AFRICA UNIVERSITY

(A United Methodist-Related Institution)

THE EFFECTIVENESS OF THE NATIONAL OFFICE FOR TECHNOLOGY ACQUISITION AND PROMOTION (NOTAP) IN PROMOTION OF INTELLECTUAL PROPERTY IN NIGERIAN RESEARCH AND TERTIARY INSTITUTIONS

BY

AYOADE, KENNY SHALOM

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN INTELLECTUAL PROPERTY IN THE INSTITUTE OF PEACE, LEADERSHIP AND GOVERNANCE

2021

Abstract

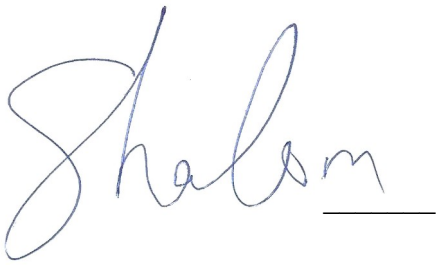
Abstract

The research study examined majorly, the effectiveness of NOTAP IP promotional roles in Nigerian research and tertiary institutions in Nigeria. Other issues explored include the relationship of the IP Offices in Nigeria and the status of research-industry linkage in Nigeria. Relevant literatures were reviewed to provide guidance on the study which focussed on the concept of IP and its importance as well as the theoretical Framework. The theories considered are the Utilitarian Theory, Labour Theory and the WIPO Development Agenda. The WIPO Development Agenda was adopted in view of its focus on IP promotion in developing countries which is relevant to this study. Other aspects of the literature focussed on the concept of Intellectual Property Office (IPO), IP and National Wealth Development or Technological Development, the rationale for Research and Tertiary Institutions as Engine Room for National Development and an overview of IP Promotion and Technology Transfer Activities in the Research and Tertiary Institutions in other Countries. The methodology adopted for the study was quantitative approach based on the use of questionnaire and interview. On the whole, the questionnaires were administered to a total of 150 respondents selected from a purposive target group. Out of this, 140 were retrieved constituting a response rate of 93.3%. On the other hand, interview questions structured in open ended format were administered to five IP experts. These comprise of two IP practitioners and three management staff of the three IP offices. The purpose of the study was to establish whether NOTAP's IP promotional role in Nigerian research and tertiary institutions is effective and to find out whether there is relationship and complimentary efforts between NOTAP and other IP Offices in the country and to also determine identify any challenges impeding the effectiveness and recommend ways of resolving them. The research findings revealed as follows: 1. NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not visible. 2.There is an impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions.3. NOTAP' s IP promotional activities in Nigerian research and tertiary institutions are not effective. 4There is no significant relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions. 5.There exist challenges of research-industry linkage in Nigeria. In the light of the findings from the study it was recommended amongst others that NOTAP should establish IPTTOs in the research and tertiary institutions where they are not yet established to improve the culture of IP in the country. Also, the programmes and activities of the IPTTOs established in the research and tertiary institutions should be well coordinated and monitored. In addition, deliberate effort needs to be made through institutional and/or national policy(s) to facilitate research-industry linkage in Nigeria so as to promote national economic development.

Keywords: Intellectual Property, NOTAP-National Office for Technology Acquisition and Promotion, Research and Tertiary Institutions, IPO-Intellectual Property Office and Promotion

Declaration Page

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

AYOADE, KENNY SHALOM 

Student's Full Name Student's Signature

Date (03/06/2021)

DR. MCLEAN SIBANDA 

Main Supervisor's Full Name Main Supervisor's Signature

(Date)

Date (03/06/2021)

Copyright Page

Acknowledgement

I am grateful to my supervisor, Dr McLean Sibanda, MIP Coordinator Mr. George Mandewo (the great motivator) and the lecturers at the College of Business, Peace, Leadership and Governance (CBPLG), Africa University, for the knowledge and inspirations they impacted during this programme and for assessing my work to the standard required for the master's dissertation.

My gratitude to the WIPO, the Government of Japan and ARIPO for their support and the opportunity to study in Africa University through scholarship.

Special thanks to DG NOTAP in person of Dr. Ibrahim DanAzumi and other Directors, Dr. A. A. Tandama, Dr. I. Okejiri, Mrs. Y. O. Akinkunmi, Mrs. Idoreyin I. Imiyoho and my current HOD, Mr. Smart Tuedor for their assistance and cooperation with me during this programme. Likewise, many thanks to my senior colleagues Mrs. H.N.A. Oladunke, Mr. Jonas N. Nzeagwu, and Engr. Enoch I. Moghalu for their support in one way or the other while I was undertaking this course. I am also thankful to all the staff for giving me the support and guidance during my studies. My appreciation also goes to Dr. (Engr) Umar B. Bindir, Mrs. Oyefunke Araba, Mrs. Caroline T. Ojo, Dr. L. Nwosa and Dr. Isaac Nwaadozie (all former DG/Directors of NOTAP), your advices and contributions to my career in this field inspired me to undertake this research.

My sincere appreciation to my family; my wife and my kids likewise Pharm. Idowu T. Orogbemi and the entire Orogbemi/Ajayi family.

Dedication

This project is dedicated to the Almighty God for being my continuous help and strength. To my late parents, for their love and commitment to my holistic development has been an inspiration and to my wife Adunola and my sons Ayooluwa-David and Ayomide-Joshua for your endless love, patience, support and understanding to me during this programme.

List of Acronyms and Abbreviations

AFCFTA	African Continental Free Trade Area
ARIPO	Africa Regional Intellectual Property Organization
AU	Africa University
AUREC	Africa University Research and Ethics Committee
CIPC	Companies and Intellectual Property Commission
DITTB	Documentation, Information of Technology Transfer Bureau
EIT	European Institute of Technology
EUIPO	European Union Intellectual Property Office
EUTM	European Union Trade Mark
FDI	Foreign Direct Investment
FRCN	Federal Radio Corporation of Nigeria
GDP	Gross Domestic Product
IMPI	Mexican Institute of Industrial Property
IP	Intellectual Property
IPC	International Patent Classification
IPO	Intellectual Property Office
IPR	Intellectual Property Right
IRS	Internal Revenue Service
IPTTOs	Intellectual Property and Technology Transfer Offices
KICs	Knowledge Innovation Centres
KIPI	Kenya Industrial Property Institute
KIPO	Kenya Industrial Property Office
MIP	Master in Intellectual Property

NCA	Nigerian Copyright Academy
NCC	Nigerian Copyright Commission
NCI	Nigerian Copyright Institute
NCS	Nigerian Customs Service
NITDA	National Information Technology Development Agency
NOTAP	National Office for Technology Acquisition and Promotion
NPF	Nigeria Police Force
PIDC	Patent Information and Documentation Centre
RCD	Registered Community Design
RMRDC	Raw Materials Research and Development Council
ST&I	Science, Technology and Innovation
TFP	Total Factor Productivity
TISC	Technology and Innovation Support Centre
TK	Traditional Knowledge
TPDR	Trademarks, Patents and Designs Registry
TRIPS	Trade Related aspects of Intellectual Property Rights
TTO	Technology Transfer Offices
TT	Technology Transfer
UAS	Universities of Applied Science
USA	United State of America
VAT	Value Added Tax
VET	Vocational Education and Training
WARF	Wisconsin Alumni Research Foundation
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

Table of Contents

List of Tables

List of Figures

List of Appendices

CHAPTER 1: INTRODUCTION

1.1 Introduction

Intellectual property (IP) is globally acknowledged as an important tool for economic development especially with the paradigm shift from a resource-based economy to a knowledge-based economy (Shukran, Sultana, & Rahman, 2011). Intellectual Property covers various categories of inventive and creative works such as inventions, signs, marks, symbols, designs, indications, books, novels, poems, drawings, paintings, photographs, films, phonograms etc. Thus, IP cuts across many fields of endeavour including, science, medicine, agriculture and also extends to arts, music, broadcasting and so on.

> The owners of the various works are conferred exclusive rights over their works. In the contemporary world IP is fast becoming a critical resource in advancing national economy. Therefore, it is imperative for developing countries such as Nigeria to get committed to develop a strong IP regime for the development of the national economy. This is crucial especially as the Tertiary and Research Institutions have developed innovative goods and services for exploitation in the industry. (Araba, F. 2005).

IP is very crucial in various ways including the following:

- IP gives statutory expression to the moral and economic right of creators in their creations and the right of public access to such creations;
- It promotes creativity and R&D results;
- Facilitates University-Industry linkage;

- IP preserves and promotes the development of cultural heritage;
- IP generates wealth for the owners through the payment of royalties when such works are licensed to interested users;
- IP stimulates transfer of technology;
- Encourages establishment of spin-off firms and creates jobs;
- Serves as a "power tool" for economic development; and many more.

It is unfortunate however that Africa, Nigeria inclusive, has a wrong perception of Intellectual Property Right (IPR) and this has led to poor creativity and inventiveness, low patent density; weak technology base, poor investment in research and development infrastructures, low human development index, import and monetary-dependent economy and low use of science and technology data in decision making process. These inadequacies have given rise to various socio-economic problems leading to unemployment, hunger, high crime waves, and high rate of child maternal mortality and youth's restiveness, despite the abundant human and natural resources endowed in Africa which needs to be properly harnessed (Alaneme, 2009).

In Nigeria, the registration, administration, licensing and management of Intellectual Property Right (IPR) are majorly undertaken by three government agencies which are:

- Trademarks, Patents and Designs Registry (TPDR) under the Federal Ministry of Industry, Trade and Investment, established by the Trademark Act, Cap 436 LFN, 2004 and Patent and Designs Act, Cap P344 LFN, 2004. The registry is responsible for the registration of Trademarks, Patents and Designs and the publication of the respective Journals.

- Nigerian Copyright Commission (NCC) under the Federal Ministry of Justice, stablished by the Nigerian Copyright Act, Cap C68 LFN, 2004. It is responsible for the administration, regulation, enforcement and prosecution of all copyright matters in Nigeria.
- National Office for Technology Acquisition and Promotion (NOTAP) under the Federal Ministry of Science and Technology, established by Decree No. 70 of 1979, now Cap N62, LFN, 2004. It is responsible for facilitating the acquisition of foreign technology and promoting the development and commercialisation of locally generated technology. It also promotes IP culture and act as patent agent as a means of evolving a strong STI system a build a strong national science and technology base.

As can be observed, the three IP Offices are under separate ministries. However, they interact especially in the areas of IP promotion and efforts are being made towards building a strong IP regime in the country. Nevertheless, the relationship could have been better if they are coordinated by the same umbrella body.

Presently, there is low IP culture in Nigeria and the IP regime is not strong. Also, there is a disconnect between the academia and research institutions on the one hand and the industry on the other hand. Consequently, most of the research results emanating from the research institutions do not meet the needs of the industry. Thus, instead of the uptake of the research results by the industry, they usually remain on the shelf. It is against this background that NOTAP embarks on bridging this gap by promoting academia/ research institutions and industry linkage particularly through the establishment of Intellectual Property and Technology Transfer Office (IPTTOs) in the tertiary and research institutions across Nigeria. One of the roles of the

IPTTOs is to ensure that the research activities of the research institutions are demand and market driven to facilitate the uptake of the results by the industry. Other roles of the IPTTO include IP training and seminars on patent search, harnessing the IP assets in the host institutions, licensing and negotiations of the IP assets. Also, through the activities of the IPTTOs and other IP promotional programmes by NOTAP, the relationship between NOTAP and the other two IP Offices in Nigeria has improved greatly. The three Offices now interact better and share ideas on how the IP culture in the country can best be enhanced.

In addition to the establishment of IPTTOs, NOTAP also facilitates the inflow of technology into Nigeria and promotes the development of IP culture by enlightening researchers on IP matters and by providing patent support services for researchers.

1.2 Background to the Study

As part of its programmes to promote IP culture in Nigeria, NOTAP established IPTTOs in Nigeria in the tertiary and research institutions. From the commencement of the programme in 2006 to 2020, a total of 55 IPTTOs have been established by NOTAP across the country. This is made up of 10 in the Research Institutes, 37 in the Universities, 4 in the Polytechnics/Monotechnics, and 4 in the Military Establishments/Teaching Hospitals as illustrated in Table 1 below.

Table 1: The Distribution of IPPTTOs in the Research Institutions

Institutions	**No. of IPTTOs**
Research Institutes	10
Universities	37
Polytechnics/Monotechnic	4
Military Establishments/ Teaching Hospitals	4
Total	0

Source: NOTAP - PIDC

Over the years, students, scientists and researchers in the academic community and private laboratories are becoming aware of IP, particularly, patents and they are beginning to protect their R&D results.

Furthermore, NOTAP also promotes IP through the establishment of the Patent Information and Documentation Centre (PIDC). The PIDC was established with the assistance of the World Intellectual Property Organisation (WIPO) in 1992. The PIDC is designed to provide relevant technical information from patent documents to support researchers and innovators especially in the tertiary and research institutions to access technical information in patent documents that could assist them in their research works.

The PIDC carries out IP awareness programmes in the tertiary and research institutions through the dissemination and sensitisation of researchers on patent and IP in general. The PIDC also publishes technical information from selected patent document for researchers to guide them in their research works.

Apart from the research institutions, the activities of the PIDC are also extended to the general public during seminars, conferences and exhibitions to create awareness on IP. In addition, the centre acts as a patent agent to researchers in patenting their inventions where the need arises (WIPO, 2015).

The patent support services provided by the PIDC are in three distinct ways viz:

a. offering advisory services to researchers and scientists in carrying out patent searches and patent drafting;
b. filing patents on behalf of inventors and innovators and undertaking the necessary follow up; and

c. payment of the prescribed patent filing fees for the inventors/innovators.

In this regard, the PIDC has recorded some notable achievements. For instance, from 1999 to 2019, a total of 939 patent applications were submitted to NOTAP for patenting assistance out of which 346 patent applications were filed at the Patent Registry. From the total of 346 applications filed, 314 patents were granted. Consequently, there has been a steady growth in the number of patent applications submitted to NOTAP for evaluation, processing and filing at the Nigerian Patent Office. Also, through the efforts of NOTAP, there has been an increase in the number of patents filed by researchers and granted annually since 2015 as illustrated in Table 2 below:

Table 2: Summary of Patent Applications Submitted to NOTAP for Evaluation and Filing

Period	No. of IP Applications Submitted to NOTAP	No. of Patent Applications Filed by NOTAP	No. of Pate Granted
1999 – 2014	0	0	0
2015	37	20	6
2016	61	35	16
2017	77	13	50
2018	136	71	55
2019	84	36	57
Total	0	0	0

Source: NOTAP - PIDC

As could be gathered from the foregoing, NOTAP has been involved in the various promotional roles in terms of the establishment of IPTTOs and training of researchers in the research institutions as well as the provision of patent support services through the PIDC, for over two decades. It has therefore become imperative to assess and evaluate the effectiveness of NOTAP in performing these roles in Nigeria. This will assist in determining its performance vis-a-vis the situation in

some advanced countries such as the USA and EU as well as some emerging economies like Mexico, the Philippines and South Africa and Kenya in Africa. Where necessary, some areas of improvement would be identified for possible consideration in the country.

Amongst all other forms of IP, it has been recognized that patent promotes R&D as it spurs researchers to embark on further research activities because of the financial benefits derived from the incentive of their invention.

To this end, NOTAP has developed a model Intellectual Property Policy Guideline which is made available to universities and research institutions in Nigeria (WIPO, 2015, p.24). This Guideline seeks to speed up the process of developing IP and innovation in Nigeria which can be protected and translated to useful products and processes. Likewise, as articulated by Essien, (2006) intellectual property and technology transfer policy will play an increasingly important part in many nations like Nigeria and enhance economic development through technology transfer from research and tertiary institutions as they become focal points for economic development (NOTAP, 2006).

NOTAP has developed many strategies for promoting IP in the country particularly, in the research institutions. There are notions and presumptions that NOTAP in its IP promotional and advocacy role is doing reasonably well especially in the area of patenting of R&D results based on the number of patents granted with the assistance of the agency (see Table 2 above).

Unfortunately, in the process of researchers interacting with some institutions and inventors in the country, there is the perception that NOTAP is doing too little in ensuring the effective generation, protection, domestic utilisation and possible

technology transfer of locally generated technologies due to low or lack of incentive, enabling environment/infrastructure for researchers and innovators to commercialize their products. For instance, NOTAP and other relevant IP Offices in Nigeria have not successfully come up with a national Intellectual Property (IP) Policy to help guide and drive the economy especially the promotion of IP in research and tertiary institutions (Onyido, 2019). In addition, on many occasions, applications submitted to NOTAP on other forms of IP such as copyrights, trademarks and industrial design are not given consideration as it were in comparison to patent applications, could this be that NOTAP has no viable relationship with the other relevant IP Offices?

Furthermore, the inflow of foreign technologies into the country in virtually every sector in Nigeria is extremely enormous due to the fact that there are very little domestication of foreign technologies and utilisation of local technologies (Onipede, 2010). This is exemplified by Figure 2 in Chapter 2. Therefore, it is very costly and difficult for local SMEs or businesses especially from the research and tertiary institutions to thrive and impact the economy using the IP system (Adeboye, 1995). This issue is buttressed by WIPO Statistics Database of 2019 on patents. Other IP categories alluded to this fact as patent filing by residents in the advanced countries like US and UK are higher than those by non-residents while the reverse is the case in the developing countries.

Arising from this and as noted by Panshak, Civcir & Ozdeser (2019), exporters from developing countries like Nigeria cannot compete with producers from developed countries on identical level in international trade. While developed countries have succeeded in properly improving the composition of their export baskets, most developing economies like Nigeria still lag behind in diversifying their export

structure. This makes substitution of foreign goods in developing countries increasingly difficult. Therefore, there is need for developing countries to intensify R&D activities and IP generation to enable them increase their export share of commodities with high demand in the international market as well as increasing government spending on R&D to spur research activities to boast the development of export goods and services for a sustainable growth of the economy.

