and above 50 respectively.

Equally, regarding percentage of total revenue, the study shows that 56.7% of the companies realized 10-20% revenue while 16.7% realized 20-30% and 30-40% respectively. Only 10% of the companies realized 0-10% total revenue. The study also pointed out that intellectual is of importance to the organizations. The study established that patents are important to the success of their organizations representing 23.3%. This is followed by registered designs and then trademarks representing 20% and 13.3% respectively. According to the respondents, technical knowledge had the least importance at 3.3%. The study also established that that the companies undertake commercialization of intellectual property. The study shows that majority representing 53.3% agreed that their organizations seek to obtain additional income by commercializing intellectual property. 33.3% of the respondents however were of the contrary opinion while 13.3% did not know.

These findings are consistent with the study by Petrova (2014). The study is based on the underlying argument that pharmaceutical companies must be involved in

continuous improvement of its products and services. It is also consistent with the findings by Robert (2014). He found out that through knowledge management, companies pharmaceutical firms are able to experience improved performance.

Regarding objective 2, the study found out that intellectual property protection influences innovation performance with a mean of 3.60. Growth in sales had the highest mean of 3.97 followed by reduced cost of operation with a mean of 3.93 and then increase in the percentage of market share with a mean of 3.87. Success rates in new product launches had a mean of 3.77 while increased number of new products had a mean of 3.67. Increased revenue due to new products had the lowest mean of 3.27. The study also found out that the adjusted R^2 is 0.287 which means that there was 28.7% positive variation in performance index due to changes in independent variables and 71.3% is variation of the dependent variable due to other factors not in the model. The study found that the correlation coefficient was 0.630 thus there was a strong positive correlation between intellectual property protection and innovation performance of pharmaceutical manufacturing firms in Kenya. Regarding the effect of intellectual property protection, the result of the findings also indicate that a factor increase in relationship with patents protection would lead to an increase in innovation performance by factor of 0.413, a unit increase in protection of business secrets would lead to an increase in innovation performance by 0.658 and an increase in copyright protection by a factor of one would lead to an increase of 0.255 in the innovation performance of pharmaceuticals manufacturing firms. This information shows that there's a positive relationship between the independent variables and innovation performance.

These findings are in agreement with the findings by Mark & Robert (2014). He found out that the performance of pharmaceutical firms is influenced by increased investment in human capital and the general implementation of knowledge management.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the research findings and also presents conclusions and recommendations of the study. The conclusions are drawn from the findings of the study which sought to establish the practice of Intellectual Property protection by the pharmaceutical manufacturers in Kenya and to determine the relationship between Intellectual Property protection and innovation performance in the pharmaceutical manufacturing industry in Kenya.

5.2 Summary of Findings

The objectives of the study were to establish the practice of Intellectual Property protection by the pharmaceutical manufacturers in Kenya and to determine the relationship between Intellectual Property protection and innovation performance in the pharmaceutical manufacturing industry in Kenya. The study targeted all pharmaceutical manufacturing firms listed by the pharmaceutical society of Kenya. The questionnaire targeted the production managers or managers in charge of research and development drawn from the pharmaceutical manufacturing companies. These managers are deemed to be the most knowledgeable with respect to the overall situation of their firms regarding innovation performance resulting from intellectual property protection. Out of the 32 respondents targeted, feedback was received from 30 companies. This formed a response rate of 93.75%. The response rate was considered adequate for the study since it is above 50% as recommended by Mugenda (2003).

Regarding years of operation, the study established that majority of the companies of up to 30% have operated for a duration of above 15 years followed by 26.7% having been in the business for between 5 – 10 years. 23.3% have between 10 – 15 years and 20% have been in business for between 1 – 5 years. This finding shows that the firms have been in business enough to develop intellectual property and establish adequate innovation programme. The study also found out that majority of the firms have been registered with pharmacy and poisons board for more than 5 years representing 80%.

Only a small number of firms representing 20% have been with the board for between 1 – 5 years. Finally, majority of the firms of up to 85% have registered 11 and above patents and trademarks during the 2015.

5.2.1 Practice of Intellectual Property Protection

The study established that majority of the companies own or make trademarks representing 30% followed by registered designs at a percentage of 23.3%. The least IP rights owned or made by the companies was database rights representing 6.7%. It was also established majority of the companies spent between 20-24% on research and developments represented by 40%. This was followed by 20% of the companies that spent between 5-9%. The lowest was 10% that spent less than 5% on research and development.

Regarding intellectual assets exploited by the organization, it was established that majority of the companies representing 40% exploits image/brand while 23.3% exploits know how. This is followed by 16.7% that exploits both knowledge and business process. A small percentage of 3.3% exploits others. The study also shows that majority of the companies representing 63.3% had generated new varieties of products between 1 – 20 in the year 2015. This was followed by 16.7% of the companies generating between 21 – 30 new varieties. The other companies generated an equal percentage of 6.7% of between 31–40, 41–50 and above 50 respectively.

