

FACTORS INFLUENCING GREEN INFORMATION TECHNOLOGY  
ADOPTION IN NIGERIAN HIGHER INSTITUTIONS

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## **DEDICATION**

This thesis is first and foremost dedicated to Allah (SWT) for the gift life and blessings numerous to mention. This work is also dedicated to my father, Alh. Muslim Muhammad, who passed away on 16<sup>th</sup> April, 2020 (May Allah, SWT grant him Jannatul Firdaus, Amin.), and my mother, Hajiya Hauwa'u Muslim for leading me to the intellectual pursuit.

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## ABSTRACT

In the last decade, there has been an increase in the awareness of environmental decline and Information Technology (IT) is identified as one of the causes. IT is a significant contributor of electronic waste (e-waste), consumer of energy and emitter of greenhouse gases such as carbon dioxide (CO<sub>2</sub>). Thus, Green information technology or Green IT is practised to address the effect of IT on the environment and make IT infrastructure more sustainable. Green IT adoption is considered a reasonable undertaking for organisations. Although previous studies investigated Green IT from an organisational perspective, few have examined factors influencing Green IT adoption from the perspective of the Chief Information Officers (CIOs). As such, this study investigated factors influencing the adoption of Green IT from the perspective of CIOs and IT senior managers. Specifically, the effect of Compatibility (CO), Cost Advantage (CA), Management Support (MS), IT Strategic Alignment (ITSA), Institutional Innovativeness (II), Regulatory Pressure (RP), Vendor Support (VS) and Ethical Responsibility (ER) on Green IT adoption were examined. Moreover, this study also looked into the impact of Green IT Goals (GITG) and Goals Feedback (GF) on institutional Green IT adoption. To determine the effect of these factors, a survey method was used in this study. The synergetic perspectives of Technology-Organisation-Environment (TOE) framework and Goal-Setting Theory (GST) were used to develop the research model based on the literature review. Data were also collected from CIOs and IT senior managers of Nigerian Universities and 143 valid responses were received based on purposive sampling. A structural equation modelling software, SmartPLS was used to analyse the hypotheses. The result of the study shows that GITG, CA, MS, ITSA, II and RP were supported whereas, GF, CO, VS and ER do not influence Green IT adoption. The findings also revealed that II, CA, and RP were found to be the most influential, followed by MS, ITSA and GITG. Furthermore, the institutional size was found to positively moderate the relationship between institutional innovativeness and Green IT adoption. In contrast, the institutional budget does not moderate the relationship between institutional innovativeness and Green IT adoption. These findings would be useful in helping CIOs make well-informed policies on technology adoption, particularly on Green IT adoption, which will potentially save cost and the environment in the future.