NOTAP IP promotional activities are designed to assist in this regard. However, the agency' enabling Act appears weak and its financial base is inadequate to enable it achieve the mandate effectively in all research and tertiary institutions in the country considering the huge number of institutions in the country as provided in Table 3 below.

Table 3: Number of Research and Tertiary Institutions in Nigeria

Research Centre	50
Universities	170
Polytechnics	69
Colleges of Education	152
Total	0

Source: Federal Ministry of Education

On this note, researchers are of the opinion that the advocacy and support services of NOTAP are not adequate to achieve its ideal objectives due to inadequate human capacity and resources. For instance, it is only very few IPTTOs that have more than 10 patent applications filed and granted through NOTAP since their establishment (Ref. Appendix 5). Likewise, the level of commercialisation of the patented inventions are insignificant to the number of patents granted. Therefore, the impact on the economy is not yet felt. As stated by Okongwu, (2007), the trajectory of Nigeria's technological development so far appears like the situation of a

sleepwalker on a platform that is moving rapidly in the opposite direction, so that the net motion of the sleepwalker is really backward.

1.3 Statement of the Problem

As observed by WIPO (2011), government, research and academic institutions need to embrace IP as a practical tool for enhancing national competitiveness, increasing opportunities for technology exchange, augmenting revenues, exports and corporate valuation, avoiding "brain drain" and motivating employees. Also as earlier noted, there is a disconnect between the research institutions and the industry in the country.

In addition, there exist a weak relationship among the three IP offices in Nigeria. especially in the area of strengthening the IP regime in the country. In view of these, there is the need to nurture a strategic and effective IP culture through IP promotion in Nigeria.

NOTAP's IP promotional activities in Nigeria have spanned over two decades. It has therefore become imperative to assess the strategies adopted by NOTAP in promoting IP in Nigeria particularly, among the research institutions so as to determine the effectiveness vis-a-vis the situation in other countries and the means of enhancing the strategies where the need arises. For instance, countries like the US, EU and The Philippines have national IP framework and IP Policy. Strong legal frameworks and institutional capacity building are also put in place which strengthens their IP regimes and assist them to conduct substantive examination of patent applications unlike the situation in Nigeria where only procedural examination is carried out. In addition, adequate resources (human and material) including seed fund such as the IP SME vouchers in the EU (CORKE, 2021) are made available to the start-ups and TTOs to implement their programmes and activities. The IP Offices

are also fully automated and Government Expenditure on R&D is quite high in comparison to Nigeria which is less than 0.3% of the GDP.

It is against this background that this research study seeks to explore the challenges of research-industry linkage, relationship of the IP Offices in Nigeria and the effectiveness of NOTAP in promoting IP in the research and tertiary institutions in Nigeria with a view to proffering necessary solutions.

1.4 Research Objectives

The objectives of this research study are as follows:

1. To explore the activities of NOTAP relating to IP promotion in Nigerian research and tertiary institutions,
2. To evaluate and determine the impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions,
3. To determine the effectiveness of NOTAP's IP promotion in Nigerian research and tertiary institutions,
4. To examine the relationship between NOTAP's IP promotional activities and those of other IP Offices in Nigeria,
5. To determine whether or not there is research industry-linkage in Nigeria.

1.5 Research Questions

In view of the above objectives, the research study provided answers to the following questions: -

1. What is the IP promotional activities being carried out by NOTAP in Nigeria's Research and Tertiary Institutions?

2. What is the impact of NOTAP's IP promotional activities in the research and tertiary institutions on the country's economy?
3. How effective are NOTAP's IP promotional activities in Nigerian research and tertiary institutions?
4. Is there any relationship or complementary efforts by other IP Offices in Nigeria in respect to the IP promotional activities by NOTAP?
5. Has NOTAP's IP Promotion activities enhance research-industry linkage in Nigerian research and tertiary institutions?

1.6 Assumptions/ Hypotheses

The followings basic assumptions/hypotheses have been identified for this research study:

Hypothesis I

H_1: NOTAP's IP promotional activities in Nigerian research and tertiary institutions are visible.

H_0: NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not visible.

Hypothesis II

H_1: There is an impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions.

H_0: There is no impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions.

Hypothesis III

H_1: NOTAP's IP promotional activities in Nigerian research and tertiary institutions are effective.

H_0: NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not effective.

Hypothesis IV

H_1: There is a relationship or complementary efforts between NOTAP and other IP Offices in country in respect of IP promotion in Nigerian research and tertiary institutions.

H_0: There is no relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions.

Hypothesis V

H_1: There exist challenges of research-industry linkage in Nigeria.

H_0: There are no challenges of research-industry linkage in Nigeria.

1.7 Significance of the Study

The study was geared towards identifying the role of NOTAP in IP promotion in the research and tertiary institutions in Nigeria with the aim of evaluating the effectiveness and the extent to which it has helped to improve the culture of IP in the country.

The research was also aimed at appraising the extent of the effectiveness of NOTAP as an IP promoter in Nigerian's research and tertiary institutions.

The findings of the research study are of benefit to NOTAP, the research and tertiary institutions, the various SMEs and individual innovators as well as the government. This is with respect to enable them know the importance of IP promotional activities of NOTAP and their significance to national economy development. The result of the study would assist in the development of necessary policy instruments such as the National IP policy to help in setting the direction for entrenching IP culture in the country. Most importantly, it would help to increase the viability of domestic technologies and reduce the negative impact of foreign technologies in the country.

1.8 Delimitation of the Study

IP promotion in Nigeria cuts across the activities of various government agencies such as the TPDR, NCC and NOTAP. However, for the purpose of the study, the focus was specifically on IP promotional roles in the Nigerian research and tertiary institutions in Nigeria by NOTAP.

In effect, only NOTAP's roles relating to IP awareness creation, protection, management and utilisation by tertiary and research institutions were subjected to critical analysis in the study.

The research also focussed on the provision of patent support services to inventors and innovators.

1.9 Limitation of the Study

The conduct of the study was affected by time constraints and inadequate resources such as heavy workload and the meagre resources available during the period of the study. Owing to both time and financial constraints the study was limited to few selected research and tertiary institutions in Nigeria, with particular emphasis on patent promotion system.

In addition, some of the respondents who are civil and public servants reluctant in responding freely to some of the researcher's questions out of fear of breaching the provisions of Public Service Rules on Oath of Secrecy. Another limitation was the absence of adequate reference materials on the research topic coupled with the dearth of IP knowledge by many researchers in the country.

CHAPTER 2: REVIEW OF RELATED LITERATURE

2.1 Introduction

Intangible asset has its origin dated back to the 17th Century especially with the Statute of Monopolies of 1623 on patent laws and that of copyright laws cited in the Statute of Anne of 1710 while the popularity of the term gained more ground in the modern day particularly, with the advent of the 19th Century International Conventions like the Paris Convention (1883), Madrid Convention (1891) amongst others.

IP is a veritable tool for development and has been used by the advanced countries and the emerging economies to develop their national economy. However, in most developing countries including Nigeria, IP culture is still very low. It is in recognition of this that NOTAP, as a technology transfer office in Nigeria, has embarked on various programmes to promote the IP culture particularly in the research and tertiary institutions. This is with the aim of leveraging on IP to enhance the development of locally motivated technologies and the commercialization of the outputs in the market.

IPR essentially performs two functions namely, creating incentives for innovative behaviour and aiding the diffusion of knowledge. An innovation system links the research organizations in a country with the government and the private sector to enhance the generation, protection and commercial exploitation of IPRs. IPRs make it possible for innovative institutions to appropriate the benefits of their innovative activities. Hence, the role of the government is to ensure that the basic elements are put in place to support an innovative economy. These elements include skilled

individuals, research, the economic and regulatory framework, and fiscal policies (WIPO, 2011).

As noted by the former Federal Minster of Science and Technology in Nigeria, Dr. Alhassan Bako Zako (2014), IPR has been recognized globally as a critical tool for industrial and economic growth, market dominance and technological superiority of nations. He also noted that an effective IPR economy will definitely stimulate creative, inventive and innovative activities as the system guarantees total disclosure of intellectual content, while IPR system acts as a strong spur for investments by multinational corporations leading to technology transfer and generation of new industries, job and wealth creation, alleviation of poverty and boost for national competitiveness. "Indeed, without an effective IPR regime, new technology cannot be effectively generated, therefore, the capacity to create, innovate and continuously exploit innovations through technology transfer process is only provided within effectively managed IPR environment" Alaneme, (2009).

2.2 Theoretical Framework

With the increasing importance of IP in society and the development of new technologies, most notably digital technology and the decoding of genetic structure, the use of theories in IP has attracted heightened interest.

The various theories that have been postulated by proponents of IP include the Utilitarian theory, Labour theory, WIPO Development Agenda and others. These are discussed below.

2.2.1 The Utilitarian Theory

The Utilitarian theory focuses on how IPR can achieve the greatest good for the greatest number (Menell, 1999). Cloaked in the more current notion of "wealth-maximization", the focus is on how to balance the social costs and benefits associated with giving legal effect to IPRs. While the theory has produced various elegant propositions on how to create the balance, it has proved to be however difficult to create robust ways to measure the inputs, outputs and the process of IP. Similarly, Mersha & Debesu, (2012) stated that the theory has never been as successful as expected. The economists have also raised objection to the theory with respect to IP, noting that conferring IPR on the owners of IP assets creates a monopoly right which negates the spirit of competition.

2.2.2 Labour Theory

The focus of the labour theory is that an individual has a right to the product of his labour. This is derived from John Locke's labour theory of property which states that people are entitled to the fruits of their labour.

Therefore, since IP is the fruit of an individual's mental labour, the labour theory is equally relevant in this regard. However, the Lockean theory's application to IP is restricted because it does not take cognisance of the temporal limitation of IPRs with respect to the terms of protection of the various rights. Thus, the theory is more relevant to corporeal ownership of property which exists for indefinite period of time unlike IP which falls into the public domain after the lapse of the term of protection (Mossoff, 2012).

2.2.3 WIPO Development Agenda

The focus of the WIPO Developmental Agenda is to improve the protection of IP throughout the world and to harmonise national legislations. The benefits of the Development agenda is that it promotes the development of IP among nations by standardising the process of legislations and strengthens capacity development especially among developing countries. (Netanel, 2008). It is perceived by scholars that WIPO development agenda is more favourable to developing countries even though developing countries seems unsatisfied with the technical assistance implementation process (De Beer, 2009).

In view of the shortcomings of both the Utilitarian and Labour theories in respect of the usefulness of IP on one hand and the relevance of the development approach to the focus of this research study, the WIPO concept of IP promotion based on it development agenda is adopted for the study.

2.3 Relevance of Theoretical Frameworks to the Study

There is an infinite source of richness in knowledge and those who have encouraged and promoted the exchange of ideas and information are in the centre of modern economic and social development such as the developed countries and the recently emerging countries like South Korea, China, India to mention a few (WIPO, 2015). According to Olwan (2011), IP scholars need to understand first, the history that shape the evolution of the international IP system from the perspective of development. Only after taking that into account should scholars consider the economic implications of IP for developing countries, using culture as a starting point for developing IP systems that suit the particular interests of each developing country.

2.3.1 The Concept of Intellectual Property (IP)

The IP concept is widely used in both the academics and in practice and has acquired international acceptance. Though there are no definite definitions of IP in most national laws but bilateral and multilateral agreements do provide some definitions through the provisions of the establishing statutes to enumerate the various categories of rights. For instance, WIPO Convention and the TRIPS Agreement itemized the subject matter of IP such as patents, copyrights, trademarks, industrial designs, geographical indications, plant varieties, traditional knowledge, layout-designs of integrated circuits, and certain undisclosed information. Most bilateral agreements and TRIPS follow this 'catalogue model' for the definition of IP. The TRIPS definition of IPRs in Article 7 rightly states that the objective of IPR is to:

> *"...contribute to the promotion of technological innovation and to the transfer and dissemination of technological knowledge in a manner conducive to social and economic welfare, and a balance of rights and obligations."*

Rights in IP allow creators, or owners of patents, trademarks or copyrights among others to benefit from their own creations or inventions. These rights are also articulated in Article 27 of the Universal Declaration of Human Rights, which provides for the right to benefit from the protection of moral and material interests resulting from authorship of scientific, literary or artistic productions (WIPO, 2011).

Fundamentally, IP gives a right holder, exclusive right to a distinctive type of works and by so doing prevent access to the protected asset by unauthorised third party. In effect, no one can copy or use the creation or invention without the owner's permission. This is applicable virtually to every form of IP earlier mentioned. Thus,

like physical properties such as land, cars, houses etc. IP can be owned, protected from encroachment and the rights can be enforced if infringed.

2.3.2 The Concept of Intellectual Property Office (IPO)

An Intellectual Property Office (IPO) refers to the Office in charge of the administration, registration and enforcement of IP assets. In this respect, an ideal IPO plays various roles in various countries depending on the structure and the enabling law. The role of IPO is to assist in the management of IP system of a country by encouraging innovation and creativity, promotes strong and competitive market, it is the foundation of the knowledge-based economy and balances the aspiration of consumers and users. IPO operate in both national and international environments within the framework of national and international law with the aim of ensuring the creation and development of new technologies and productions, as well as the encouragement and growth of competitive markets that are essential to a nation's economic development and wealth. This is done by giving IPRs to creators or innovators through the IP system so that they can benefit from their creativity which is very important for successful commercial endeavours (Micklewright, 2020).

According to WIPO Model for administration and management of IP (WIPO, 2015), IPOs also play a major role in the formulation of international as well as domestic policy on IPRs, deals with examining applications and granting rights under domestic legislation on various IPs. In most developing countries, IPOs are also involved in IP promotions such as liaising with relevant government agencies and the

private sector to formulate and implement plans and policies to strengthen the protection and exploitation of IPRs in the country (Ref. Figure 1).

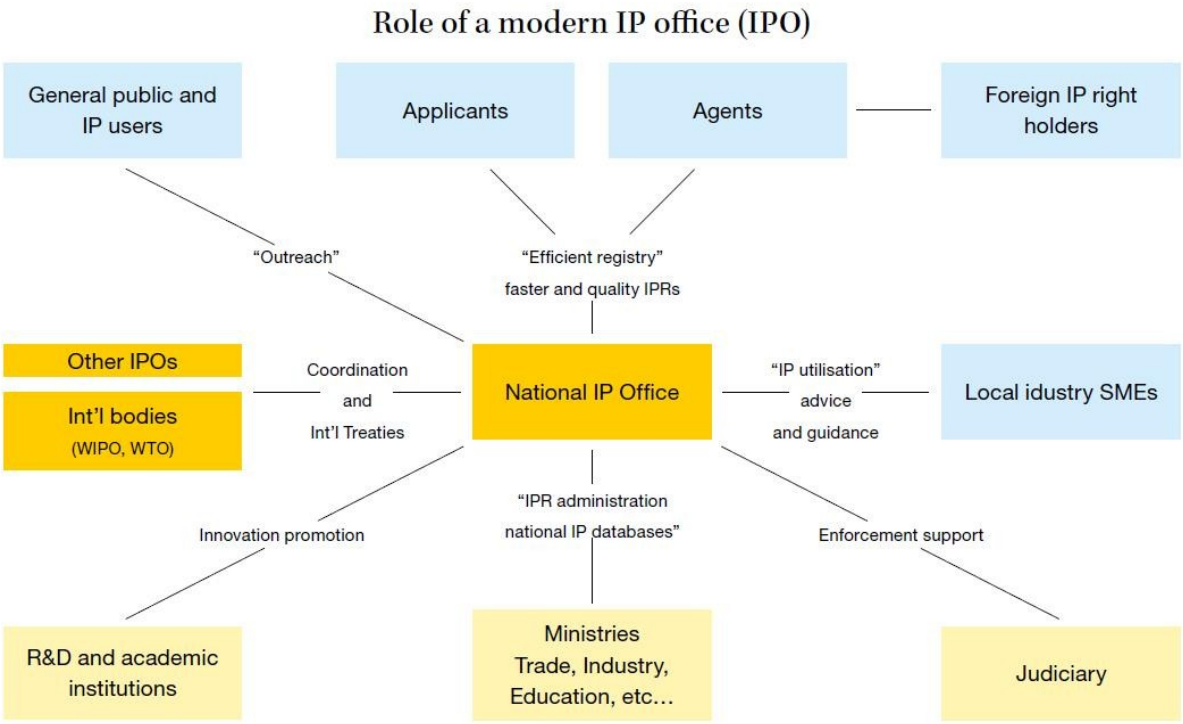


Figure 1: Possible functions of a modern IP office

Source: WIPO

Another role of IPOs is the development and implementation of strategies to promote the use of patent information as a tool for technology development, capacity building and training of IP professionals on IPRs, creating IP awareness across all sectors of the economy especially among educational and research institutions so as to enhance, promote and facilitate technology transfer and registration of technology transfer agreements.

Additionally, an IPO is largely involved in IP legal issues (IP tribunal) based on national legislations by resolving disputes involving technology transfer issues, facilitating compulsory licensing and enforcement of IPRs amongst others.

The absence of some of the key instruments for promotion and development of IP functions in some developing countries like Nigeria where the IPO does not have all the IP categories under a single government agency or ministry but rather in various ministries, often constitutes impediments to the administration of all IPRs in the country. For instance, in Nigeria, copyright and related rights are administered by the Nigerian Copyright Commission (NCC) under the Federal Ministry of Justice, while industrial property majorly Trademarks, Patents and Industrial Designs are administered by the Trademarks Patents and Designs Registry under a department in the Federal Ministry of Industry, Trade and Investment and there is no autonomy for their operations as it were in most jurisdictions (Ibrahim, 2020).

In some developing countries the IP activities are not carried out by a single IPO. Instead, most of the activities are divided among two or more agencies in different government ministries. For instance, as earlier noted, in Nigeria, there are three IP Offices namely, Trademarks, Patents and Designs Registry (TPDR), Nigerian Copyright Commission (NCC) and National Office for Technology Acquisition and Promotion (NOTAP). Each of them is responsible for different aspects of IP activities.