Equally, regarding percentage of total revenue, the study shows that 56.7% of the companies realized 10-20% revenue while 16.7% realized 20-30% and 30-40% respectively. Only 10% of the companies realized 0-10% total revenue. The study also pointed out that intellectual is of importance to the organizations. The study established that patents are important to the success of their organizations representing 23.3%. This is followed by registered designs and then trademarks representing 20% and 13.3% respectively. According to the respondents, technical knowledge had the least importance at 3.3%. The study also established that that the companies undertake commercialization of intellectual property. The study shows that majority representing 53.3% agreed that their organizations seek to obtain additional

income by commercializing intellectual property. 33.3% of the respondents however were of the contrary opinion while 13.3% did not know.

5.2.2 Intellectual Property Protection and Innovation Performance

The study found out that intellectual property protection influences operational performance with a mean of 3.60. Growth in sales had the highest mean of 3.97 followed by reduced cost of operation with a mean of 3.93 and then increase in the percentage of market share with a mean of 3.87. Success rates in new product launches had a mean of 3.77 while increased number of new products had a mean of 3.67. Increased revenue due to new products had the lowest mean of 3.27. The study also found out that the adjusted R^2 is 0.287 which means that there was 28.7% positive variation in performance index due to changes in independent variables and 71.3% is variation of the dependent variable due to other factors not in the model. The study found that the correlation coefficient was 0.630 thus there was a strong positive correlation between intellectual property protection and innovation performance of pharmaceutical manufacturing firms in Kenya. Regarding the effect of intellectual property protection, the result of the findings also indicate that a factor increase in relationship with patents protection would lead to an increase in innovation performance by factor of 0.413, a unit increase in protection of business secrets would lead to an increase in innovation performance by 0.658 and an increase in copyright protection by a factor of one would lead to an increase of 0.255 in the innovation performance of pharmaceuticals manufacturing firms. This information shows that there's a positive relationship between the independent variables and innovation performance.

5.3 Conclusions

From the study findings, the two objectives were adequately met. First, the study established that majority of the companies own or makes trademarks. The study established that majority of the companies representing exploits image/brand and knows how. The companies also exploits both knowledge and business process. In another finding the study established that 56.7% of the companies realized 10-20% revenue while 16.7% realized 20-30% and 30-40% respectively. Only 10% of the companies realized 0-10% total revenue.

Secondly, the findings the study shows that there is a strong positive relationship between the intellectual property protection and innovation performance. The study further found out that intellectual property protection influences innovation performance with a mean of 3.60.

5.4 Recommendations for Policy, Practice and Theory

The present study contributes immensely to policy, practice and theory. In practice, the study should form a platform for better knowledge of the interplay between intellectual property protection and innovation performance. While this finding strengthens the opinion of specialists in strategic management, it also adds value to the existing body of knowledge. Managers in the pharmaceutical industry therefore need to pay attention to the dimensions of intellectual property protection for purposes of improving the performance of their companies.

On issues of policy, intellectual property protection has become an important part of doing business, especially in the manufacturing sector. The study recommends the need for policy formulation on intellectual property protection by manufacturing companies in the pharmaceutical firms. The government of Kenya can use the findings of this research to get pragmatic approach and will realized the benefits of intellectual property policy framework and its significant role in the pharmaceutical industry in Kenya. Lastly the findings will contribute to professional extension of the existing knowledge in the theory of strategic management by helping to understand the existence of intellectual property protection in Kenya and innovation performance in the pharmaceutical industry in Kenya.

5.5 Limitations of the Study

The study is limited to the extent that it only deals with the views of the pharmaceutical manufacturing firms. When using questionnaires, some of the respondents were not willing to give information citing reasons of busy schedules while other feared that some of the information needed were sensitive with respect their vow to protect business secrets of the company. Finally the study only sampled a few respondents meaning the collected data may have not given the true did not

obtain information from all respondents sampled and this could have affected the result of the study since the sample size reduced drastically.

5.6 Suggestions for Future Research

Arising from this study, the following directions for future research in corporate reputation are suggested. This study focused on the pharmaceutical manufacturing firms in Kenya and therefore, generalizations cannot adequately extend to other companies. The future studies should also improve on methodology used by employing more advanced analysis techniques in order to obtain better results. The current study only used simple regression analysis and descriptive analysis techniques and a small sample size of the study population.