## ABSTRAK

Dalam dekad yang lalu, terdapat peningkatan kesedaran mengenai penurunan persekitaran dan Teknologi Maklumat (IT) dikenal pasti sebagai salah satu penyebabnya. IT adalah penyumbang utama sisa elektronik yang penting (*e-waste*), pengguna tenaga dan pemancar gas rumah hijau seperti karbon dioksida (CO<sub>2</sub>). Oleh itu, teknologi maklumat Hijau atau *Green IT* dipraktikkan untuk menangani kesan IT terhadap alam sekitar dan menjadikan infrastruktur IT lebih mampan. Penerapan IT hijau dianggap sebagai usaha yang wajar untuk organisasi. Walaupun kajian terdahulu mengkaji IT Hijau dari perspektif organisasi, hanya sedikit yang mengkaji faktor-faktor yang mempengaruhi penggunaan IT Hijau dari perspektif *Chief Information Officer* (CIO). Oleh itu, kajian ini mengkaji faktor-faktor yang mempengaruhi penerapan IT Hijau dari perspektif CIO dan pengurus kanan IT. Secara khususnya, kesan Keserasian (CO), Kelebihan Kos (CA), Sokongan Pengurusan (MS), Penyelarasan Strategi IT (ITSA), Inovasi Institusi (II), Tekanan Pengatur (RP), Sokongan Vendor (VS) dan Tanggungjawab Etika (ER) mengenai penggunaan IT Hijau turut dikaji. Selain itu, kajian ini juga mengkaji kesan Matlamat IT Hijau (GITG) dan Maklum Balas Matlamat (GF) terhadap penerapan IT Hijau institusi. Untuk menentukan kesan faktor-faktor ini, kaedah tinjauan digunakan dalam kajian ini. Perspektif synergetik kerangka Teknologi-Organisasi-Alam Sekitar (TOE) dan Teori Penetapan-Matlamat (GST) digunakan untuk membangunkan model kajian berdasarkan tinjauan literatur. Data dikumpulkan dari CIO dan pengurus kanan IT Universiti Nigeria dan 143 maklum balas yang sah diterima berdasarkan persampelan bertujuan. Perisian pemodelan persamaan struktur, SmartPLS digunakan untuk menganalisis hipotesis. Hasil kajian menunjukkan bahawa GITG, CA, MS, ITSA, II dan RP didapati paling berpengaruh, sedangkan GF, CO, VS dan ER tidak mempengaruhi penerapan IT. Hasil kajian juga menunjukkan bahawa II, CA, dan RP didapati paling berpengaruh, diikuti oleh MS, ITSA dan GITG. Selanjutnya, ukuran institusi didapati secara positif mempengaruhi hubungan antara inovasi institusi dan penerapan IT Hijau. Sebaliknya, belanjawan institusi tidak menyederhanakan hubungan antara inovasi institusi dan penerapan IT Hijau. Dapatan ini akan berguna dalam membantu CIO membuat keputusan yang tepat mengenai penggunaan teknologi, terutama mengenai penggunaan IT Hijau, yang berpotensi akan menjimatkan kos dan persekitaran di masa depan.

## TABLE OF CONTENTS

	<b>TITLE</b>	<b>PAGE</b>
	<b>DECLARATION</b>	<b>iii</b>
	<b>DEDICATION</b>	<b>iv</b>
	<b>ACKNOWLEDGEMENT</b>	<b>v</b>
	<b>ABSTRACT</b>	<b>vi</b>
	<b>ABSTRAK</b>	<b>vii</b>
	<b>TABLE OF CONTENTS</b>	<b>viii</b>
	<b>LIST OF TABLES</b>	<b>xiii</b>
	<b>LIST OF FIGURES</b>	<b>xv</b>
	<b>LIST OF ABBREVIATIONS</b>	<b>xvi</b>
	<b>LIST OF SYMBOLS</b>	<b>xvii</b>
	<b>LIST OF APPENDICES</b>	<b>xviii</b>
<b>CHAPTER 1</b>	<b>INTRODUCTION</b>	<b>1</b>
1.1	Study Background	3
1.2	Information and Communications Technology Development in Nigeria	6
1.3	Need for Green IT Adoption in Nigerian Higher Education Institutions	7
1.4	Problem Background	9
1.5	Problem Statement	11
1.6	Research Questions	12
1.7	Research Objectives	13
1.8	Research Scope	13
1.9	Research Significance	14
1.10	Summary and Thesis Structure	14
<b>CHAPTER 2</b>	<b>LITERATURE REVIEW</b>	<b>17</b>
2.1	Green IT Background	17
2.1.1	Direct Impacts (First Order)	20

2.1.2	Enabling Impacts (Second Order)	20
2.1.3	Systemic Impacts (Third Order)	20
2.2	Nigerian Green IT Initiatives	21
2.3	Systematic Literature Review of Green IT Adoption	23
2.3.1	Systematic Review Questions	23
2.3.2	Inclusion and Exclusion Criteria	24
2.3.3	Source Identification and Search Strategy	24
2.3.4	Citation Management	26
2.3.5	Quality Criteria	27
2.3.6	Data Extraction and Coding	28
2.3.7	Result of Systematic Literature Review	29
2.3.7.1	Factors Influencing Green IT Adoption	29
2.3.7.2	The Most Relevant Factors	30
2.3.7.3	Factors Investigated in this Study	32
2.3.8	Technological Factors	32
2.3.9	Organisational Factors	33
2.3.10	Environmental Factors	33
2.3.11	Theoretical Frameworks Used in Previous Green IT Adoption Studies	34
2.3.11.1	Classification of Theories by Purpose	34
2.3.11.2	Frequency of Use of Theory	36
2.3.11.3	Use of Theory by Year of Publication	37
2.4	Theory Used in this Study	45
2.4.1	Technology-Organization-Environment (TOE) Framework	45
2.4.2	Goal-Setting Theory (GST)	46
2.5	Justification and Application of Theories Used in this Study	48
2.6	Research Hypotheses	50
2.7	Initial Research Model	58
2.8	Chapter Summary	60