2.3.2.1 The Trademark, Patent and Design Registry (TPDR)

The Trademarks, Patents and Designs Registry are in constant collaboration with WIPO to strengthen IP awareness and capacity amongst other IP stakeholders in the country. The most notable IP promotional programme anchored by the Registry is

the establishment and inauguration of the Technology and Innovation Support Centre (TISC) in Nigeria by WIPO in December, 2012 (Daniel, 2014).

The WIPO TISC programme has complementary services and objectives with that of the IPTTOs established by NOTAP. For instance, the TISC provides innovators in developing countries with access to locally based, high quality technology information and related service. It also helps innovators to exploit their innovative potentials and to create, protect, and manage their IPRs. The services offered by TISCs include: -

- Access to online patent and non-patent (scientific and technical) resources and IP-related publications;
- Assistance in searching and retrieving technology information;
- Training in database search;
- On-demand searches (novelty, state-of-the-art and infringement);
- Monitoring technology and competitors and so on.

WIPO supports the TISCs in Nigeria through the TPDR by facilitating access to databases and training (both of trainers and of local users, on-site and through distance learning); providing information and training materials; supporting awareness-raising activities; and disseminating best practices and experiences among TISCs.

2.3.2.2 The Nigerian Copyright Commission (NCC)

The NCC engages in IP promotion programmes through its training arm, the Nigerian Copyright Academy (NCA). The NCA provides services which are designed around three broad areas of its mandate which are Training (short and long

Term), Curriculum Development and Advisory Services and Research and Publishing.

Furthermore, the NCA designs and maintains training programmes, which cater for the general and individual needs of diverse groups.

2.3.2.3 National Office for Technology Acquisition and Promotion

NOTAP facilitates the inflow of technology to Nigeria and promotes the development of locally motivated technologies. It also promotes the culture of IP by creating the awareness among researchers and the general public. It is in this regard that it organises training programmes and seminars on IP for scientists and researchers and also provides patent support services for researchers, inventors and innovators. In addition, NOTAP establishes IPTTOs in the research and tertiary institutions in Nigeria. The functions of the IPTTOs and details of the IP promotional activities were already discussed in Chapter 1.

Unfortunately, the IPOs in Nigeria especially in the area of industrial property lack adequate human capital in all relevant fields of IP and IP management and also lack infrastructural facilities to enable them perform optimally. Also, the Patents and Designs Act does not make provision for substantive examination. Consequently, the Trademarks, Patents and Industrial Designs Registry does not carry out substantive examination of patents.

These and more are the rationale for the Patent Registry in Nigeria not carrying out substantive patent examinations Though the NCC is making much effort in the area of campaign against copyright infringement and piracy to the general public, but the establishment of the NCA is still at the elementary stage with the hope that soonest the implementation of the programmes and the objective of the Institute would be realised. This will go a long way in complimenting NOTAP's promotional activities.

This situation is actually not peculiar to Nigeria but to developing countries in general. As noted by Sikoyo, Nyukuri & Wakhungu (2006), developing countries lack capacity to effectively implement and harness legislative compliance with international IPR norms for national development. In addition, developing countries especially in Africa have limited understanding of IPRs and the implications of instituting effective IP protection systems because there are very few people and institutions in the continent with experience and capacity to handle IPRs, especially with respect to trade, competition, investment and other recent global imperatives.

2.3.3 IP and National Wealth Development or Technological Development

Many models and economic growth studies have postulated and arrived at apparent conclusions about the role of IPRs in national wealth development and economic development. As enumerated by Maskus (2000), the discussion is complex, the effectiveness of IPRs in the development and growth depends on the respective circumstances of each country. Different systems of IP protection can either stimulate or restrict growth. The effects on economic growth and technological progress are positive only if they are structured in such a way as to promote competition. For instance, CIPLA Limited, an Indian multinational pharmaceutical company which produces drugs and medical equipment has leveraged on the full

potential of Indian national patent system to improve its production processes. First, CIPLA utilises technological information in patent documents to produce drugs and invent new medical devices for treatment of complex medical sicknesses and deceases. CIPLA, also carried out new research innovations through the patent system and licensed them within and outside India for its capital development and national development as well (WIPO, 2017).

However, in the developing countries, there is little evidence that IP have impacted on the development of the individual countries due to the barriers for accessing proprietary technology necessary for development of essential medicine to contain prevalent deceases such as HIV/AIDs (Sikoyo, Nyukuri & Wakhungu, 2006).

A number of renowned economists, including Stiglitz (2008), are of the opinion that the differences between the developed and developing countries are not only due to resource gaps but also gaps in knowledge and information. The imbalance in the technological capacities between the developed and developing countries has shown inequalities between different parts of the world and makes it difficult to analyse critically the impact of IP in relation to property rights and biodiversity conservation without polarizing the world into two major blocs of developed and developing countries. Thus, inspite of the fact that two thirds of the world's biodiversity are situated in developing countries, the technology for unlocking the value of the diversity is in the developed countries.

From a developmental perspective, it is therefore necessary to determine whether IPR results in greater overall production of knowledge and advancement of standards of living than would have been achieved without it. First, there is the need to find out IPR (or more broadly, innovation system) best advances the standard of living in the

developing countries. Stronger IPR may constitute a barrier to the ability of firms catching up with the frontier of innovation, even if it enhances it within the country. Where developing countries engage in catching up, the optimal IPR regime for them will in general differ from that of the advanced economy.

Secondly, stronger IPR regime will entail the transfer of more money in the form of royalty payments from developing to developed countries. The benefits to developing countries from these increased payments (beyond the direct transfer of knowledge) are minimal, i.e., it is not likely that these payments will significantly affect either the amount or direction of research. This is most apparent in the drug industry, where pharmaceutical company devote relatively little of their research budget towards the diseases that afflict developing countries, and the incremental returns that they receive from developing countries are sufficiently smaller that they are unlikely to affect significantly the overall pace of innovation (Baker, Jayadev & Stiglitz, 2017).

In responding to this situation in Nigeria, many research and tertiary institutions have been established. Unfortunately, the institutions are characterised by inefficiency with little or nothing to show in the area of inventions and innovations. Where there are some tangible outputs, they are either not patented or translated into useful goods and services even when patented. Thus, Nigeria is adjudged the lowest in the annual rates of licensed patents and other IPRs. Another important point to note is that industries are virtually disconnected from the research and tertiary institutions. As rightly observed by Alams (2008), "We cannot begin to think of development when we have so neglected our own home-grown science, technology and innovation system. Important lessons from the development of our oil sector have taught us that

we cannot continue to depend on imported technology without developing our local content".

From the foregoing, it is worthy of note that empirical studies give conflicting results as to the impact of IPRs on national development and economic growth. For instance, Kanwar & Evenson (2003) amongst others concluded that strengthening IPRs have significant positive effect on innovation and growth, whereas Sakakibara & Branstetter (2001) concluded otherwise.

Nevertheless, the fact that IPR contributes to economic development as earlier noted cannot be denied.

2.3.4 The Rationale for Research and Tertiary Institutions as Engine Room for National Development

Linkage between Research and Tertiary Institutions and the industry in Nigeria is very weak and where there is a linkage, it has not been sustained as depicted in Figure 2. Many reasons and factors have been adduced for this poor linkage. According to Araba (2006) two reasons attributed to this challenge are lack of IP Policy and lack of up-to-date scientific and technological infrastructure for industry laid – research. Therefore, the experience of research and tertiary institutions from developed and newly industrialized countries, suggests that IP Policy is a pre-requisite and a powerful instrument for spurring innovation, creativity, inventiveness, wealth creation and rapid technological development.

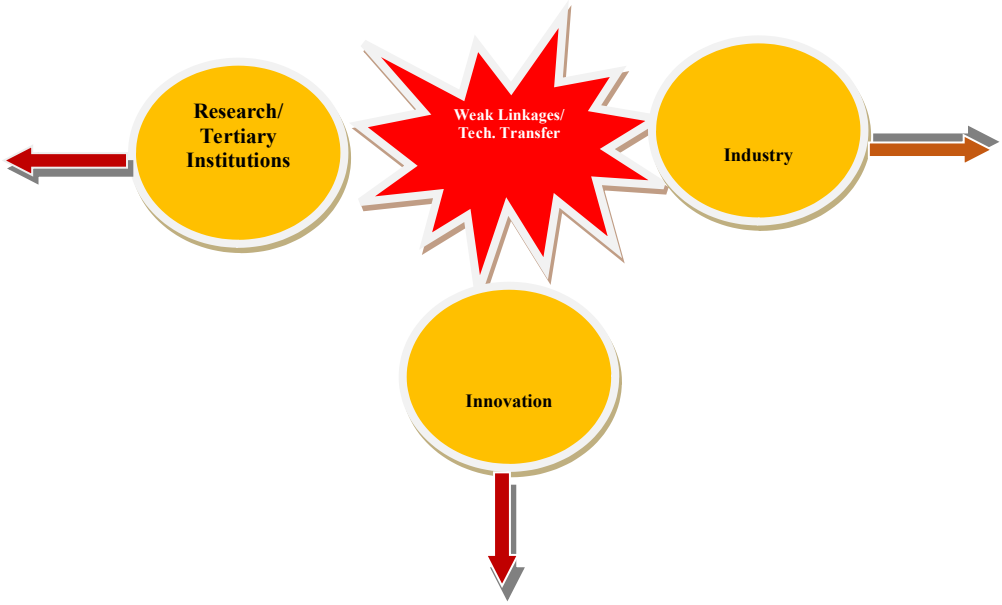


Figure 2: The Disconnection between Research-Industry Linkage in the Country

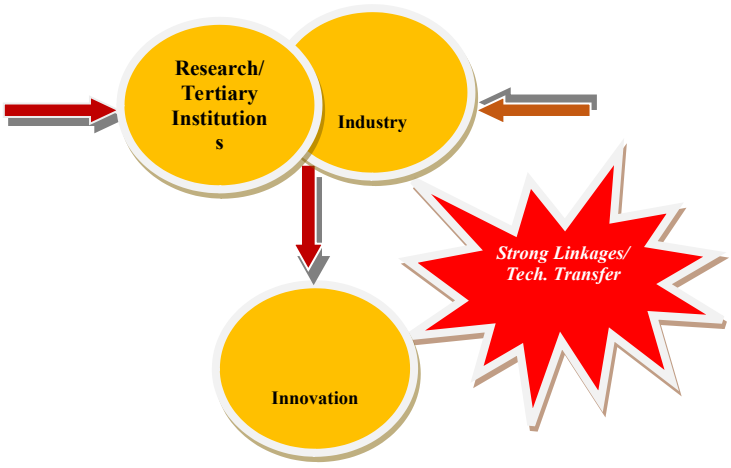


Figure 3: The Expected Interaction between Research-Industry Linkage that can lead to an Effective and Productive Economic Growth in the Country

Source: DG NOTAP 2014

Araba further noted that the status of most research and tertiary institutions in Nigeria which are all public funded, largely depend on government subvention and funds and other sources which are very negligible and small. Consequently, institutions are faced with various challenges that prevent them from carrying out their traditional mandates of teaching and research effectively. Nevertheless, despite these constraints, it is obvious that the institutions are endowed with scientific and technical experts with capability to produce market and demand driven research products as illustrated in Figure 2. There is therefore the need to introduce IP policy to reshape and redesign the activities of the institutions to tailor them towards creative and inventive activities.

In another perspective, the general assertion is that increment in new technological innovation gives rise to increment in Total Factor Productivity (TFP), which in turn brings about increase in GDP per capita. The question is, how can the research and tertiary institutions in Nigeria be encouraged to make the needful investment that will give rise to innovation and invariably economic growth? To get these institutions to make this investment, adequate incentive and reward system must be put in place (Jackson, 2013). He also asserted that a robust reward system is capable of promoting innovation and bring about the necessary incentives to stimulate investors to invest in technological innovations which will in turn facilitate growth in the economy. Having a reward system that is predicated on a robust IPRs framework

will make the institutions to develop new products and processes that will benefit the society.

Additionally, with such a reward system, the institutions will be willing to invest the necessary resources (money and time) to achieve their objectives. However, such a reward system should not be at the expense of the rest of the public. In other words, the IPRs regime should seek to reward the inventor and at the same time benefit the wider public. All these should be done in such a way that will create a positive impact on the overall economic development of the country.

According to Ofili (2014), for a country that is at the early stages of its development, it will be better off putting in place strategies and policies that encourage technology adoption so as to enhance the imitation of advanced technologies. This should include having a robust educational system that will produce the right human capital, establish policies that will ensure seamless linkage between universities, research institutions and industries and establish policies that will promote institutional-level innovation. Ofili added that it is very important to state that for a country to properly learn and imitate technologies from advanced countries it must build the relevant human capacities to develop, absorb and utilize such technologies.

Arising from the foregoing, Nigeria should have a workforce that has the ability to effectively absorb and adapt imported technologies that are beneficial to its local needs. These kinds of skills can be acquired through appropriate education and by encouraging research and tertiary institutions as well as the SMEs among others to engage in focused research and development programs. There should be strong linkages between the research institutions, tertiary institutions and industries. Such linkage will ensure that research institutions embark on research projects that are

commercially, economically and socially viable and relevant (Ref. Figure 2). To strengthen this sort of linkage, there should be a well-defined framework on how the accrued benefits will be shared between the research/tertiary institutions and researchers in a manner that is mutually beneficial.

Similarly, financial institutions should be encouraged to invest in R&D (Maskus, 2000). Consequently, as the country climbs up the technology advancement ladder it can gradually refine and modify the above strategies and policies to embark on more advanced innovations. At this point the country can begin to further strengthen its IPRs protection.

2.3.5 An Overview of IP Promotion and Technology Transfer Activities in the Research and Tertiary Institutions in other Countries

As earlier mentioned in chapter one, it is of essence to evaluate and appraise the effectiveness of NOTAP in promoting IP in Nigeria vis-à-vis the situation in some developed countries, such as USA and EU as well as some emerging economies like Mexico and Philippines, likewise Kenya and South Africa in Africa. Many developed countries have adopted various types of public policies to enable them promote IP.

According to Wellings (2008), IP in public research institutions especially universities have huge benefit such as:

- Effective management of IP for the benefit of the institutions and the wider economy;
- Incentives and rewards for institutions and staff;

- Linkage between research students, graduate school and effective IP generation and exploitation;
- Co-ordination of Technology Transfer Offices (TTO).

Universities in particular, make two significant and central contributions to national systems of innovation. First, they upgrade the knowledge and skills of students and equip the next generation of researchers, policy-makers and business leaders. Secondly, they simultaneously create new knowledge which supports the development of new products and services.

2.3.5.1 Developed Countries

The developed countries are the United State of America (USA) and the European Union countries under the European Union Intellectual Property Office (EUIPO)

2.3.5.1.1 United State of America (USA)

In the USA, prior to the passage of the Bayh-Dole legislation, universities and public and private research institutions did not aggressively pursue IPRs. Exceptions to this are evident in the reviewed actions by the Wisconsin Alumni Research Foundation (WARF). Research Foundation, which was chartered in 1925 (Fred, 1973). The passage of the Bayh-Dole Act of 1980 however ushered in a second era characterized by increased university licensing, as well as concomitant rising of TTOs, licensing revenues, and, most controversial, commercial influences on universities. Since the passage of the Bayh-Dole Act, universities and research institutions have become the most active patent producers in biotechnology and patent licenses. Nevertheless, while universities still retain the right to public-funded inventions under the Bayh-Dole Act, they do not exercise that right indiscriminately.

The objectives of the Act were to encourage utilization of research, promote collaboration between commercial and non-profit concerns, enhance the commercialization of patented inventions and public availability of inventions and facilitate technology transfer in order to stimulate economic development (Owoseni, 2012).

The Bayh-Dole Act, specifically in the field of health care has strengthened US economic output by $1.3 trillion, supported 4.2 million jobs and resulted in more than 11,000 start-up companies. Some of the benefits of the Act include: -

i. Ownership of patents by Universities
ii. Increase in the number of universities patenting their inventions
iii. University-Industry Collaboration
iv. Increase in Transfer of Technology and Commercialization of Inventions
v. Revenue Generation by Universities
vi. Development of Entrepreneurial skills in universities

The Bayh-Dole Legislative Framework has been widely acknowledged as a successful framework for the promotion and protection of IP and transfer of technology both within and outside the US.

The US serves as a good example to other countries across the globe and became a global leader in R&D in the 20th century, funding as much as 69% of annual global R&D in the period following World War II. The Figure 4 shows the growth in total U.S. R&D expenditures from 1953 to 2018 in current dollars. 2 U.S. R&D in 2018 was 112 times higher than it was in 1953 in current dollars, and more than 15 times higher in constant dollars **(Jr, 2020)**.

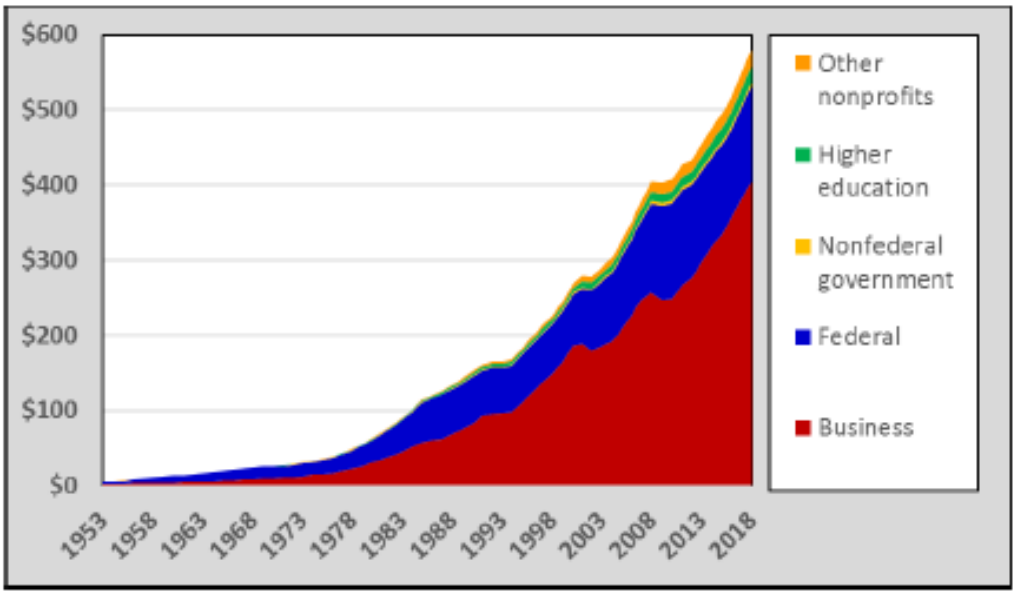


Figure 4: U.S. R&D Expenditures by Source of Funding, 1953-2018

Source: CRS analysis of National Science Foundation, National Patterns of R&D Resources

2.3.5.1.2 The European Union Intellectual Property Office (EUIPO)

The EU operates through a system of supranational independent institutions and Treaties, Directives or Council Regulations which harmonise the national laws of Member States on common policies on major socio-economic and political matters such as IPRs, customs services and tax system. The Treaties and Regulations have a binding force on Member States and take precedence over national laws including the constitutional laws of the Member States. The EU as a body does not have any specific law, like the Bayh-Dole Act in the United States which regulates such issues as ownership of inventions, provision of incentives for researchers and the sharing of rewards. However, some of the Member States have introduced some measures dealing with ownership and title of IP generated by publicly funded research in the universities based on their national laws. Some of these countries include Austria, Denmark, Germany, UK and the Netherlands (Owoseni, 2012).