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APPENDIX I: QUESTIONNAIRE

PART A: BACKGROUND INFORMATION

1. Name of the company _____
2. Years of operation
 - i. 1 – 5 years
 - ii. 5 – 10 years
 - iii. 10 – 15 years
 - iv. Above 15 years
3. Years of membership with pharmacy and poisons board
 - i. 1 – 5 years
 - ii. 5 – 10 years
 - iii. 10 – 15 years
 - iv. Above 15 years
4. Number of registered patents and trademarks
 - i. 1 – 10
 - ii. 11 – 20
 - iii. 21 – 30
 - iv. Above 30

PART B: INTELLECTUAL PROPERTY PROTECTION PROFILE

1. Which of the following types of IP rights does your organisation own or make use of? (Tick where appropriate)
 - i. Patents ()
 - ii. Trade Marks ()
 - iii. Registered designs ()
 - iv. Copyright (including copyright of software) ()
 - v. Database rights ()
 - vi. Trade secrets ()
2. Approximately what percentage of your organisation's total turnover was spent on research and development in 2015? (Tick where appropriate)
 - i. <5 ()
 - ii. 5-9 ()
 - iii. 10-14 ()

- iv. 15-19 ()
- v. 20-24 ()
- vi. 25+ ()
- vii. Don't know ()

3. Which of the following types of intellectual assets does your organisation actively exploit?

- i. Know How
- ii. Knowledge
- iii. Business process
- iv. Image / Brand
- v. Other (specify)

4. How many new varieties of products have the company generated in 2015?

- i. 1 – 20
- ii. 21 – 30
- iii. 31 – 40
- iv. 41 – 50
- v. Above 50

5. What percentage of total revenue of the year 2015 arose from new products?

- i. 0 – 10%
- ii. 10 – 20%
- iii. 20 – 30%
- iv. 30 – 40%

6. Level of intellectual property

How important are the following types of intellectual assets to the success of your organisation? Please rate on a scale of 1 to 5 where 1 = not at all important; 2 = less important; 3 = moderately important; 4 = important and 5 = very important.

- i. Patents ()
- ii. Trade Marks ()
- iii. Registered Designs ()
- iv. Copyright (including copyright of software) ()

- v. Database rights ()
- vi. Trade secrets ()
- vii. Technical knowledge ()
- viii. Knowledge ()
- ix. Business process ()
- x. Image / Brand ()

7. Does your organisation seek to obtain additional income by commercialising its IP? (Tick where appropriate)

- i. Yes ()
- ii. No ()
- iii. Don't know ()

PART C: INTELLECTUAL PROPERTY PROTECTION AND INNOVATION PERFORMANCE

The following is a list of innovation performance indicators. Please indicate your level of agreement regarding whether intellectual property protection would lead to achievement of each of them by using the scale of 1-5 where 1= Not at all; 2 = Small extent; 3 = Moderate extent; 4 = Great extent & 5 = Very great extent.	Does IP lead to the innovation performance?				
	Not at all	Small extent	Moderate extent	Great extent	Very great extent
	1	2	3	4	5
Increased number of new products					
Increased number of varieties of products					
Increased revenue due to new products					
Increase in the number of registered trademarks and patents					
Reduced cost of operation					
Increase in the number of new ideas per employee					
High percentage of new ideas selected for funding					
Increase in the percentage of market share					
Growth in sales					
Success rates in new product launches					

APPENDIX II: LIST OF MANUFACTURING PHARMACEUTICAL FIRMS

1. African Cotton Industries Limited
2. Alpha Medical Manufacturers
3. Aventis Pasteur SA East Africa
4. Bayer East Africa Limited
5. Beta Healthcare (Shelys Pharmaceuticals)
6. Biodeal Laboratories Limited
7. Bulk Medicals Limited
8. Cosmos Limited
9. Dawa Pharmaceuticals Limited
10. Didy Pharmaceutical
11. Diversey Lever
12. Eli-Lilly (Suisse) SA
13. Elys Chemical Industries Ltd
14. Gesto Pharmaceuticals Limited
15. Glaxo SmithKline
16. High Chem East Africa Ltd
17. Ivey Aqua EPZ Limited
18. KAM Pharmacy Limited
19. Laboratory & Allied Limited
20. Mac's Pharmaceutical Ltd
21. Manhar Brothers (Kenya) Ltd
22. Medivet Products Limited
23. Novartis Rhone Poulenc Ltd
24. Novelty Manufacturers Ltd
25. Pfizer Corp (Agency)
26. Pharm Access Africa Limited
27. Pharmaceutical Manufacturing Co (K) Ltd
28. Pharmaceutical Products Limited
29. Phillips Pharmaceuticals Limited
30. Regal Pharmaceutical Ltd
31. Revital Healthcare (EPZ) K
32. Universal Pharmaceutical Limited

(Kenya Association of Manufactures, 2015)