<b>CHAPTER 3</b>	<b>RESEARCH METHODOLOGY</b>	<b>63</b>
3.1	Research Paradigm	64
	3.1.1 Positivist Paradigm	64
	3.1.2 Interpretive paradigm	66
3.2	Qualitative versus Quantitative	66
3.3	The justification for the Choice Paradigm	68
3.4	Research Design	69
3.5	Exploration Phase	70
3.6	Initiation Phase	71
	3.6.1 Construct Operationalisation	71
	3.6.2 Instrument Development	73
	3.6.3 Instrument Testing	73
	3.6.3.1 Face Validity	74
	3.6.3.2 Content Validity	75
	3.6.3.3 Pre-testing	76
	3.6.3.4 Pilot Survey	76
3.7	Validation Phase	77
	3.7.1 Unit of Analysis	77
	3.7.2 Population	78
	3.7.3 Sample Size	79
	3.7.4 Survey Administration	80
	3.7.5 Data Analysis	81
3.8	Reporting Phase	83
3.9	Chapter Summary	84
<b>CHAPTER 4</b>	<b>INSTRUMENT DEVELOPMENT AND MODEL</b>	<b>85</b>
<b>VALIDATION</b>		
4.1	The Survey Method	85
4.2	Instrument Development	88
	4.2.1 Technological Factors	88
	4.2.2 Organisational Factors	94
	4.2.3 Environmental Factors	98
	4.2.4 Dependent Variable	102

4.3	Instrument Validation	104
4.4	Pilot Study	106
4.5	Main Survey	110
4.5.1	Data Screening	110
4.5.2	Analysis of the Respondents Profile	113
4.5.3	Assessment of the Measurement Model	116
4.5.3.1	Internal Consistency Reliability	117
4.5.3.2	Convergent Validity	118
4.5.3.3	Discriminant Validity	122
4.5.3.4	Summary of Measurement Model	128
4.5.4	Assessment of the Structural Model	128
4.5.4.1	Collinearity Statistics	129
4.5.4.2	Path Coefficients	130
4.5.4.3	Hypotheses Testing	131
4.5.5	Moderating Effect	133
4.5.5.1	Moderating Effect of Institutional Size (IS)	134
4.5.5.2	Moderating Effect of Institutional Budget (IB)	136
4.5.6	Importance-Performance Matrix Analysis (IPMA)	137
4.5.7	Summary of the Research Hypotheses	139
4.5.7.1	Summary of the Research Hypotheses Testing	141
4.5.8	Coefficient of Determination ( $R^2$ )	143
4.5.9	Assessment of Effect Size $f^2$	143
4.5.9.1	Predictive Relevance $Q^2$	144
4.6	Summary of Research Findings	145
4.7	Chapter Summary	146
<b>CHAPTER 5</b>	<b>DISCUSSION OF RESULTS</b>	<b>149</b>
5.1	Overview of the Findings	150
5.2	Discussion of Hypotheses Testing	150

5.3	Moderating Effect of Relevant Demographic Data	157
5.4	Important Influential Factors	158
5.5	Recommendations from the Study	158
5.6	Chapter Summary	163
<b>CHAPTER 6</b>	<b>CONCLUSION</b>	<b>165</b>
6.1	Research Achievements	165
6.2	Research Contributions	169
6.2.1	Theoretical Contributions and Implications	170
6.2.2	Practical Recommendations	171
6.3	Limitations and Future Research Directions	175
<b>REFERENCES</b>		<b>177</b>
<b>APPENDIX</b>		<b>205</b>