The European Union Intellectual Property Office (EUIPO) was established in 1994 as one of EU's Agency responsible for the registration of the European Union trade mark (EUTM) (formerly known as "community trade mark") and the registered Community design (RCD), two unitary IPRs valid across the 27 Member States of the EU. The EUIPO enjoys legal, administrative and financial autonomy. The functions of EUIPO are:

- Management of the registration of the EU trade mark and the registered Community design for citizens and businesses with a single application throughout the European Union (EU);
- Harmonisation of registration practices for trademarks and designs and the development of common IP management tools with the cooperation of national and regional IP offices throughout the EU-27;

According to the European Commission (2020) report that over the last two decades, the volume of annual investments in 'IP products' increased by 87% in the EU, while the volume of tangible (non-residential) investments increased by only 30%. Investments in intangibles were also significantly less affected by the 2008 economic crisis.

Furthermore, IP is considered as a key asset for the EU to be able to compete globally. World-wide, the number of IP filings is on the increase. The same trend was noted in the EU. between 2010 and 2019, the number of European patents granted rose from 58 000 to 137 000, approximately. Although the increase is less those recorded in other parts of the world, notably Asia, where the economies are quickly catching up on IP generation, the EU has the means to remain competitive in the global race for technological leadership. It also has a robust IP framework. For

instance, a single application mechanism makes it possible to obtain and enforce trademark, designs and plant variety protection across Europe. The quality of patents granted in Europe is among the highest in the world. European innovators are frontrunners in green technologies. Globally, they hold a major portion of green patents and have particularly strong IP portfolios in technologies such as climate change adaptation, carbon capture and storage, water and waste treatment. European companies are also leaders in specific digital technologies, such as connectivity technologies.

The EU also implements an IP Action Plan 2020 with a focus on the following:

- Promoting effective use and deployment of IP, especially by SMEs,
- Easier access to, and sharing of IP-protected assets
- Fighting IPR infringements

The Table 4 reflects the state-of-play of the implementation on promoting effective use and deployment of IP, especially by SMEs.

Table 4: The implementation on promoting effective use and deployment of IP in the EU

Action	**Status and info**
Provide, with the EUIPO, a scheme for IP **SME vouchers** to finance IPR registration and strategic IP advice (Q1 2021)	IP Vouchers are available from 11 January 2021, to co-finance trade mark and design registration as well as personalized IP

Action	Status and info
	advice (‘IP Scan’).
Roll out **IP assistance services for SMEs** in the 'Horizon Europe' programme and expand it to other EU programmes (2020+)	• New IP Scan services for Horizon participants are available from 22 March 2020. • IP assistance will be better integrated within the EIC support services. • IP assistance will also be integrated into the Invest EU SME window, and gradually into ESIF-funded R&I projects.

Source: (CORKE, 2021)

Additionally, various mechanisms were established by the EU to facilitate technology or knowledge transfer from the research institutions to industry. These include Science Parks, Spin-offs and Start-ups, Incubation Centres and TTOs. Moreso, in the EU, Innovation Relay Centres (IRCs); Knowledge and Innovation Communities (KICs) along with the Co-location Centres (CLCs) were established to facilitate transnational technology transfer. Among the mechanisms, the establishment of TTOs or Knowledge Transfer Organizations emerged as a key mechanism for the commercialization and transfer of technology from the government-funded research institutions and in fostering university-industry linkages.

2.3.5.2 Emerging Economies

The experiences of the emerging economics such as Mexico and the Philippines with respect to the establishment of Technology Transfer Registry in the countries were

similar to the purpose for which NOTAP was set up in Nigeria. In fact, at the commencement of its operation NOTAP gathered experiences from the following organizations in the aforementioned countries:

i. Mexican Institute of Industrial Property (IMPI), Mexico
ii. IP Office of the Philippines

2.3.5.2.1 Mexican Institute of Industrial Property (IMPI), Mexico

The Transfer of Technology Office in Mexico is Mexican Institute of Industrial Property (IMPI). The Institute was created by a Presidential Decree on December 10, 1993 as a legal entity and was entrusted with the task of managing the Industrial Property System in Mexico. It has five regional offices. The services of IMPI in Mexico are:

(i) Publication of Gazette of Industrial Property;

(ii) Provision of support for the expansion of WIPO's Distance Learning;

(iii) Establishment of IP Academy;

(iv) Design of a website to promote the disclosure of technological information contained in patent documents to SMEs by the PYMETEC system;

(v) Establishment of Patent Centres within the Research Institutions, Universities and Industrial Chambers to guide researchers on the processes and registration of IPRs at IMPI and so on.

More than 31 Patenting Centres have been established nationwide. The project is being evaluated to be considered as grounds for the creation of Technology Transfer offices (TTOs) in the Science, Technology and Innovation Act which is being studied by the Congress. Most of the Patenting centres are located inside a library or

a similar place so that all the technical information can be easily accessed. The Centres are managed and supported by the institution or the host organization. The functions of the Patenting Centres among others include:

- Offer IP advisory services on inventions;
- Help inventors to redraft patent applications and to carry on all the paperwork;
- Promote IP culture through conferences, seminars, talks and related courses. (Araba, 2017)

These functions are similar to that of the PIDC in NOTAP.

2.3.5.2.2 Intellectual Property Office of the Philippines

In the Philippines, technology transfer arrangements are regulated by the IP Code of the Intellectual Property Office of the Philippines (IPO). The Directorate responsible for the registration of Transfer of Technology under the IPO is the Documentation, Information of Technology Transfer Bureau (DITTB).

The functions of the DITTB include the following:

(i) Support the search and examination activities of the Office;

(ii) Establish networks or intermediaries or regional representatives;

(iii) Educate the public and build awareness on IP through the organisation of seminars and lectures and other similar activities;

(iv) Establish working relations with R&D institutions as well as with local and international IP professional groups;

(v) Perform state-of the-art searches;

(vi) Promote the use of patent information as an effective tool to facilitate the development of technology in the country and so on.

2.3.5.3 African Countries

As earlier mentioned, the developing countries in Africa considered are South African and Kenya IP Offices.

2.3.5.3.1 The Companies and Intellectual Property Commission (CIPC) – South Africa

The Companies and Intellectual Property Commission (CIPC) is an agency of the Department of Trade and Industry in South Africa. The CIPC was established by the Companies Act, 2008 (Act No. 71 of 2008) as a juristic person to function as an organ of state within the public administration, but as an institution outside the public service. Some of the functions of the Commission are as follows:

- Promotion of education and awareness of Company and IP Law
- Promotion of compliance with relevant legislation
- Efficient and effective enforcement of relevant legislation
- Licensing of Business rescue practitioners
- Report, research and advise the Minister on matters of national policy relating to company and IP law and so on.

To achieve this, CIPC between 2013 to 2018 map out a programme on Innovation and Creativity Promotion. The purpose of the programme is to support the international IP system and to promote local innovation and creativity by maintaining accurate and secure registries of patents, designs, film productions and recordals of indigenous cultural expressions and creative works, as well as by supervising and regulating the distribution of benefits of copyright and IK rights and protecting existing rights. The programme is also responsible for providing policy and legal

insight and advice on the co-ordination, implementation and impact of the respective laws (Companies and Intellectual Property Commission (CIPC), 2021).

2.3.5.3.2 Kenya Industrial Property Institute (KIPI)

Kenya Industrial Property Institute (KIPI) is a government parastatal under the Ministry of Industry, Trade and Cooperatives. The Institute was established on 2nd May 2002 upon the coming into force of the Industrial Property Act 2001. Previously the Institute existed as Kenya Industrial Property Office (KIPO), which was established in February 1990 after the enactment of the Industrial Property Act, CAP 509 of the Laws of Kenya. The functions of the Institute are to:

i. Administer industrial property rights;
ii. Provide technological information to the public;
iii. promote inventiveness and innovativeness in Kenya; and
iv. Provide training on Industrial property.

The general Kenyan public, and in particular the crucial informal sector, is still a long way from understanding the industrial property system let alone how to utilize it for industrial development. Furthermore, the general public is largely unaware of the fact that protection is given for only a limited periody, after strict conditions are met and that once the protection ends, the invention becomes available and accessible in the public domain (Mbuimwe, 2016).

With respect to IP promotion, KIPI educational and Outreach programme was launched in March, 1995 with a view to implementing two of the four core functions of KIPI namely:

- Dissemination of patent information to the public; and;

- Promotion of inventive and innovative activities in Kenya.

The plan of implementation of the programme envisages a strategy of education, collaboration and communication between players in the public sector, private sector and mass media categories. In many ways, the categories overlap which is unavoidable given the variety and often common interests of those involved in industrial property activities. This can be seen as an advantage in developing a broad-based outreach programme as its strength lies in identifying and capitalizing on the linkage between the three groups. This is carried out through the following ways: -

- Shows, Exhibitions, and Trade Fairs;
- Internal Seminars to strengthen the IP capacity of its staff domestically and internationally and seminars based on request for formal institutions;
- Visits to Industries, Research Institutions and Universities;
- Mass Media – such as print and electronic media;
- Students' Congresses on Science and Technology; and
- Promotion and Stimulation of Innovative and Inventive Activities (KIPI, 2017).

2.3.5.4 Lessons for Nigeria

In the US and most EU Member States like Germany and Netherlands as earlier mentioned, effective legislations and IP Policies are put in place. The culture of IP is also well established in the developed countries and the emerging economies. Therefore, formal mechanisms of IPRs such as patenting and licensing are usually pursued to the commercialization stage. Prior to the legislations and policies, the

general trend in all these countries was that the rate of commercialization of technology from the public institutions to the market was low similar to the situation in the research and tertiary institutions in Nigeria as well as the US prior to the enactment of the Bayh - Dole Act in 1980. However, immediately after the legislative framework in the US, there was an upsurge in the patenting and licensing processes. The legislations facilitated patenting and licensing and also encouraged the transfer of research results to the industry.

In the case of EU, the body does not have any specific law, like the Bayh-Dole Act in the United States which regulates the ownership and management of inventions though some of the Member States have. The EU however provided some guidelines to guide Member States on such issues. Though the guidelines are not binding, nevertheless it has facilitated some me the development of IPR and continuous policy formulation and action plans to meet the current trends and challenges relating to knowledge transfer mechanisms among the Member States as did the legislations in the US. In addition to patenting and licensing, other mechanisms such as the establishment of Technology/Knowledge Transfer Offices/Centres, Spin-offs, Start-ups, Incubation centres etc were also established and modalities for their interrelations.

Also unlike in Kenya, South Africa, Mexico and the Philippines, R&D is well funded in the US and EU. For instance, in 1980, the year the Bayh-Dole Act was enacted the US government funded academic research at the Federal level with about USD 8 billion. In Europe, the European Regional Development Fund (ERDF) and the European Social Fund (ESF) play significant roles in financing knowledge transfer projects at the regional and trans-regional level. Another notable feature of the

framework in the developed countries is private sector participation in funding R&D. In the US, the Research Corporation established by Frederick Gardner Cottrell in 1912 was dedicated to promote science. Similarly, the Wisconsin Alumni Research Foundation (WARF) was established to manage university discovery and subsequently recycled research proceeds and channelled them into further academic research (Owoseni, 2012).

Furthermore, in the developed countries, R&D is usually focused on the needs of the society. In the US, Government universities focused on their research mission in areas relevant to the regional economic needs. In the case of EU, the KICs established by the European Institute of Technology (EIT) such as the EIT–ICT lab, KIC InnoEnergy and KIC –Climatic change are all focused on the high society needs in the continent.

Additionally, the developed countries give attention to the Small and Medium Enterprises in their technology transfer process. In the US, the Bayh-Dole Legislation included the SMEs among the beneficiaries of patenting of U.S. government funded inventions by universities, business and non-profit institutions. In the EU, particularly in the Netherlands, 'Innovation Voucher Scheme' was introduced to facilitate access to research outputs by SMEs.

2.4 Summary

This chapter discussed the concept and importance of IP to economic development. It also the discussed theoretical framework for the study. The various theories postulated by some proponents of IP include but not limited to the Utilitarian theory, Labour theory and WIPO Developmental Agenda. In view of the shortcomings of both the Utilitarian and Labour theories in respect of the usefulness of IP on one

hand and the relevance of the developmental approach on other hand, the WIPO concept of development agenda was adopted for the study (WIPO, 2015).

Furthermore, the relevance of the developmental agenda to the study was discussed. Consideration was also given to the economic implications of IP for developing countries with special focus on culture as a starting point for developing IP systems that suit the interests of each particular country. This also led to deliberation on the essence of IP at ensuring that rights of owners are fully maximized as benefit for the value of their works as creators in relation to 'real' property.

Similarly, the role of IPOs in respect of the WIPO Model, in the administration and management of IP was also deliberated and identified that essentially, their major role is in the formulation of international as well as domestic policy on IPRs, examination of IP applications and granting rights under domestic legislation. With respect to Nigeria, the IP system is being coordinated by separate agencies of government which are based on different structures and legislative frameworks. The IPOs are the Trademarks, Patents and Designs Registry, the Nigerian Copyright Commission and NOTAP. The roles of the IPOs though differ in some respects, are complimentary in relation to IP promotion, particularly the establishment of TISC under the Trademarks, Patents and Designs Registry and the Nigerian Copyright Academy by the Nigerian Copyright Commission and the IPTTOs by NOTAP.

Additionally, this section also reflected on the role of IPRs as tools for national wealth economic development. While the developed countries like the US and European Union member states as well as the emerging economies of Mexico, the Philippines and African countries such as South Africa and Kenya have used IP to their advantage; Nigeria is still groping with low IP culture, in response to this, the three IP offices have embarked on various IP promotional strategies such as the

establishment of TISCS by the TPDR, the Nigerian Copyright Academy by NCC and the IPTTOs by NOTAP. While these are beginning to yield some results in the aspect of increase in patent filing, particularly the IPTTOs, there is much to be desired when compared to the IP promotional activities in the developed countries and emerging economies earlier mentioned. This is actually due to various challenges as identified by both national and international experts and organizations including WIPO. The challenges include but not limited to the following, poor research – industry linkage, lack of updated IP law, absence of National IP Policy. Others challenges, are shortage of IP experts, poor funding of research and tertiary institutions. There is therefore the need to proffer solutions to these challenges by drawing lessons from the policies and programmes adopted in some of the advanced countries and emerging economies earlier mentioned.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter focussed on the research methods adopted for the study and begins by restating the research problem followed by the description of the research design. Further to this, the chapter identified and described the population, sampling of data collection instruments and the methods of data collection utilised in the study. The chapter also provides a description of the data analysis and discussed the issue of reliability and validity of the study. It concludes with a summary of the chapter.

3.2 The Research Design

The methodology adopted for the study was majorly quantitative approach. This was based on the use of questionnaire administered to the targeted respondents.

3.3 Population and Sampling

Bearing in mind that the research study focuses on the research and tertiary institutions, therefore the targeted population were lecturers and researchers selected from the tertiary institutions and research institutes in Nigeria where NOTAP established IPTTOs. Taken the above into consideration and bearing in mind the large number of research and tertiary institutions in Nigeria, the sample population was restricted to twenty-five (25) selected institutions across the six (6) geo-political zones in the country. The respondents were made up of two (2) IPTTOs staff and other three researchers/staff from each of the institutions as the main population. In addition, three other research institutes under the Federal Ministry of Science and

Technology and the two other IP Offices in Nigeria i.e. TPDR and NCC were selected as part of the respondents.

3.4 Data Collection Instruments

The data collection instruments used in the study were questionnaire and semi-structured interviews. The questionnaire was used to collect a high proportion of responses from a large sample. The questionnaire consisted of 30 - 40 questions comprising both closed and open-ended questions. This facilitates the gathering of factual information from the respondents while the interview questions were ope ended.

3.5 Data Collection Procedure

Both primary and secondary data format of answering research questions were adopted in the study and the various forms of data collection were explained.

3.6 Analysis and Organization of Data

The imperial Chi- square, X^2 formula and critical ratio Table were adopted as the guiding formula to test the various hypotheses and carry out the analysis of the study. The chi square formula is as stated below while the Table is contained in Appendix 7.

Formula:

$$\times^2 = \frac{O_i - E_i}{E_i}$$

Where: X^2 = Chi-square

O_i = set of observed frequencies

E_i = set of expected frequencies

= summation or total

The calculated X_2, value obtained by the formula is compare with the value from chi-square distribution table (X^2) for a given significant level of say (5) degree to obtain the value of degrees of freedom (df). The contact value and the two must be of significant level.

Degree of freedom (r – 1) (c – 1)

Where: R (r) = number of rows

C (c) = number of columns

To test the hypothesis, the statistic distribution in percentage and chi-square, x was employed.

3.7 Ethical Consideration

In line with the compulsory requirement of the Africa University Research Ethics Committee (AUREC), permission was obtained from the respective institutions prior to the commencement of data collection for the study. conduct research were obtained from each of the institutions. This involves sending informed consent forms for the participants to complete the questionnaire as well as the letter of introduction of the researcher to the various institutions. The AUREC approval letter was also attached to the data request letters sent to the relevant institutions. Respondents' anonymity and confidentiality were also assured.

All copyrighted works were acknowledged and cited with relevant references in the American Psychological Association format to avoid plagiarism. The researcher followed the guidelines of the AUREC in order to maintain high standards of ethical consideration throughout the study (Africa University, 2016). The data solicited for the research study was largely obtained from public institutions, hence the level of risk of breach of confidentiality was minimal.

3.8 Summary

The aim of the research study was to assess the effectiveness of NOTAP in promoting IP in the research institutions in Nigeria. The methodologies adopted were Questionnaire and Interview. The study obtained information from 150 respondents selected from 28 research/tertiary institutions, 2 IP Offices and 5 IP experts. Ethical guidance according to AUREC regulations were complied with in the design of the data collection instruments and also during the data collection process.

CHAPTER 4: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

As mentioned in chapters 1 and 3, the focus of the research study was to examine the effectiveness of NOTAP's IP promotional activities in Nigerian research and tertiary institutions, the relationship between NOTAP promotional activities and other IP offices in Nigeria and the challenges of research-industry linkage. This would assist in knowing the status of IP promotion, the relationship between the IP Offices and the existing challenges with a view to resolving the challenges and improving the IP culture in the country. This chapter consists of the data presentation and analysis, discussions and interpretation of the data including the test of the hypotheses followed by the summary.

4.2 Data Presentation and Analysis

Out of the 150 questionnaires that were administered, 140 were retrieved. 6 questionnaires were reported lost and 4 were returned incomplete. Therefore, the data analysis was based on the retrieved and completed questionnaires. The data analysis was carried out with the use of frequency distribution for the general description of data. This involved a tabular arrangement of the data by class frequencies. There are 46 tables in all. The other data gathered on age and sex were of not much relevance to the study. The use of chi-square (X^2) test of significance was also employed in testing of the hypotheses and analysing the data. It is worth mentioning here that though this stage was interesting, it was the most tedious and time consuming.

4.3 Discussion and Interpretation

4.3.1 Questionnaire Method

Table 5: Classification of Respondents by Age

Age	No of Respondent	Percentage of Respondent by Age
18-25	8	6
26-35	20	14
36-45	60	43
46-55	28	20
56-65	24	17
Total	140	100

Table 5 shows that respondents between 36-45 years age bracket representing 43% of age distribution have the highest responses while those between 18-25 years age bracket representing 6% have the lowest range. This reveals that the middle-aged category responded to the questionnaire more than the younger and older respondents.

Table 6: Classification of Respondents by Sex

Sex	No of Respondent	Percentage Respondent
Male	108	77
Female	32	23
Total	**140**	**100**

Table 6 shows the sex of the respondents. This shows that the males have the highest percentage of responses with 77% while the responses of the females were 23%.

Table 7: How Respondents Know about IP

How respondent knew about IP	No of Respondent	Percentage
Through Commercialization Process	16	12
Through Government Regulators	34	24
Through Institutions/Research Centres	61	44
Through Co-Researchers/Friends	20	14
Others	9	6
Total	**140**	**100**

Table 7 indicates that most of the respondents got to know about IP through Institutions/Research centres which accounts for 44% being the highest followed by Government regulators with 24%, co-researcher/friends with 14% and the commercialization process with 12% while the least was through other means with 6%.

Table 8:Years of Experience of Respondents in Handling IP

Years of Experience in Handling IP	No of Respondent	percentage
1yr-10yrs	78	56
11yrs-20yrs	36	26
21yrs-30yrs	22	16
> 30yrs	4	3
Total	**140**	**100**

The responses from Table 8 reveal that respondents with 1-10 years representing 56% have more experience in handling IP matters than those with more years of experience at work. For instance, those with 11-20 years accounts for 26%, those with 21-30years accounts for 16% and those above 30 years accounts for only 3%. This implies that those with lower years of experience who appears to be the younger generation are more conversant with IP.

Table 9: The kind of IP handled by respondents in their institutions

The Kind of IP handled by respondents in their institutions	**No of Respondent**	**percentage**
Patents	64	46
Trademarks	29	21
Copyrights	26	19
Industrial Designs	19	14
Others	2	1
Total	140	100

Table 9 above shows that most respondents (46%) have handled patents more than trademarks, copyrights, industrial designs while the least respondents (1%) handled other types of IP that were not specified in the Table.

Table 10: How often respondents handle IP related works

How Often Respondent handles IP related works	**No of Respondent**	**percentage**

Always	45	32
Most of the Time	41	29
Sometimes	40	29
Rarely	14	10
Never	0	0
Total	140	100

In Table 10, majority of the respondents representing 32% responded that they always handle IP related works while 10% rarely handle works related to IP. This implies that the target respondents have an idea of IP and handle IP matters at various degrees.

Table 11: Number of IP registered by Institutions

No of IP registered by Institutions	**Patents**	**Copyrights**	**Trademarks**	**Industrial Designs**
Above 20 IP	7 (9.4%)	1 (3.4%)	4 (13.8%)	4 (26.6%)
Between 11-20 IP	4 (5.4%)	1 (3.4%)	1 (3.4%)	1 (6.7%)
Between 1-10 IP	47 (63.5%)	11 (37.9%)	11 (37.9%)	1 (6.7%)
None	16 (29.6%)	16 (29.6%)	13 (24.1%)	9 (16.7%)
Total	**74 (50.3%)**	**29 (19.7%)**	**29 (19.7%)**	**15 (10.2%)**

The responses in Table 11 above reveal that all the categories of respondents registered more patents (50.3%) than other IP rights. This is most likely as a result of the awareness on patent by NOTAP. This was followed by copyrights and trademarks representing 19.7% each while only 10.2% registered industrial designs. On the range of IP registered, 47 respondents registered between 1-10 patents, 4

respondents registered 11-20 patents and 7 respondents registered 20 and more patents. As regards copyright 11 respondents registered between 1-10 copyrights, 1 respondent registered between 11-20 copyrights. Also, 1 respondent registered 20 and more copyrights. On the other hand, 11 respondents registered between 1-10 trademarks, 1 respondent registered between 11-20 trademarks and 4 respondents registered 20 and more trademarks. With respect to industrial designs, only 1 respondent each registered between 1-10 industrial designs and between 11-20 industrial designs while 4 respondents registered 20 and more industrial designs. On the whole, there was none of the respondents who did not register at least one of the IP assets. This demonstrates that the target respondents are aware of IP though with various level of awareness. In addition, the awareness on industrial designs is relatively low compared to patents, copyrights and trademarks. The level of IP awareness in the country is also still low going by the number of filings for the various categories of IP. Therefore, there is the need to beef up more awareness on IP in Nigeria.

Table 12: Usage of technical information in patent documents for product development

Technical Information in Patent Documents used for Product Development	**No of Respondent**	**percentage**
Yes	100	71
No	40	29
Total	140	100

In Table 12, a total of 100 respondents which accounts for 71% have used technical information in patent documents for product development while 40 respondents

which accounts for 29% have not used technical information in patent documents for product development. This shows that despite the low awareness of IP, few researchers who are aware of IP and importance of patents are utilising the knowledge on the technical information in patent documents to their advantage.

Table 13: Patent Licensed or Commercialised

Number of Patents that have been Licensed or Commercialized	**No of Respondent**	**percentage**
> 20	1	1
Btw 1-10	16	11
Btw 11-20	3	2
None	120	86
Total	140	100

Table 13 shows that 86% of the respondents have not had patent being licensed or commercialised while about 2% have had between 11-20 patents licensed or commercialised.

Table 14: Institutions with product in the market

How many Institution has Product in the Market	**No of Respondent**	**percentage**
Yes	30	21
No	110	79
Total	140	100

Table 14 shows that 79% of the respondents indicated that their products are in the market while 21% do not have their products in the market.

Table 15: Institutions which have had financial benefits from IP ventures

How many Institution have had Financial Benefit from IP Venture	No of Respondent	percentage
Yes	15	11
No	125	89
Total	140	100

In Table 15, a total of 125 respondents representing 89% stated that they had not benefited financially from IP ventures while only 15 respondents representing 11% have benefited. This shows that most of the research outputs from the laboratories are not being translated into useful products and services needed in the market which is a clear indication of poor research – industry linkage.

Table 16: Reason why product does not bring financial benefit

Why Known Product does not bring Financial Benefit	No of Respondent	percentage
The Commercialization process is difficult	24	17
The institution does not support commercialization process	56	40
No adequate information on commercialization process	16	11
Lack of fund	30	21
Others	14	10
Total	140	100

In Table 16, 56 respondents representing 40% attributed non-financial benefits from their research outputs to lack of institutional support for the commercialization process. This was followed by lack of funds noted by 30 respondents (21%) and difficulty of the commercialization process noted by 24 respondents (11%). The

remaining 14 respondents (10%) noted that other reasons accounted for this. The import of this is that efforts should be made to develop the entrepreneurial skills of researchers. Researchers should also be trained on the commercialization cum licensing processes to enable them derive financial benefits from their research outputs. It is also very significant for each institution to provide financial support for the commercialization of research outputs emanating from their institutions. Above all, there is the need for each research institution to develop an IP policy which will address the other issues mentioned.

Table 17: Respondents on Number of Patents filed by individual researchers without their institutions

Whether researchers have registered IP without their Institutions	**No of Respondent**	**percentage**
Yes	54	39
No	86	61
Total	140	100

Table 17 shows that 86 respondents representing 61% indicated that they did not register IP personally without their institutions while 54 respondents representing 39% filed IP without their institutions. The number of researchers filing IP without their institutions is quite significant and it portrays either lack of IP policy in their institutions or non-compliance with the policy due to some internal issues.

Table 18: Registration of IP emanating from collaborative Research with other Institutions

Whether respondents have registered IP emanating from collaborative research with other institutions	**No of Respondent**	**percentage**
Yes	41	29

No	99	71
Total	140	100

The data from Table 18 reveals that a total of 99 respondents representing 71% did not register any IP involving collaborative research with other institutions while 41 respondents representing 29 did. This implies that most researchers are not carrying out collaborative research and if they do, it does not result in IP registration.

Table 19: Number of Respondents who have had training on IP

Whether respondents have had training on IP	**No of Respondent**	**percentage**
Yes	92	66
No	48	34
Total	140	100

In Table 19, 66% of the respondents agreed to have been trained on IP while 34% said that they have not been trained. The responses reveal that a substantial number of the target respondents have been trained on IP. This was actually as a result of NOTAP Training programmes on IP for researchers.

Table 20: How often respondents have IP Training

How often do Respondents have Training on IP?	**No of Respondent**	**percentage**
Always	18	13
Most of the Time	16	11
Sometimes	24	17
Rarely	26	19
Never	56	40
Total	140	100

Table 20 shows that 56 respondents constituting 40% of the target population noted that they have never had training on IP while a total of 84 respondents constituting 60% have had training on IP either occasionally, most of the time or always. This further buttressed the awareness and training programmes by NOTAP among the researchers in the research and tertiary institutions in Nigeria.

Table 21: How well do respondent know about NOTAP's IP promotion

How well do you know about NOTAP IP Promotion	No of Respondent	percentage
Very well	62	44
Fairly well	56	40
Not really	16	11
Not at all	6	4
Total	140	100

Table 20 indicates that majority of the respondents constituting 44% are aware of NOTAP's IP promotion very well. Another 40% also know about NOTAP IP promotion fairly well. However, 11% of the respondents does not really know about NOTAP IP promotion while 4% did not know about NOTAP's IP promotion at all. On the whole, a total of 84% of the respondents know about NOTAP IP promotion fairly well and very well. This is highly significant and affirms the visibility of NOTAP IP promotional activities in the research and tertiary institutions in Nigeria.

Table 22: What respondent know about NOTAP in relation to IP

What do you know about NOTAP in	Patents	Copyrights	Trademarks	Licence & Franchising	Technology Transfer	IP Negotiation

relation to IP						
Number	37	10	14	11	15	7
Total	37	10	14	11	15	7

In Table 22, 37 of the respondents know NOTAP in terms of Patents. This is followed by the respondents who know NOTAP about technology transfer. The least number of respondents who are 7 in number know NOTAP about IP negotiation while those who know NOTAP about other IP rights such as copyrights, trademarks and franchising are in between the peak and the least responses.

This demonstrates that the respondents are aware of NOTAP major roles which are facilitating technology transfer and providing patent support services.

Table 23: How often do institutions submit IP applications through NOTAP?

How often Institutions Submit IP applications through NOTAP	No of Respondent	percentage
Always	24	17
Most of the Time	16	11
Sometimes	46	33
Rarely	32	23
Never	22	16
Total	140	100

Table 23 shows that 33% of the institutions always submit IP applications for registration through NOTAP while 11% of the institutions submit their IP applications through NOTAP most of the times. However, 33% of the institutions rarely submit their IP applications through NOTAP while 16% never submit their IP applications through NOTAP. In effect, NOTAP IP promotional activities have had

some impacts in terms of patent filing. The impact is however not yet felt by majority of researchers.

Table 24: How many Institutions file IP applications through other IP Offices beside NOTAP?

Does your Institution file IP applications through other IP Offices beside NOTAP?	No of Respondent	Percentage
Yes	22	16
No	118	84
Total	140	100

Table 24 shows that a total of 118 respondents constituting 84% indicated that their institutions do not file their IP applications directly with other IP offices other than NOTAP while 22 respondents constituting 16% noted that their institutions file their applications directly with other IP offices i.e., Nigerian Copyright Commission and the Trademarks Patents and Designs Registry. The high number of respondents filing their IP applications through NOTAP implies that the role of NOTAP as a patent agent is quite notable. It also buttresses the fact that NOTAP's IP promotional activities have impact among researchers in the research and tertiary institutions.

Table 25: Specific IP applications filed outside NOTAP

IP applications filed outside NOTAP	No of Respondent	Percentage
Patents	10	45
Trademarks	7	32
Copyrights	5	23
Total	22	100

The data from Table 25 reveals that IP applications which are not filed with NOTAP comprise 10 patents representing 45% followed by 7 trademarks representing 32% and 5 copyrights representing 23%. In effect, some institutions do file their IP applications through other means apart from notap. these other means are indicated in Table 26.

Table 26: Other means by which IP applications are filed beside NOTAP

Means by which IP applications are filed other than by NOTAP	**No of Respondent**	**Percentage**
Foreign Application	1	5
IP Agents	19	86
Directly through the IP offices	2	9
Total	22	100

Table 26 shows other means by which IP applications are filed apart from NOTAP are through foreign applications, other IP agents and directly through other IP offices. From Table 26, only 1 IP application constituting 5% was filed through foreign application. Also, 19 IP applications constituting 86% were filed through other IP agents while 2 IP applications constituting 9% were filed directly through the other IP offices.

Table 27: Ways by which NOTAP promotes IP in Nigeria

Ways by which NOTAP is promoting IP in Nigeria	**No of Respondent**	**percentage**
Through Patent support services	50	36
Through commercialization of IP	18	13

Through Training/ IP awareness activities such Publications	28	20
Through Establishment of IPTTO	44	31
Total	140	100

The data from Table 27 reveals that the major IP promotional activity being carried out by NOTAP, indicated by 50 respondents is provision of patent support services. The next notable promotional activity indicated by respondents is the establishment of IPTTO. This is followed by commercialization of IP and training/IP awareness programme.

Table 28: NOTAP's rating in IP promotion performance

How would you rate NOTAP IP promotion performance?	**No of Respondent**	**Percentage**
Excellence	26	19
Very Good	36	26
Good	48	34
Fair	20	14
Poor	10	7
Total	140	100

Table 28 reveals that majority of the respondents constituting 34% rated NOTAP's performance of its IP promotional activities good while 7% rated it poor. This implies that though NOTAP IP promotional activities are not excellent, they are adjudged to be good by majority of the respondents.

Table 29: Has NOTAP established IPTTO in your Institutions?

Has NOTAP established IPTTO in your institution?	**No of Respondents**	**Percentage**
Yes	52	37

No	88	63
Total	140	100

In Table 29, majority of the respondents representing 63% indicate that NOTAP has not established IPTTO in their Institutions while 37% noted that NOTAP has established IPTTO in their institutions. This implies that NOTAP needs to intensify efforts to establish IPTTOs in the other research and tertiary institutions where they are not yet established to promote the culture of IP in the institutions.

Table 30: Are the IPTTOs performing as required in institutions where they are established?

Are the IPTTOs performing as required?	**No of Respondent**	**Percentage**
Yes	14	48
No	15	52
Total	29	100

Table 30 shows that 52% of the respondents noted that the IPTTOs are not performing as required while 48% agreed that the IPTTOs are performing as required. This signifies that the IPTTOs are still performing below expectation. Therefore, much need to be done for the IPTTOs to achieve the purpose for which they are established.

Table 31: Challenges affecting NOTAP's Promotional activities

What are the challenges affecting NOTAP's Promotional activities	**No of Respondent**	**Percentage**
Inadequate funding	29	21

Improper Government/institutional policy	24	17
Inadequate resources and manpower	18	13
Inadequate Awareness/Long processing time	51	36
Inadequate interaction and coordination of the IPTTO by NOTAP	18	13
Total	140	100

Table 31 indicated that majority of the respondents constituting 36% said that inadequate awareness/long processing time is a major factor affecting NOTAP's promotional activities while the least number of respondents constituting 13% identified inadequate resources and manpower as the impeding factor. Other challenges are inadequate interaction and coordination of the IPTTO by NOTAP. This indicates that some notable challenges are impeding the performance of NOTAP promotional activities.

Table 32: Perception about NCC IP promotional activities

Your Perception about NCC IP promotion activities	**No of Respondent**	**Percentage**
Excellent	8	6
Very Good	8	6
Good	28	20
Fair	77	55
Poor	19	14
Total	140	100

In Table 32, majority of the respondents representing 55% perceived NCC IP promotional activities as fair while another 14% perceived the performance as poor

while only 12% of respondents rated NCC IP promotional activities to be very good and excellent. This may actually be due to the fact that the agency's IP promotional activities are no longer publicised as before.