## LIST OF TABLES

<b>TABLE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
Table 2.1	Green IT Scope	19
Table 2.2	Factors influencing Green IT Adoption	30
Table 2.3	The Most Relevant Factors	31
Table 2.4	Theoretical Frameworks Used in Previous Green IT Studies	38
Table 2.5	Summary Proposed Hypotheses	60
Table 3.1	Summary of the Difference between Quantitative and Qualitative	67
Table 3.2	Expert Profile	75
Table 4.1	Evaluation of survey design and conduct (Adopted from Recker (2008); Malhotra and Grover (1998)	86
Table 4.2	Measurement Items for Technology Factors	90
Table 4.3	Measurement Items for Organisational Factors	95
Table 4.4	Measurement Items for Environmental Factors	99
Table 4.5	Measurement Items for Dependent Variable	103
Table 4.6	Internal Consistency Reliability and Reliability (Hair et al., 2014)	107
Table 4.7	Discriminant Validity based on Fornell-Larcker Criterion Analysis (Hair et al., 2014)	109
Table 4.8	Data Distribution based on Kurtosis and Skewness (Hair et al., 2014)	112
Table 4.9	Analysis of the Respondents Profiles	114
Table 4.10	Assessment of the Measurement Model Criteria (Hair et al., 2014)	117
Table 4.11	Internal Consistency and Reliability (Hair et al., 2014)	118
Table 4.12	Convergent Validity (Hair et al., 2014)	120
Table 4.13	Discriminant Validity based Fornell-Larcker criterion (Hair et al., 2014)	123

Table 4.14	Discriminant Validity based on Cross-Factor Loadings (Hair et al., 2014)	124
Table 4.15	Shows the Assessment of the Structural Model (Hair et al., 2014)	129
Table 4.16	Collinearity Statistics (Hair et al., 2014)	130
Table 4.17	Hypotheses Testing (Hair et al., 2014)	132
Table 4.18	Institutional Size (IS) Result (Hair et al., 2014)	135
Table 4.19	Legend of the Figure 4.3	136
Table 4.20	Institutional Budget (IB) Result (Hair et al., 2014)	137
Table 4.21	Summary of the Research Hypotheses Testing (Hair et al., 2014)	142
Table 4.22	Effect Size ( $f^2$ ) and Coefficient of Determination ( $R^2$ Value)	144
Table 4.23	Predictive Relevance $Q^2$ (Hair et al., 2014)	145

## LIST OF FIGURES

<b>FIGURE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
Figure 1.1	Research Gaps	12
Figure 2.1	Review Protocol	23
Figure 2.2	Frequency of Use of Theory From 2007 to 2018	37
Figure 2.3	Technology-organization-environment (TOE) framework	46
Figure 2.4	Goal-Setting Theory	47
Figure 2.5	Initial Research Model	59
Figure 3.1	Research Operational Framework	70
Figure 4.1	Measurement Model	119
Figure 4.2	Structural Model (T-Statistics)	133
Figure 4.3	Institutional Size (IS) Result	135
Figure 4.4	Importance-Performance Map Analysis (IPMA)	138
Figure 4.5	Final Research Model	146

## LIST OF ABBREVIATIONS

AVE	-	Average Variance Extracted
CR	-	Composite Reliability
CV	-	Convergent Validity
GIT	-	Green Information Technology
ICT	-	Information and Communications Technology
IS	-	Information Systems
NCC	-	Nigerian Communications Commissions
NUC	-	Nigerian University Commission
PLS	-	Partial Least Square
SEM	-	Structural Equation Model

## LIST OF SYMBOLS

N	-	Population
$f^2$	-	Effect Size
$R^2$	-	Coefficient of Determination
$Q^2$	-	Predictive Relevance
D	-	Omission Distance

## LIST OF APPENDICES

<b>APPENDIX</b>	<b>TITLE</b>	<b>PAGE</b>
APPENDIX A	List Nigerian Universities	205
APPENDIX B	Letter of Permission for Data Collection	215
APPENDIX C	Instrument Validation Form	217
APPENDIX D	Questionnaire	227
APPENDIX E	A snapshot of G*Power Analysis	233

# CHAPTER 1

## INTRODUCTION

Historically, environmental concern has been a longstanding issue. The societal concern on the negative impact of human activities to the environment is deep-rooted and difficult to determine its origin from the literature (Gollnow, 2014). There is growing scientific data by world-leading experts associating the observable global environmental degradation due to human activities (Perera et al., 2020, Huang et al., 2020). The environmental deterioration due to climate change and global warming is one critical challenge currently facing the world (Bastiaansen et al., 2020). This fact is accepted by more than 190 countries and influenced them to take action leading to ratification of the 2015 Paris-climate agreement (Savaresi, 2016).

An environment suffers a great deal from human activities such as the manufacture and use of information technology (IT) and its sub-systems (Hernandez and Ona, 2018). Another impact of IT on the environment is from the exploration of natural resources used in the manufacture of IT systems (Asadi and Dahlan, 2017). Recently, climate change and global warming brought focus to human activities that negatively affect the environment, such as IT (Elliot and Webster, 2017). At the individual and organisational level, IT has been an integral part of our operational lives (Nwankwo et al., 2020). It plays a vital role in organisational effectiveness and competitiveness. Despite the benefits derived from deployment and the use of IT, but it has a negative environmental consequence (Bokolo et al., 2018).

In the last decade, there was an increase in awareness of the negative effect of IT on the environment. IT contributes to the environmental decline as much as the aviation industry (Ojo et al., 2019). IT is a significant contributor of electronic waste (e-waste), consumer of energy and emitter of greenhouse gases such as carbon dioxide (CO<sub>2</sub>) (Asadi *et al.*, 2019). Green information technology or Green IT practices are accepted primarily to mitigate the negative impact of IT on the environment (Dalvi-

Esfahani and Rahman, 2016). The fundamental objective of Green IT is on enhancing efficiency and sustainability in broader IT. Green IT covers a wide range of organizational activities, such as managerial and technological practices relating to the whole IT life cycle (Molla and Abareshi, 2011). Organisations are now building their IT strategies based on triple-bottom-line, technology, efficiency and environment (Ojo *et al.*, 2019).

IT is positioned to play a leading role in global environmental solutions (Dalvi-Esfahani *et al.*, 2017a). With increased recognition of IT as a potential solution, Green IT receives more attention from organisations and governments (Elliot and Webster, 2017). Green IT initiation and adoption is considered as a reasonable undertaking for organizations and has both economic and eco-sustainable potentials (Chen and Chang, 2014). Organisational Green IT planning, adoption and post-adoption strategies have received serious attention from IS researchers (Chong and Olesen, 2017, Abdul Rahman *et al.*, 2014, Benitez-Amado and Walczuch, 2012). Currently, organizations, particularly in developing countries, are in the initial phase of Green IT adoption (Mishra *et al.*, 2014a; Jenkin *et al.*, 2011; Asadi *et al.*, 2018)(Muslim *et al.*, 2019). Green IT organisational awareness and empirical research are limited (Asadi and Dahlan, 2017, Ainin *et al.*, 2016, Akman and Mishra, 2014).

Empirical studies on Green IT effects, outcomes and drivers are relatively at its infancy (Hernandez, 2018; Yoon, 2018; du Buisson and Naidoo, 2014). Investigating the factors influencing organisational Green IT adoption from the perspective of IT policymakers is necessary (Asadi *et al.*, 2019). Lack of theoretical model was also identified as a gap in previous Green IT studies (Hernandez, 2020, Asadi *et al.*, 2019, Bokolo *et al.*, 2018). Researchers such Xia *et al.* (2019) and Gholami *et al.* (2013) made a similar proposition regarding the need for theoretical frameworks in Green IT research. The Green IT potential benefits can only be realised if it is accepted and adopted; thus, the necessity of organisational Green IT adoption studies (Ainin *et al.*, 2016). Although previous studies investigate Green IT from an organisational perspective, few examine factors influencing Green IT adoption from the perspective of chief information officers (CIOs). Most studies investigated factors influencing Green IT adoption from an individual perspective (Asadi *et al.*, 2019,

Wesselink et al., 2017). Moreover, most studies were conducted based on data collected primarily from developed countries such as the United States and Australia (Asadi et al., 2019, Muslim et al., 2019). Factors influencing organisational Green IT adoption, particularly from developing countries, are rarely studied (Ojo et al., 2019, Dezdar, 2017a).