Table 33: Complimentary Effort between NCC and NOTAP's IP promotional roles

Is there any complementary effort between NCC and NOTAP's IP Promotional Roles?	**No of Respondent**	**Percentage**
Yes	76	54
No	64	46
Total	140	100

Table 33 reveals that majority of the respondents representing 54% noted that there is a complimentary effort between NCC and NOTAP's IP promotional roles while 46% said that there is no complimentary effort between IP promotional roles of the two agencies.

Table 34: Opinion about IP promotional activities by TPDR

Your Opinion about IP promotion activities by Trademarks, Patents and Design Registry in Nigeria	**No of Respondent**	**Percentage**
Excellent	8	6
Very Good	8	6

Good	24	17
Fair	72	51
Poor	28	20
Total	140	100

Table 34 indicates that majority of the respondents representing 51% noted that IP promotional activities of TPDR is fair. Another 20% noted that it is poor while 6% each noted that the promotional activities are very good and excellent respectively. This is probably because the IP promotional activities of the Registry are not very pronounced and recognized by researchers..

Table 35: Complimentary effort between TPDR and NOTAP's IP promotional roles

Is there any complementary effort between Trademarks, Patents & Designs Registry and NOTAP's IP Promotional Roles?	**No of Respondent**	**Percentage**
Yes	92	66
No	48	34
Total	140	100

As in the case of NCC, Table 35 reveals that majority of the respondents constituting 66% said that there is a complimentary effort between the TPDR and NOTAP's IP promotional roles while 34% said that there is no complimentary effort in the IP promotional roles of the two agencies. The responses reveal that there is a relationship between NOTAP and the other two IP offices in Nigeria i.e., Nigerian Copyright Commission and the Trademarks Patents and Designs Registry. Also, there is complimentary effort in the IP promotional roles of the two agencies with that of NOTAP.

4.3.2 Interview Data Method

As earlier indicated under the research methodology, in addition to the questionnaire, the use of interview was adopted to compliment the data gathered from the respondents on the questionnaire. The interview method also helped to obtain information from IP experts which were used to corroborate facts deduced from the other research method. On the whole, five experts were interviewed. These comprise two IP practitioners and three management staff of the three IP offices in Nigeria i.e., NCC, TPDR and NOTAP. The interview questions were structured as open-ended questions to enable the experts express their opinions on the identified issues without restriction.

Out of the five experts, responses were obtained from five of them. Below is the summary of the opinions expressed by the experts on the various issues.

Table 36: Interviewee's Response on schedule of duties involving IP promotion

Does your schedule of duties involve IP promotion	**No of Response**	**Percentage**
Yes	4	80
No	1	20
Total	5	100

From the responses in Table 36, 4 out of the interviewees constituting 80% noted that their schedule of duties involves IP promotion. This indicates that the targeted interviewees are those knowledgeable in the subject matter of the research study.

Table 37: Interviewee's Response on the field of IP they are really engaged in.

Which field of IP are you really engaged in.	**No of Responses**	**Percentage**
Patents	3	38

Trademarks	2	25
Copyrights	3	38
Total	8	100

The opinions expressed in Table 37 reveals that three interviewees representing 38% each were engaged in patents and copyrights while two interviewees representing 25% were engaged in trademarks. In effect, the experts are divided in the subject matter of IP in which they are engaged. This is because some of the interviewees are staff of the three IP offices and handle different aspects of IP. However, from the responses, some of the experts engage in more than one aspect of IP. This accounts for why the total responses was more than the number of interviewees.

Table 38: Interviewees' Response on their agency engagement in IP promotion in the research and tertiary institutions in Nigeria

Is your agency engaged in any IP promotion in the research and tertiary institution in Nigeria?	**No of Responses**	**Percentage**
Yes	4	80
No	1	20
Total	5	100

In Table 38, four of the interviewees representing 80% noted that their agencies engage in IP promotion in the research and tertiary institutions in Nigeria while one interviewee representing 20% noted that his agency is not engaged in IP probably the interviewee is not working in an IP office.

Table 39: Interviewee's Response on their interaction and collaboration with other IP Office in the country

Does your agency interact and collaborate with	**No of**	**Percentage**

other IP Office in the country?	Responses	
Yes	5	100
No	0	0
Total	5	100

The data obtained from the Table 39 reveals that the agencies where the interviewees work interact and collaborate with other IP offices in the country. This implies that generally there is interaction and collaboration among the IP offices in the country.

Table 40: Interviewees' Response on IP Offices' collaboration in relation to IP Promotion

IP Offices collaborations	No of Responses	Percentage
Trademarks, Patent & Design Registry	4	36
Nigerian Copyright Commission	2	18
NOTAP	5	45
Total	11	100

Table 40 shows that 45% of the interviewees said that they have had interaction and collaboration activities with NOTAP. 35% of the interviewees also noted to have had interaction and collaboration engagements with Trademarks, Patent and Designs Registry while 18% alluded to have had interaction and collaboration engagements with NCC. From Table 40, all the interviewees agreed to have had interaction and collaboration activities with NOTAP, while 4 noted that they have had interaction and collaboration engagements with TPDR and 2 of the interviewees alluded to have had interaction and collaboration engagements with NCC. Therefore, this is a general indication that the three IP offices collaborate in their IP promotional programmes.

Table 41: Interviewees' Response on awareness of the IP promotional activities by NOTAP

Are you aware of the IP promotional activities by NOTAP?	No of Responses	Percentage
Yes	5	100
No	0	0
Total	5	100

From Table 41, the data reveals that all the interviewees are aware of NOTAP's IP promotional activities. This is a clear indication that NOTAP's role in IP promotion in the country is quite visible.

Table 42: Interviewee's Response on the ways by which NOTAP is promoting IP in Nigeria

Ways by which NOTAP is promoting IP in Nigeria	No of Responses	Percentage
The establishment of IPTTOs	4	22
Awareness Programmes	5	28
Training programmes	3	17
Patent Support Services	4	22
Research-Industry linkage Programme	2	11
Total	18	100

The data presented in Table 42 rated awareness programme as topmost means by which NOTAP is promoting IP. This is followed by the establishment of IPTTOs and provision of patent support services which ranked the same. Next is the provision of training programmes while research-industry linkage is the least. This shows that the first three IP promotional activities of NOTAP are more prominent while the research-industry linkage is less prominent.

Table 43: Interviewee's opinion about the impact of NOTAP's IP promotion activities in the research and tertiary institutions in Nigeria

What do you think about NOTAP's IP promotional activities in the research and tertiary institutions in Nigeria?	No of Responses	Percentage
Impactful	5	100
Not Impactful	0	0
Total	5	100

Table 43 reveals that all the interviewees agreed that NOTAP's IP promotional activities are impactful. This implies that the IP promotional activities by NOTAP in the research and tertiary institutions in Nigeria have impact.

Table 44: Interviewee's opinion about the effectiveness of NOTAP's IP promotion activities in the research and tertiary institutions in Nigeria

How effective are NOTAP's IP promotion activities in the research and tertiary institutions in Nigeria?	No of Responses	Percentage
Effective	1	20
Not Effective	4	80
Total	5	100

Table 44 reveals that 80% of the interviewees noted that NOTAP IP promotional activities are not effective. When this is juxtaposed with the responses on the impact of NOTAP IP promotional activities, it shows that though the activities have impact in the institutions, the impact is not yet effective.

Table 45: Interviewees' opinion about the linkage between IP generated in the research and tertiary institutions to the industry in Nigeria

Is there any linkage between IP generated in the research and tertiary institutions to the industries in Nigeria?	No of Responses	Percentage
There is linkage	2	40
There is no linkage	3	60
Total	5	100

Table 45 shows that 40% of the interviewees responded that there is linkage between IP generated in the research and tertiary institutions and the industry in Nigeria while 60% are of the opinion that there is no linkage. This implies that there is little or poor research-industry linkage in Nigeria.

4.3.3 Test of Hypotheses

4.3.3.1 Hypothesis I

H_1: NOTAP's IP promotional activities in Nigerian research and tertiary institutions are visible.

H_0: NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not visible.

To test the hypothesis I, Chi-Square test was used and the result obtained is presented in Table 46. Result indicates that there is a significant difference in the number respondents that have been trained on IP and those that have not been trained. The number of respondents that indicated that training on IP either on always, most of the time, sometimes or rarely (86) were more than those that have never been trained (56). The Chi-square of 5.60 was obtained with P-value of 0.018. The probability value is less than 0.05 meaning that training is organised on IP. Result also reveals

that the knowledge of respondents about IP differs as the majority of the respondents perceived NOTAP more in terms of patent and this result is statistically significant (χ^2 -calc. = 37.489, P =0.000, P<0.01). The distribution of how often institutions Submit IP applications through NOTAP was also significant (P =0.000, P<0.05) as most of them indicated that this is sometimes done. In terms of the establishment of IPTTO, result indicates that IPTTO are not established in most of the institutions as the number of respondents that were affirmative was significantly less than that of respondents who were affirmative (χ^2 -calc. = 9.257, P =0.002, P<0.01). From these results, though majority number of respondents who indicated that IP organized training were significantly higher than those that said never, result shows that NOTAP does not establish IPTTO in most of the institutions, IP applications are sometimes submitted (P = 0.000, P<0.01) and it is concluded that NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not visible.

Table 46: Chi-Square result summary testing the visibility of NOTAP's IP promotional activities in Nigerian research and tertiary institutions

Questions	**O_i**	**E_i**	**df**	**χ^2 - calc.**	**P-value**
How often do Respondents have Training on IP? (*Ref. Table 20*)					
Trained	8	70.00	1	5.60	0.018*

	4				
Not trained	56	70.00			
What do you know about NOTAP in relation to IP (*Ref. Table 22***)**					
Patents	37	15.70			
Copyrights	10	15.70	5	37.489	0.000**
Trademarks	14	15.70			
Licence and Franchising	11	15.70			
Technology transfer	15	15.70			
IP negotiation	7	15.70			
How often Institutions Submit IP applications through NOTAP (*Ref. Table 23***)**					
Always	24	28.00	4	19.143	0.0000**
Most of the Time	16	28.00			
Sometimes	46	28.00			
Rarely	32	28.00			
Never	22	28.00			
Has NOTAP established IPTTO in your institution? (*Ref. Table 29***)**					
Yes	52	70.00	1	9.257	0.002**

No	88	70.00			

*O_i = observed frequencies, Ei = expected frequencies, *Significant at 5% (P<0.05).*

***Significant at 1% (P<0.01).*

4.3.3.2 Hypothesis II

H_1: There is an impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions.

H_0: There is no impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions.

Table 47 presents the analysis of the impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions. Result shows that most of the respondents rated NOTAP IP promotion performance as good and this was significant at 1% (χ^2 -calc. = 30.571, P =0.000, P<0.01). The P-value of 0.000 is less than 0.05 and the χ^2 -calculated of 30.571 is greater than the (χ^2 -tabulated of 9.49 with 4 degrees of freedom at 5% level of significance. Hence, the null hypothesis above is rejected and therefore, there is an impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions.

Table 47: Chi-Square result summary testing the impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions

Questions	O_i	E_i	df	χ^2 - calc.	P-value

How do you rate NOTAP IP promotion performance? (*Ref. Table 28***)**					
Excellence	26	28.00	4	30.571	0.000**
Very Good	36	28.00			
Good	48	28.00			
Fair	20	28.00			
Poor	10	28.00			
Has NOTAP established IPTTO in your institution? (*Ref. Table 29***)**					
Yes	52	70.00	1	9.257	0.002**
No	88	70.00			

*O_i = observed frequencies, Ei = expected frequencies, **Significant at 1% (P<0.05)*

4.3.3.3 Hypothesis III

H_1: NOTAP's IP promotional activities in in Nigerian research and tertiary institutions are effective.

H_0: NOTAP's IP promotional activities in in Nigerian research and tertiary institutions are not effective

Table 48 below examine the effectiveness of NOTAP's IP promotional activities in in Nigerian research and tertiary institutions. Result reveals χ^2 -calculated of 0.034 with P-value of 0.l853 and χ^2 -critical of 3.84 at the 0.05 level of significance with

1 degree of freedom. The χ^2 -calculated (0.034) is not greater than the χ^2 -critical (3.84). The null hypothesis is not rejected. Hence, NOTAP's IP promotional activities in in Nigerian research and tertiary institutions are not effective. In terms of challenges, result indicated that inadequate awareness/Long processing time was the major challenge affecting NOTAP's Promotional activities (χ^2 -calculated = 26.643, P =0.000, P<0.01).

Table 48: Chi-Square result summary testing the effectiveness of NOTAP's IP promotional activities in Nigerian research and tertiary institutions

Questions	**O_i**	**E_i**	**Df**	**χ^2 - calc.**	**P-value**
Are the IPTTOs performing as required? (*Ref. Table 30***)**					
Yes	14	14.50	1	0.034	0.853
No	15	14.50			
What are the challenges affecting NOTAP's Promotional activities? (*Ref. Table 31***)**					
Inadequate funding	29	28.00			
Improper Government/institutional policy	24	28.00			
Inadequate resource and manpower	18	28.00	4	26.643	0.000**
Inadequate Awareness/Long	51	28.00			

processing time					
Inadequate interaction and coordination of the IPTTO by NOTAP	18	28.00			

*O_i = observed frequencies, Ei = expected frequencies, **Significant at 1% (P<0.05).*

4.3.3.4 Hypothesis IV

H_1: There is a significant relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions.

H_0: There is no significant relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions.

Table 49 presents summary result of the relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions. The number of respondents that perceived the promotion activities of NCC IP has been fair was significantly higher than those that perceived it as excellent, very good, good and poor (χ^2 -calc. = 117.214, P =0.000, P<0.01). For the relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions, result reveals χ^2 -calculated of 1.029 and P-value of 0.310 at the 0.05 level of

significance with 1 degrees of freedom with χ^2 -critical of 3.84. The χ^2 -calculated of 1.029 is less than the χ^2 -critical of 3.84. The null hypothesis is not rejected. Hence, there is no significant relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions.

Table 49: Chi-Square result summary testing whether there is relationship or complementary efforts between NOTAP and other IP Offices in respect of IP Promotion in Nigerian Research and Tertiary Institutions

Questions	**O_i**	**E_i**	**df**	**χ^2 - calc.**	**P-value**
Your Perception about NCC IP promotion activities? (*Ref. Table 32***)**					
Excellent	8	28.00	4	117.214	0.000**
Very Good	8	28.00			
Good	28	28.00			
Fair	77	28.00			
Poor	19	28.00			
Is there any complementary effort between NCC and NOTAP's IP Promotional Roles? (*Ref. Table 33***)**					
Yes	76	70.00	1	1.029	0.310
No	64	70.00			
Your Opinion about IP promotion activities by Trademarks, Patents and					

Design Registry in Nigeria (*Ref. Table 4.30***)**					
Excellent	8	28.00	4	98.286	0.0000**
Very Good	8	28.00			
Good	24	28.00			
Fair	72	28.00			
Poor	28	28.00			
Is there any complementary effort between Trademarks, Patents & Designs Registry and NOTAP's IP Promotional Roles? (*Ref. Table 35***)**					
Yes	92	70.00	1	13.829	0.0000**
No	48	70.00			

*O_i = observed frequencies, Ei = expected frequencies, **Significant at 1% (P<0.05).*

4.3.3.5 Hypothesis V

H_1: There exist challenges of research-industry linkage in Nigeria.

H_0: There are no challenges of research-industry linkage in Nigeria.

Table 50 shows challenges of research-industry linkage in Nigeria. The major challenge affecting NOTAP's promotional activities is inadequate Awareness/Long processing time with χ^2 -calculated of 26.643 and P-value of 0.0000 with χ^2 -critical of 9.49. The χ^2 -calculated (26.643) is greater than χ^2 -critical (9.49), the null hypothesis is rejected. Hence, there exist challenges of research-industry linkage in Nigeria. The major challenge was inadequate Awareness/Long processing time.

Table 50: Chi-Square result for challenges of research-industry linkage in Nigeria.

Questions	**O_i**	**E_i**	**df**	**χ^2 - calc.**	**P-value**
What are the challenges affecting NOTAP's Promotional activities (*Ref. Table 31***)**					
Inadequate funding	29	28.00			
Improper Government/ institutional policy	24	28.00	4	26.643	0.0000**
Inadequate resource and manpower	18	28.00			
Inadequate Awareness/Long processing time	51	28.00			
Inadequate interaction and coordination of the IPTTO by NOTAP	18	28.00			
	0				

*O_i = observed frequencies, Ei = expected frequencies, **Significant at 1% (P<0.05).*

4.4 Summary

This chapter analyses data based on the review of chapter 2 and using the adopted research methodology in chapter 3, to further understand the five research objectives and the arising research questions and the drawn hypotheses. The purpose of the

analysis was to establish whether NOTAP's IP promotional role in research and tertiary institutions in Nigeria is effective and to analysis the relationship of NOTAP with other IP Offices in the country and to recommend ways to resolving the challenges affecting it effectiveness.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the research findings, the implications of the research, the conclusions, the recommendations and suggestions for future research.

5.2 Summary of the Findings

The analysis of the data was carried out using Chi-square statistical analysis. The summary of the research findings are as follows:

i. NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not visible.

ii. There is an impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions.

iii. NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not effective.

iv. There is no significant relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions.

v. There exist challenges of research-industry linkage in Nigeria.

5.3 Conclusions

The result obtained is presented in Table 46 - 50. First, the result indicates that NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not visible. From the findings of the study, it was concluded that NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not visible.