The focus of this study was to investigate factors influencing Chief Information Officers (CIOs) decision to adopt Green IT adoption in higher education institutions. The aim was to develop a model based on the factors influencing the decision to adopt Green IT in Nigerian higher education institutions. Moreover, this study also investigated the impact of Green IT goals and goals feedback on institutional Green IT adoption.

## **1.1 Study Background**

The conceptual origin of Green IT dated back to energy-star certification (Harmon and Auseklis, 2009). Energy-star benchmark was introduced in the year 1992 by the US Environmental Protection Agency (EPA). The scheme is essential but voluntary certification method designed to identify and promote energy-efficiency, minimise energy consumption and provide greater transparency with regards to the use of energy in monitors and electronics as a basic pollution prevention strategy (Peters, 2020). However, from the beginning, their definition, guidelines and implementation processes were somewhat vague, diffuse and occasionally confusing (Boyd et al., 2008). For instance, the multiplicity of concepts and key terms and such as energy ratings, efficiency, performance, labelling and benchmarking have emerged with overlapping meanings (Boyd *et al.*, 2008). This had frequently led to misleading interpretations by regulators, companies and consumers (Boyd *et al.*, 2008). Despite challenges faced by energy-star certification, it has succeeded in bringing environmental issues to the global discuss and set the necessary foundation for the worldwide Green movement (Harmon and Auseklis, 2009). In 2007, Green IT was recognised as an area of research by scholars and practitioners and the same year, the term Green IT first appeared on CIO magazine (Asadi and Dahlan, 2017).

Green IT was introduced to address the environmental concern associated with the deployment and use of IT (Chen et al., 2009). IT lifecycle from production, use and disposal harms the environment. IT systems, particularly data centre energy consumption, caused a sharp increase in energy demand and cost (Anthony et al., 2018). For instance, in the United States alone, IT accounts for the estimated energy consumption of 20 Million Gigajoules (Ranganathan, 2010). At a corporate level, data centre operations consume a significant proportion of the total running cost (Rasmussen, 2006). Accenture (2008) estimates, data centre operations to account for 1.5% of the United States electricity consumption, which is estimated to cost about 4.5 billion USD in energy cost. Million GigaJoule of energy is estimated to be consumed by IT systems annually (Ranganathan, 2010).

Additionally, the manufacture and use of IT products and systems are some of the significant sources of waste called electronic waste or e-waste. E-waste increases five times every year, becoming the fastest growing waste source from developed and developing nations (Schmidt et al., 2010b). An estimated five million tons annually of e-waste is being dumped into the environment, equivalent to 9000 fully loaded A380-Airbus passenger planes (Schmidt et al., 2010b). The concentration of toxic chemicals such as mercury and lead from e-waste pollute the environment and caused a serious health risk and soil infertility rendering farmlands agriculturally unproductive (Nnorom and Osibanjo, 2008). IT contributes to the emission of greenhouse gases such as CO<sub>2</sub> to the planet as much as the airline industry (Heng, 2009). According to some estimate, out of 820 million tons of CO<sub>2</sub> released to the atmosphere per year, IT accounts for two per cent (Heng, 2009). The carbon footprint increases the earth disposition to global warming and climate change (De Zoysa and Wijayanayake, 2013).

Ubiquitous nature of computers, smartphones and telecommunications equipment causes a rapid increase in the rate of consumption of the natural resources used in the fabrication and manufacturing of these products. While the planet earth is believed to have existed for 4.5 billion years, one-third of its non-renewable natural resources are estimated to have been exhausted in the last thirty years (Talebi and Way, 2009). Some of the resources, such as silicon are used in the manufacture of IT