This could be as a result of the fact that the total number of IPTTOs established in the in the research and tertiary institutions are insignificant when compared with the total number of institutions in the country. Additionally, in some institutions where IPTTOs are established, the institutions have not made concerted effort to sensitize the researchers or staff about the roles and services being rendered by the IPTTOs. In other words, there is disconnection between the IPTTOs and the researchers in the institutions. In another vein, it appears that in some of the institutions where NOTAP has established IPTTOs, the IPTTOs are not functioning as expected as a result of which some members of the academic community are not aware of their existence and their roles in the institutions. Second, NOTAP has not established IPTTOs in most of the research institutions. Therefore, members of such institutions are not likely to be aware of NOTAP IP promotional activities like those in institutions where IPTTOs are already established. As could be gathered from the findings, respondents from institutions where IPTTOs are established alluded to the fact that they had IP organized training. They also perceived NOTAP as a patent agent and agreed that they submitted patent applications through NOTAP which implies that NOTAP IP promotional activities are visible at least in institutions where IPTTOs are established.

Table 47 presents the analysis of the impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions. Result shows that most of the respondents rated NOTAP IP promotion performance as good. Therefore, there is an impact of NOTAP's IP promotional activities in Nigerian research and tertiary institutions. The findings can be justified based on the experiences of respondents who are aware and have also benefitted from the services rendered by the IPTTOs in their institutions.

Table 48 examine the effectiveness of NOTAP's IP promotional activities in Nigerian research and tertiary institutions. Result reveals that NOTAP's IP promotional activities in Nigerian research and tertiary institutions are not effective. This actually indicates that though NOTAP IP promotional activities are already having impact in the institutions, the impact is not yet effective owing to various challenges which include inadequate awareness/long processing time for providing patent support services for researchers by the agency, inadequate funding, shortage of manpower and so forth as indicated in Table 30.

Table 49 presents summary result of the relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions. Result reveals there is no significant relationship or complementary efforts between NOTAP and other IP Offices in respect of IP promotion in Nigerian research and tertiary institutions. This must have been based on the fact that NOTAP's IP promotional activities have made some impact among researchers while the activities of the other two IP offices are seldom felt by researchers in the research and tertiary institutions. As a matter of fact, the activities of the TPDR relate more to the industrialist while that of NCC relate more to the performing artists than researchers.

Table 50 shows that there exist challenges of research-industry linkage in Nigeria. Ideally, IP generated in the research and tertiary institutions is expected to fuel and support innovations by the industry. Also, research results emanating from the institutions are expected to translate into products and services in the market place but this is not currently happening at the rate it should especially in view of inadequate interface between the two. The major challenge affecting NOTAP's

promotional activities is inadequate Awareness/Long processing time. Hence, the major challenge was inadequate Awareness/Long processing time.

5.4 Implications

From the findings of the study, NOTAP IP promotional activities are important and the impact is already been felt especially in the institutions where IPTTOs have been established. However, the impact is not yet effective in the country owing to various challenges which include inadequate awareness/long processing time. First, the IPTTOs in most of the institutions are not functioning properly as some researchers in the institutions where the IPTTOs are established are either not aware of the existence or utilise their services. Second, the research and tertiary institutions in the country are many and IPTTOs are yet to be established in most of the institutions to enable researchers benefit from the activities.

Therefore, NOTAP needs to intensify effort to ensure that the established IPTTOs are well guided and monitored to enable them achieve the desired objectives in the institutions. Also, efforts should be made to establish more IPTTOs in the institutions that are not yet covered. This will help to improve the culture of IP in the country. To achieve these, the challenges impeding the effective performance of NOTAP IP promotional activities should be adequately addressed.

5.5 Recommendations

In view of the findings of the research study, the following are recommended:

i. NOTAP should intensify efforts to resolve the challenges impeding the effectiveness of its IP promotional activities particularly, inadequate awareness/long processing time of patent applications
ii. Efforts should be made to establish IPTTOs in the research and tertiary institutions where they are not yet established in order to improve the culture

of IP in the country and enhance the quality of the research outputs emanating from the institutions.

iii. NOTAP should ensure proper and effective coordination and monitoring of the programmes of the IPTTOs established in the research and tertiary institutions

iv. The IP awareness programmes by NOTAP should be heightened to ensure that various sectors of the economy are sensitized on the importance and the role of IP to their endeavours/businesses through collaborations with relevant agencies in the country.

v. Deliberate effort needs to be made either through institutional and /or national policy(s) to facilitate research-industry linkage in Nigeria so as to promote national economic development.

vi. NOTAP should develop a web portal for researchers, inventors and SMEs to access technical information contained in patent documents online like the PYMETEC system Web Portal by the Mexican Institute of Industrial Property for the purpose of using them to develop technologies to meet local needs. Strategies for should also be put in place to strengthen the capacity of researchers to absorb imported technologies to domesticate them to suit the local environment.

vii. Research institutions also need to develop institutional IP policies and strategies to guide them in developing demand/market driven inventions and create viable incentive system for researchers through the use of IP sharing formula.

viii. NOTAP and the other two IP Offices should collaborate with the IP expert group that is planning to develop the national IP policy for proper

implementation of IP matters in the country. Interaction and cooperation between NOTAP and other IPOs should also be heightened particularly, in the area of IP promotion.

ix. NOTAP should be empowered in terms of adequate funding and manpower to enable it implement effectively all its programmes and activities particularly, those relating to IP promotion so as to help develop the national technology base.

5.6 Suggestions for Further Research

In recognition of the fact that NOTAP IP promotional activities in the research and tertiary institutions are not effective, it will be necessary to conduct further research in this area. This will help to determine the strategies that can make the activities effective so as to achieve the desired objectives.

REFERENCES

Adeboye, T. (1995). Diffusion of Precommercial Inventions from Government-Funded Research Institutions in Nigeria. In *Technology Policy and Practice in Africa: Technical Change, Innovation, and Diffusion* (pp. 119–139). Ottawa, ON, Canada: International Development Research Centre. Retrieved from https://prd-idrc.azureedge.net/sites/default/files/openebooks/319-4/#page_119

Akhbari, K., (2018). *What Is Intellectual Property?* Legal Match. Retrieved from https://www.legalmatch.com/law-library/article/intellectual-property-law.html

Alaneme, L., (2009, July-September). Technology and Intellectual Property Critical Tool for African Development. *Science and Technology Digest Magazine,* Vol 7. P. 15.

Alams, H., (2008, October- December). Can Vision 2020 Succeed without Science & Technology? The National Research and Development Coordinating Council, Federal Ministry of Science and Technology Task Ahead. *Science and Technology Digest Magazine*. Vol 6. P. 23.

Araba, F., (2005). *Intellectual Property Regime, Technology Transfer and Innovation Culture – Prerequisites for National Development in Nigeria*. Abuja: TADI.

Brady et al., (2015). *UK University Technology Transfer: Behind the Headlines - A Note from the UK's Leading University Technology Transfer Professionals*. UK

Cohen, L, Manion, L, & Morrison, K. (2007). *Observation. Research Methods in Education,* 6, 396-412.

Cooper, D. R, & Schindler, P. S. (2006). *Marketing Research. New York*: McGraw-Hill/irwin

Creswell, J. W. (2009). *Research design: Qualitative and Mixed Methods Approaches*. London and Thousand Oaks: Sage Publications.

Denscombe, M., (2007). *Grounded theory. The Good Research Guide for Small-Scale Social Research Projects* (88-106) (3rd ed.) (3 Reimp.) Berkshire, England: McGraw-Hill

Denscombe, M., (2010). *The Good Research Guide–for Small-Scale Social*. Oxford University Press. (Vol .4)

Denscombe, M., (2014). *The Good Research Guide: for Small-Scale Social Research Projects*. McGraw-Hill Education (UK).

Federal Ministry of Education (2020). *Institution: List of Federal, State and Private Universities in Nigeria*. Ministry of Education. Retrieved from https://education.gov.ng/government-universities

Fred, E. B., (1973). *The Role of the Wisconsin Alumni Research Foundation in the Support of Research at the University of Wisconsin.* Madison: Wisconsin Alumni Research Foundation

Ibrahim, D. (2020). Overview of Intellectual Property (IP) Management Systems and Role in National Development. *Training Workshop of Nigerian Researchers on Intellectual Property Right (IPR) and Writing Skills for a Grant Winning Proposal* (pp. 9-25). Abuja: NOTAP.

International Chamber of Commerce and World Intellectual Property Organisation (2011). Making Intellectual Property Work for Business: A Handbook for Chambers of Commerce and Business Associations Setting up Intellectual Property Services. Geneva: WIPO.

Jackson, E. T. (2013). Interrogating the Theory of Change: Evaluating Impact Investing Where It Matters Most. *Journal of Sustainable Finance & Investment,* 3(2), 95-110.

Kahn, J. H., (2006). Factor Analysis in Counseling Psychology Research, Training, and Practice: Principles, Advances, and Applications. *The Counseling Psychologist,* 34(5), 684-718.

Kanwar, S, & Evenson, R. (2003). Does Intellectual Property Protection Spur Technological change? Oxford Economic Papers,55(2), 235-264.

Kiljunen, Kimmo (2004). *The European Constitution in the Making*. Centre for European Policy Studies. pp. 21– 26. ISBN 978-92-9079-493-6

Maskus, K., (2000), Intellectual Property Rights and Economic Development, Revised Draft. Cleveland, Ohio: Case Western Reserve University

Maskus, K.E. (2000). Intellectual Property Rights in the Global Economy. *Institute for International Economics*, Washington, DC.

McMillan, J. H., & Schumacher, S. (2010). *Research in Education: Evidence-based Inquiry* (7th ed.). Boston: Pearson.

Menell, P. S., (1999). Intellectual property: General Theories. *Encyclopedia of Law and Economics*, 2, 129-188.

Mersha, B. & Debesu, K., (2012). Theories of Intellectual Property. *Abyssinia Law*. accessed on 18/11/2020 from <https://www.abyssinialaw.com/online-resources/study-on-line/item/468-theories-of-intellectual-property>

Micklewright, B., (2020). *Patents: The Intellectual Property Office.* IP Career, UK. Retrieved from https://www.ipcareers.co.uk/career-advice/the-intellectual-property-office

Adeboye, T. (1995). Diffusion of Precommercial Inventions from Government-Funded Research Institutions in Nigeria. In *Technology Policy and Practice in Africa: Technical Change, Innovation, and Diffusion* (pp. 119–139). Ottawa, ON, Canada: International Development Research Centre. Retrieved from https://prd-idrc.azureedge.net/sites/default/files/openebooks/319-4/#page_119

Companies and Intellectual Property Commission (CIPC). (2021). CIPC Functions. Retrieved 11 April 2021, from http://www.cipc.co.za/index.php/about/our-functions/

CORKE, M. L. (2021, March 3). Intellectual Property Action Plan implementation [Text]. Retrieved 11 April 2021, from Internal Market, Industry, Entrepreneurship and SMEs—European Commission website: https://ec.europa.eu/growth/industry/policy/intellectual-property-action-plan-implementation_en

Daniel, S. (2014). Nigerian Innovators Get Connected. *WIPO Magazine*. Retrieved from https://www.wipo.int/wipo_magazine/en/2014/01/article_0009.html

De Beer, J. (Ed.). (2009). *Implementing the world intellectual property organization's development agenda*. Ottawa: Wilfred Laurier Univ. Press.

Jr, J. F. S. (2020). U.S. Research and Development Funding and Performance: Fact Sheet. *Fact Sheet*, 6.

KIPI. (2017). Kenya Industrial Property Institute: IP Education and Outreach programme. Retrieved 11 April 2021, from http://www.kipi.go.ke/index.php/outreach

Mbuimwe, F. (2016). Strengthening Kenya's IP Landscape. *WIPO Magazine*, 7.

Mossoff, A. (2012). Saving Locke From Marx: The Labor Theory of Value in Intellectual Property Theory. *Social Philosophy and Policy*, *29*(2), 283–317. https://doi.org/10.1017/S0265052511000288

Netanel, N. W. (2008). *Introduction: The WIPO Development Agenda and Its Development Policy Context* (SSRN Scholarly Paper No. ID 1310388). Rochester, NY: Social Science Research Network. Retrieved from Social Science Research Network website: https://papers.ssrn.com/abstract=1310388

Onipede, K. J. (2010). Technology Development in Nigeria: The Nigerian Machine Tools Industry Experience. *Journal of Economics*, *1*(2), 85–90. https://doi.org/10.1080/09765239.2010.11884927

Naoum, S. G., (2007). Dissertation research and writing for construction students (2nd ed.). Elsevier, UK.

National Office for Technology Acquisition and Promotion (2006). *Guidelines on Developing Intellectual Property Policy*. p.4

National Office for Technology Acquisition and Promotion (2006). *Proceedings of the National Workshop on Developing Intellectual Property Policies and Establishing Intellectual Property and Transfer of Technology Offices (IPTTO) in Tertiary and Research Institutions*. p.3

Netanel, N. W. (2008). *Introduction: The WIPO Development Agenda and Its Development Policy Context* (SSRN Scholarly Paper No. ID 1310388). Rochester, NY: Social Science Research Network. Retrieved from Social Science Research Network website: https://papers.ssrn.com/abstract=1310388

Ofili, O. U., (2014). Intellectual Property Rights Protection and Economic Development: The Case of Nigeria. *European Scientific Journal*, 1-145.

Okongwu, D. A., (2007). *Fifty Years of Technology Transfer in Nigeria: 1956-2006: The Quest for Technological Capability and Economic Transformation*. Ucheakonam Foundation. P 4

Olwan, R. M., (2011). *Intellectual Property and Development: Theory and Practice*. Yarmouk University. Jordan

Onyido, J., (2019). *Strengthening Intellectual Property Rights to Protect Innovators and Creators in Nigeria*. University of Abuja, Abuja. p. 6.

Owoseni, C, (2011). *Intellectual Property Rights as an Aid to Wealth Creation and Economic Development: A- One Day National Workshop on Strengthening Technology in Nigeria*. NOTAP

Patton, M. Q., (1990). *Qualitative evaluation and research methods*. SAGE Publications, inc.

Panshak,Y., Civcir, I., & Ozdeser, H. (2019). *Technology Gap and the Role of National Innovation System in a Balance of Payments Constrained Growth Model: Empirical Evidence from Nigeria*. SAGE Open, 9(1), 2158244019828846. p. 2

Saunders, M., Lewis, P., & Thornhill, A (2007). *Research methods. Business Students* 4th edition Pearson Education Limited, England.

Sakakibara, M. and Branstetter, L. (2001). Do stronger Patents Induce More Innovation? Evidence from the 1988 Japanese patent law Reforms. *Rand Journal of Economics*, 32(1): 77-100.

Sekaran, U., (2003) *Research Methods for Business: A Skill-Building Approach*. 4th Edition, John Wiley & Sons, New York.

Shukran, K., Sultana, R. & Rahman, F. (2011). *Moving towards the knowledge-based economy: A comparative study between Malaysia and South Korea.* 1-6. 10.1109/ICRIIS.2011.6125722

Sikoyo, G. M, Nyukuri, E, & Wakhungu, J. W. (2006). *Intellectual Property Protection in Africa Status of Laws, Research and Policy Analysis in Ghana, Kenya, Nigeria, South Africa and Uganda.*

Stiglitz, J.E., (2008), Economic Foundations of Intellectual Property Rights, *Duke Law Journal*, vol 57

The Bayh- Dole Act (2006). *The Bayh- Dole Act at 25*. Bayh-Dole25, Inc. New York, page 38;

The Laws of the Federal Republic of Nigeria. (2004). *NOTAP Act Cap. N62 LFN 2004*.

Wellings, P. (2020). *Intellectual Property and Research Benefits: A Report Prepared for the Rt. Hon. John Denham, MP, Secretary of State for Innovation, Universities and Skills*. Lancaster University: UK

Wikipedia Encyclopaedia Online. (2020). *Intellectual Property*. accessed on 19/11/2020 from https://en.wikipedia.org/wiki/Intellectual_property

World Trade Organisation (WTO). (Ed.) (1995). *The Trade-Related Aspect of Intellectual Property Rights* (TRIPS Agreement)

World Intellectual Property Organisation (2011). IP Asset Development and Management: A Key Strategy for Economic Growth. p. 19

World Intellectual Property Organisation (2015). Methodology for the Development of National Intellectual Property Strategies. p.24

World Intellectual Property Organisation (2015). Methodology for the Development of National Intellectual Property Strategies. p.32

World Intellectual Property Organisation (2011). IP Asset Development and Management: A Key Strategy for Economic Growth. p. 29

World Intellectual Property Organisation (2017). Using IP for development: Success stories from around the world. p. 7 – 9

World Intellectual Property Organisation (2015). Methodology for the Development of National Intellectual Property Strategies. p.27

World Intellectual Property Organisation (2015). Methodology for the Development of National Intellectual Property Strategies.

World Intellectual Property Organisation (2011). What is intellectual property? p.27

World Intellectual Property Organisation (2011). IP Asset Development and Management: A Key Strategy for Economic Growth. p. 4

World Intellectual Property Organisation (2015). Methodology for the Development of National Intellectual Property Strategies. P. 13

World Intellectual Property Organisation (2019). World Intellectual Property Indicators 2019.

APPENDICES

Appendix 1: Informed Consent

COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

INFORMED CONSENT

My name is **Ayoade, Kenny Shalom** a Master's Degree (MIP) student from **Africa University, Mutari, Zimbabwe.** I am carrying out a study on *The Effectiveness of the National Office for Technology Acquisition and Promotion (NOTAP) in Promotion of Intellectual Property in Nigerian Research and Tertiary Institutions.* I am kindly asking you to participate in this study by answering these questions/filling in this questionnaire.

Purpose of the study:
The purpose of the study is to assess the roles and to evaluate the effectiveness of NOTAP in the promotion of Intellectual Property (IP) in Nigeria especially in the tertiary and research institutions which has become extremely necessary as an agency of government. You were selected as part of the 150 participants for the study because your insightful responses on the subject matter will help to know what NOTAP is achieving it objectives or not and to strategize NOTAP's efforts on the issue on IP promotion.

Procedures and duration
If you decide to participate you will be expected to completely fill a questionnaire and the likelihood to participate in a virtual semi-fucus interview for about 30mins to 45mins while the questionnaire will take 10mins to 15mins.