With increased recognition of the negative impact of IT on the environment and IT as a potential solution, Green IT receive more attention from organisations and governments (Asadi and Dahlan, 2017). For instance, Green IT report (2009), in its worldwide survey of 1,052 corporate entities, 86 per cent of the organisations surveyed believed in a significance or somewhat Green IT implementations in their organisations. CIO magazine survey also found that CIOs are looking at the best ways to implement Green IT practices (Staff, 2008). The magazine further reported that cost savings and corporate social responsibility were the main motives behind the Green IT initiatives (Staff, 2008). In 2010, the United Nations (UN) global pact, ISO 26000 standard, released a comprehensive direction and recommendations to corporate executives on corporate social responsibility. In the standard, organisations are required to take precautionary measures to protect the planet and encourage greater environmental responsibility through organisation activities and implementation of IT systems and practices (Burton-Jones and Gallivan, 2007, Murillo-Luna et al., 2007, Dascalu et al., 2010).

## **1.2 Information and Communications Technology Development in Nigeria**

Nigeria, before the year 2000, had limited modern IT infrastructural with around 200,000 regular internet users which is less than 1% of the population (Yusuf, 2005). To bridge this gap, Nigeria had to develop a national information and communication technology policies to serve as a blueprint for ICT infrastructural development and integration in all sectors of the country (Ajayi, 2002). In 2001 the Nigerian government established the National Information Technology Development Agency (NITDA) to serve as a bureau for the implementation of National Policy on Information Technology (Ajayi, 2002).

Nigeria government made series of reforms to bridge decades-long significant social and economic inequality in the access and use of information and communication technology (ICT) between developed and developing nations which is referred to as the digital divide (Loo and Ngan, 2012). The government made several initiatives beginning with the establishment of critical ICT regulatory and supervisory

institutions and enabling the environment. National ICT Policy was developed in 2001, which led to the establishment of the Nigeria IT Development Authority (NITDA) charged with the implementation of the policy (Ajayi, 2002). ICT policy should address vertical horizontal and infrastructural policies (Hafkin, 2002). Vertical ICT policy addresses sectoral aspect such as the use of ICT in educational and other sectors (Hafkin, 2002). The horizontal policy deals with the impact of ICT on the environment and society (Hafkin, 2002). All these aspects were addressed in the Nigerian IT policy adequately (Nitda, 2012). The National Assembly passed NITDA's enabling act into law in April 2007 (Nitda, 2012). To booster online presence, in 2006, the Nigeria Internet Registration Association was established (Ajayi, 2002). ICT policies and programs were encouraged at all levels to booster development of indigenous IT industry (Nitda, 2012) .

These efforts paid off, Nigeria's ICT industry now holds considerable potential at both macro and microeconomic levels. Internet penetration, mobile penetration and mobile internet have significantly increased. According to Nigerian Communications Commissions (NCC) reports, mobile internet has risen to become the dominant channel for internet access in Nigeria (NCC, 2018). Mobile internet subscriptions had tripled since 2013, rising from 32 million in January 2013 to 100.2 million in January 2018, before reaching 104.6 million in August 2018, according to most recently available statistics (NCC, 2018). Based on the IMF's population estimate of 194m, the mobile internet penetration rate stood at about 54% that month (EIU, 2019). NCC statistics also recorded 66,144 Code-division multiple access (CDMA) subscribers, 12,602 fixed-internet users and 359,501 VoIP subscribers in August 2018. However, the development in ICT is not without negative environmental impact.

### **1.3 Need for Green IT Adoption in Nigerian Higher Education Institutions**

The higher education sector in Nigeria has four main segments, universities, polytechnics, colleges of education and innovative enterprise institutes (Gabadeen and Raimi, 2012). The four regulatory commissions supervise the Nigerian higher education sector. These include the National Universities Commission (NUC),

National Board for Technical Education (NBTE) and National Commission for Colleges of Education (NCCE) (Gabadeen and Raimi, 2012). Joint Admission and Matriculation Board (JAMB) is in charge of admission into the higher education institutions through the Unified Tertiary Matriculation Examination or (UTME). The examination is a mandatory requirement for admission into higher education institutions in Nigeria except a candidate is admitted through direct entry if the candidate possesses the advance level certificate. Since the creation of the sector, the Nigerian higher education institutions produced some of the country's best leaders and intellectuals (Ayanda et al., 2011).