Risks and discomforts
Few potential risks are anticipated for the research. Psychologically, the participants may be distracted from their core duties in the course of attending to the demands of the research. To curtail or minimise that, the research questions and the semi-structured interviews as the case may be, will be made to be as brief as possible.

Benefits and/or compensation

There would be any form of renumeration to the participants from the researcher.

Confidentiality

Although the participants would be required to state their names and that of their institutions, this information would not be disclosed in the published work. The work would only publish the data received and analysed. As such, the privacy and confidentiality of the participants would be maintained. The questionnaire retrieved and contents of the document analysis and semi-structured interviews would be kept private by the researcher at all times.

Voluntary participation

Participation in this study is voluntary. If participant decides not to participate in this study, their decision will not affect their future relationship with the researcher nor with NOTAP or the participant's organisation or other authority) If they chose to participate, they are free to withdraw their consent and to discontinue participation without penalty.

Offer to answer questions

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

Authorisation

If you have decided to participate in this study, please sign this form in the space provide below as an indication that you have read and understood the information provided above and have agreed to participate.

Name of Research Participant (please print) Date

Signature of Research Participant or legally authorised representative

If you have any questions concerning this study or consent form beyond those answered by the researcher including questions about the research, your rights as a research participant, or if you feel that you have been treated unfairly and would like to talk to someone other than the researcher, please feel free to contact the Africa University Research Ethics Committee on telephone (020) 60075 or 60026 extension 1156 email aurec@africau.edu

Appendix 2: AUREC Approval Letter

AFRICA UNIVERSITY
(A United Methodist-Related Institution)
INVESTING IN AFRICA'S FUTURE

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 website: www.africau.edu

Ref: AU1931/21 5 March, 2021

Kenny Shalom AYOADE
C/O CBPLG
Africa University
Box 1320
Mutare

RE: **THE EFFECTIVENESS OF THE NATIONAL OFFICE FOR TECHNOLOGY ACQUISITION AND PROMOTION (NOTAP) IN PROMOTION OF INTELLECTUAL PROPERTY IN NIGERIAN RESEARCH AND TERTIARY INSTITUTIONS**

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal
b) Data collection instruments
c) Informed consent guide

- **APPROVAL NUMBER** AUREC1931/21
  This number should be used on all correspondences, consent forms, and appropriate documents.
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** March 5, 2021
- **EXPIRATION DATE** March 5, 2022
- **TYPE OF MEETING** Expedited
  After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.
- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)
APPROVED
P.O. BOX 1320, MUTARE, ZIMBABWE

Yours Faithfully

MARY CHINZOU – A/AUREC ADMINISTRATORFOR CHAIRPERSON, AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE

Appendix 3: Questionnaire for Intellectual Property Managers, IPTTOS Managers/Staff

QUESTIONNAIRE FOR INTELLECTUAL PROPERTY MANAGERS, IPTTOS MANAGERS/STAFF

I am a post graduate student of Africa University, Mutare, Zimbabwe. I am currently carrying out a research study on "the effectiveness of NOTAP's role in promoting IP in Research and Tertiary Institutions in Nigeria". Please, kindly note that all information is strictly for research purpose and will be treated with confidentiality. In this regard, I will appreciate your effort in assisting me to complete this questionnaire. This will only take 10 – 15 minutes of your time.

Please tick ☐ and complete as appropriate for each question.

PART A: DEMOGRAPHIC DATA

1. Name of respondent (Optional)……
2. Institution ……..……
3. Age: (18 – 25) ☐ (26 – 35) ☐ (36 – 45) ☐ (46 – 55) ☐ (56 – 65) ☐
4. Sex: Male ☐ Female ☐
5. How long have you worked in the institution? …….....
6. Faculty, Department or Unit ……...
7. What is your specific discipline?.....
8. Position in the institution: ……

PART B: COMPETENCY INDICATOR

9. Are you involved in Intellectual Property (IP) and IP related matters in your institution?

   Yes ☐ No ☐
10. If yes to above, how long have you worked on IP and IP related matters in your institution? Please specify, ☐
11. What kind of IP have you processed or handled for your institution?

    Patents ☐ Trademark ☐ Copyrights ☐ Industrial Designs ☐

    (If others, please specify)

12. How often do you handle such IP or IP related job in your institution?

Always ☐ Most of the time ☐ Sometimes ☐ Rarely ☐ Never ☐

13. How many of the following Intellectual Property Rights (IPRs) below have you assisted your institution to register?

Patents ☐ Copyrights ☐ Trademarks ☐ Industrial Designs ☐

(If any other, please specify)

14. With relation to patent, have you used technical information contained in patent document to fabricate/design or improve your existing R&D, products or process for your institution before? Please highlight.

15. How many of these IP have your institution licensed or commercialised? Please, itemize them?

16. Does your institution have any well-known product(s) in the market? Yes ☐ No ☐

If yes, how many, please name them?

17. Have your institution or researchers benefitted financially from any IP venture at any time? Yes ☐ No ☐ If yes, please give an estimated figure ☐

If no, please give reason. ☐

18. Have you registered a personal IP before? Yes ☐ No ☐

19. Have you registered an IP in conjunction with any other person or Institution in or outside Nigeria? Yes ☐ No ☐

If yes, state the name of the person(s) or institution(s)

☐

20. Have you undertaken any training on IP before? Yes ☐ No ☐ If yes, how often, where and in which area of IP? Please enumerate.

☐

PART C: PERFORMANCE INDICATORS

Please tick and complete as appropriate for each question.

21. How well do you know about NOTAP and its drive on IP Promotion?

Very well ☐ Fairly well ☐ Not really ☐ Not at all ☐

22. How regularly does your institution work with NOTAP on IP related issues (Patents, Copyrights, Licensing, Negotiations, Trademarks or Other IP matter?

Always ☐ Most of the time ☐ Sometimes ☐ Rarely ☐ Never ☐

23. How often does your institution submit an IP for registration through NOTAP?

Always ☐ Most of the time ☐ Sometimes ☐ Rarely ☐ Never ☐

24. Does your institution process or register IP protection through other IP Offices other than NOTAP in Nigeria? Yes ☐ No ☐

If yes, please list the IP you often register without NOTAP?

25. In what ways do you think NOTAP is promoting IP in Nigeria? Please itemize.

26. How will you rate NOTAP's performance in IP promotion in your institution?

Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor ☐

27. Has NOTAP established an Intellectual Property and Technology Transfer Office (IPTTO) in your institution? Yes ☐ No ☐

28. Do you think the IPTTOs are functioning or performing as required? Yes ☐ No ☐

29. What do you think are the challenges affecting NOTAP's IP promotion activities?

30. What is your perception about IP promotion activities by the Nigerian Copyright Commission (NCC)?

31. With respect to the above, do you think there is any complementary effort or relationship with NOTAP's IP promotion? Yes ☐ No ☐

32. What is your opinion about IP promotion activities by the Trademarks, Patents and Designs Registry in Nigeria?

33. With respect to the above, do you think there is any complementary effort or relationship with NOTAP's IP promotion? Yes ☐ No ☐

34. What suggestions do you have concerning IP promotion in Nigeria?

Thank you for completing this questionnaire!!!

Appendix 4: Questionnaire for Researchers and Lecturers

QUESTIONNAIRE FOR RESEARCHERS AND LECTURERS

I am a post graduate student of Africa University, Mutare, Zimbabwe. I am currently carrying out a research study on "the effectiveness of NOTAP's role in promoting IP in Research and Tertiary Institutions in Nigeria". Please, kindly note that all information is strictly for research purpose and will be treated with confidentiality. In this regard, I will appreciate your effort in assisting me to complete this questionnaire. This will only take 10 – 15 minutes of your time.

Please tick ☐ and complete as appropriate for each question.

PART A: DEMOGRAPHIC DATA

1. Name of respondent (Optional)……
2. Age: (18 – 25) ☐ (26 – 35) ☐ (36 – 45) ☐ (46 – 55) ☐ (56 – 65) ☐
3. Sex: Male ☐ Female ☐
4. Institution ……..
5. How long have you worked in the institution? …….....
6. Faculty, Department or Unit ……
7. What is your specific discipline?.....
8. Position in the institution: ……..……

PART B: COMPETENCY INDICATOR

9. When and how did you get to know about Intellectual Property (IP) and IP related issues in your institution?
10. Have you applied for registration of any of the following before?

    Patents ☐ Trademark ☐ Copyrights ☐ Industrial Designs ☐

    (If any other, please specify)
11. Which, if any, of the following IP related subject are you conversant with?

    Patents ☐ Trademark ☐ Copyrights ☐ Industrial Designs ☐

Others (Specify) All of the above ☐ None of the Above ☐

12. How often do you come across such IP or IP related works in your work schedule?

Always ☐ Most of the time ☐ Sometimes ☐ Rarely ☐ Never ☐

13. How many Intellectual Property Rights (IPRs) have you registered?

Patents ☐ Copyrights ☐ Trademarks ☐ Industrial Designs ☐

(If others, please specify) ☐

14. Are you conversant with technical information contained in patent document?

Yes ☐ No ☐

15. If Yes, have you used technical information in patent document to improve an existing process technologies or products before? Yes ☐ No ☐ If Yes, please explain.

16. How many of these products have been licensed or commercialised by your institution? Please, itemize them.

17. Does your institution have any well-known product(s) in the market in Nigeria or elsewhere? Yes ☐ No ☐

If yes, how many, please name them?

18. Have you as a researcher benefitted financially from any IP venture at any time?

Yes ☐ No ☐ If yes, please give an estimated figure

If no, please give reason

19. Have you registered an IP in conjunction with any other person or institution in or outside Nigeria? Yes ☐ No ☐ If yes, state the name of the person(s) or institution(s)

20. Have you obtained any training on IP in or outside Nigeria before? Yes ☐ No ☐

If Yes, how often, where and in which area of IP? Please enumerate.

PART C: PERFORMANCE INDICATORS

Please tick and complete as appropriate for each question.

21. How well do you know about NOTAP and its drive on IP Promotion?

Very well ☐ Fairly well ☐ Not really ☐ Not at all ☐

22. What do you know about NOTAP in relation to IP? Copyrights ☐ Licensing ☐

Negotiations ☐ Trademarks ☐ Technology Transfer ☐ Other IPs Matter ☐

23. How often does your institution submit an IP for registration through NOTAP?

Always ☐ Most of the time ☐ Sometimes ☐ Rarely ☐ Not sure ☐

24. Does your institution process or register IP protection through other IP Offices other than NOTAP in Nigeria? Yes ☐ No ☐

If yes, please list the IPs you often get done without NOTAP?

25. In what ways do you think NOTAP is promoting IP in Nigeria? Please itemize.

26. How will you rate NOTAP's performance in IP promotion in your institution?

Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor ☐

27. Has NOTAP established an Intellectual Property and Technology Transfer Office (IPTTO) in your institution? Yes ☐ No ☐

28. What do you think are the challenges affecting NOTAP's IP promotion activities?

29. What is your perception about IP promotion activities by the Nigerian Copyright Commission (NCC)?

30. With respect to the above, do you think there is any complementary effort or relationship with NOTAP's IP promotion? Yes ☐ No ☐

31. What is your opinion about IP promotion activities by the Trademarks, Patents and Designs Registry in Nigeria?

32. With respect to the above, do you think there is any complementary effort or relationship with NOTAP's IP promotion? Yes ☐ No ☐

33. What suggestions do you have to promote IP system in Nigeria?

Thank you for completing this questionnaire!!!

Appendix 5: Interview Guide

INTERVIEW QUESTIONS FOR INTELLECTUAL PROPERTY OFFICE (IP) AND IP PROFESSIONALS

I am a post graduate student of Africa University, Mutare, Zimbabwe. I am currently carrying out a research study on "**the effectiveness of NOTAP's role in promoting IP in Research and Tertiary Institutions in Nigeria**". Please, kindly note that all information is strictly for research purpose and will be treated with confidentiality. In view of your experience in IP, I will appreciate your effort in assisting me to respond to the following questions.

1. Which institution do your work or have worked before?
2. Which position did you hold or held before in your institution?
3. Does or did your schedule of duties involve IP promotion?
4. If yes to the above, which field of IP are you really engaged in?
5. Is your agency engaged in any IP promotion in the research and tertiary institution in Nigeria? If yes, please state the IP promotional activities.
6. In the course of the IP promotion, does your agency interact and collaborate with other IP Office in the country?
7. If yes, please mention the IP Offices and indicate the area(s) of collaborations.
8. Are you aware of the IP promotional activities by NOTAP?
9. In what ways do you think NOTAP is promoting IP in Nigeria?
10. In your view, what do you think about NOTAP's IP promotion activities in the research and tertiary institutions in Nigeria?
11. What are your suggestions for NOTAP IP promotional activities in the research and tertiary institutions to be more effective?

Thank you for your effort and time!!!

Appendix 6: Status of Patent Applications Submitted to NOTAP by Intellectual Property and Technology Transfer Offices (IPTTOS) as at December, 2018

STATUS OF PATENT APPLICATIONS SUBMITTED TO NOTAP BY INTELLECTUAL PROPERTY AND TECHNOLOGY TRANSFER OFFICES (IPTTOs) AS AT DECEMBER, 2018

S/N	ESTABLISHED IPTTOS	DATE ESTABLISHED/ DATE COMMISSIONED	IP APPLICATIONS SUBMITTED TO NOTAP	PATEN GRANT
1	Federal Institute of Industrial Research, Oshodi (FIIRO) Lagos	2007/2008	37	26
2	University of Lagos (UNILAG)	2007/ -2008	1	1
3	University of Ibadan,	2007/ 2011	5	3
4	Federal University of Agriculture Abeokuta, Ogun State	2007/ 2010	5	0
5	Obafemi Awolowo University (OAU), Ile-Ife, Osun State	2007/ 2011	12	0
6	Ogun State University (Agoiwoye)	2008/ 2009	0	0
7	Federal University of Technology, Akure	2007/ 2010	22	1
8	Yaba College of Technology, Yaba, Lagos	2007/ 2009	5	1
9	Covenant University Ota, Ogun State	2010/ 2010	52	24
10	LASUTH	2012/ -	0	0
11	Enugu State University of Science & Technology (ESUT)	2008/ -	0	0
12	Federal University of Technology, Owerri (FUTO)	2008/ 2008	7	3
13	Federal Polytechnic, Nekede	2009/ 2012	14	1
14	Project Development Institute (PRODA), Enugu	2007\ 2008	6	6
15	National Root Crops Research Institute (NRCRI), Umudike	2008/ 2012	0	0
16	University of Nigeria (UNN), Nsukka,	2008/ 2008	22	6

	Enugu			
17	Nnamdi Azikiwe University (NAU), Awka	2007/ 2008	9	2
18	Ebonyi State University, Abakaliki	2018	0	0
19	Rivers State University of Science and Technology (RSUST)	2008/ -	3	0
20	University of Benin	2007/ 2012	13	0
21	University of Uyo (UNIUYO)	2007/ -	2	2
22	University of Port Harcourt	2007/ 2010	26	4
23	University of Calabar (UNICAL)	2012/ -	8	1
24	Delta State University, Abraka	2018	0	0
25	Federal University, Otuoke, Beyelsa State	2018/2018	0	0
26	Ahmadu Bello University (ABU), Samaru, Zaria	2007/ 2008	1	0
27	Kaduna Polytechnic, Kaduna	2008/ 2008	0	0
28	Nigerian Research Institute of Chemical Technology (NARICT), Zaria	2007/ 2008	6	4
39	Air force Institute of Technology, Kaduna	2011/ 2011	5	2
30	Usman Dan Fodiyo University, Sokoto	2012/ -	3	3
31	Nigerian Defence Acedamy,Kaduna	2012/ -	0	0
32	Umaru Musa Yar'Adua University, Katsina	2018	0	0
33	National Institute for Pharmaceutical Research and Development (NIPRD), Idu, Abuja	2007/ 2011	0	0
34	Nigerian Building and Road Research Institute (NBRRI) Abuja	2007/ -	11	0
35	University of Jos	2008/ -	5	2
36	University of Agriculture Makurdi	2007/ -	0	0
37	Nasarawa State University	2012/ 2013	0	0
38	University of Ilorin, Kwara State	2012/2018	4	0
39	Federal University of Technology,	2018	12	3

	Minna			
40	University of Maiduguri	2007/ -	4	2
41	MAUTECH, Yola, Adamawa State	2011/ 2011	5	0
42	Tafawa Balawa University, Bauchi	2012/ 2015	2	2
43	Federal polytechnic, Bauchi	2012/ 2015	0	0
TOTAL		-	0	0

Source: NOTAP-PIDC

Appendix 7: Chi-Square Distribution

CHI-SQUARE DISTRIBUTION

Degrees of Freedom *(df)*	**Probability** (p)										
	0.95	0.90	0.80	0.70	0.50	0.30	0.20	0.10	0.05	0.01	0.001
1	0.004	0.02	0.06	0.15	0.46	1.07	1.64	2.71	3.84	6.64	10.83
2	0.10	0.21	0.45	0.71	1.39	2.41	3.22	4.60	5.99	9.21	13.82
3	0.35	0.58	1.01	1.42	2.37	3.66	4.64	6.25	7.82	11.34	16.27
4	0.71	1.06	1.65	2.20	3.36	4.88	5.99	7.78	9.49	13.28	18.47
5	1.14	1.61	2.34	3.00	4.35	6.06	7.29	9.24	11.07	15.09	20.52
6	1.63	2.20	3.07	3.83	5.35	7.23	8.56	10.64	12.59	16.81	22.46
7	2.17	2.83	3.82	4.67	6.35	8.38	9.80	12.02	14.07	18.48	24.32
8	2.73	3.49	4.59	5.53	7.34	9.52	11.03	13.36	15.51	20.09	26.12
9	3.32	4.17	5.38	6.39	8.34	10.66	12.24	14.68	16.92	21.67	27.88
10	3.94	4.86	6.18	7.27	9.34	11.78	13.44	15.99	18.31	23.21	29.59
	Nonsignificant								Significant		

Source: R.A. Fisher and F. Yates, Statistical Tables for Biological Agricultural and Medical Research