The higher educational institutions in developing countries like Nigeria are continuously evolving and modernising to meet the challenges of modern teaching, learning and research (Thomson and van Belle, 2015). In the modernisation efforts, the institutions build and operate sophisticated information technology infrastructure and systems to support their dynamic communities. A modern campus network constitutes a data centre, fibre optic backbone, devices, applications and thousands of computers and ubiquitous devices connected to the network, which make the higher education sector a significant contributor of e-waste, consumer of energy and emitter of greenhouse gases (such as CO<sub>2</sub>). This trend raises the Green (sustainability) question in IT procurement, deployment, operation and disposal of IT products and systems in higher educational institutions (Chai-Arayalert and Nakata, 2011b) .

Higher education institutions are under pressure by governments to implement Green IT in their IT implementations and processes (Chai-Arayalert and Nakata, 2011b). The adoption of Green IT initiatives by higher education institutions is necessary to minimise their environmental footprint (Thomson and van Belle, 2015). Green or sustainable IT practices facilitate the use of IT resources and systems efficiently in an environmentally friendly way while maintaining or increasing performance (Asadi and Dahlan, 2017). Green IT studies from the perspective of higher education received less attention, and none found to have studied Green IT from a perspective Sub-Saharan African countries like Nigeria (Thomson and van Belle, 2015, Petzer et al., 2011). The results of this study will provide insights into the factors

influencing Green IT adoption in the higher education sector and from the perspectives of the developing country, particularly in Sub-Saharan Africa. These insights are beneficial to the CIOs, particularly in higher education institutions and IS researchers.

#### **1.4 Problem Background**

From the Green IT literature, three main gaps were identified as illustrated in Figure 1.1. First, literature (Ojo et al., 2019, Dezdar, 2017b) reveals that the majority of the studies focused on developed nations such as Australia (Cater-Steel and Tan, 2011, Hasan et al., 2009, Huang, 2008, Molla and Abareshi, 2011), USA (Chetty et al., 2009, Molla et al., 2009, Marett et al., 2013), UK (Chai-Arayalert and Nakata, 2011a, Bhamra, 2012), Fewer studies considered leading developing nations such as India (Datta et al., 2010), China (Xu, 2012, Cai et al., 2013) and Malaysia (Asadi *et al.*, 2019). Only a few studies focused on Africa (Lamb, 2011, Corbett, 2010). Findings of previous studies were based on data collected from western and developed countries and therefore might not be transferable or applicable to Nigerian society which is characterised by a relatively weak economy and limited technological infrastructure (Ahmad and Aafaqi 2004; Hofstede 1998). Thus, this research intends to provide new findings, which reflect the perspectives of developing countries in sub-Saharan Africa and might broaden the generalisability of Green IT adoption literature.

Secondly, researchers agree that realistic and conscious goal-setting influence performance, such as adoption (Demirkol, 2020, Locke and Latham, 2013, Miner, 2005). However, only one study found by the researcher that investigated the impact of goal-setting in Green IT adoption (Loock et al., 2013b). For instance, (Loock et al., 2013b) study investigates goal setting from the theoretical lens of an extended model of Goal-directed behaviour (EMGB) (Loock et al., 2013b) and is limited to individual perspective. Motivated by the work, this research was intended to extend the work of (Loock et al., 2013b) to investigating Green IT goals and goals feedback as possible antecedents of organisational Green IT adoption.

Goals setting is important, and it facilitate organizational focus and its effectiveness (Park and Choi, 2020). Governments and organizations have leveraged goal setting as a means of motivation to achieve higher levels of strategic objectives (Liu et al., 2020). Goal setting is often used in organisations as part of a broader performance appraisal process (Petitta and Jiang, 2020). Goal setting has been used as one of the cores of Management by Objectives (MBO) (Liu et al., 2020). Its effectiveness as productivity-enhancing technic had been established (Locke and Latham, 2013). Goal setting leads to an increase in productivity, and usually more effective when performance is regularly evaluated, and feedback is offered in relation to the attainment of the goals (Wörner and Tiefenbeck, 2018). Goals feedback facilitates goal performance and clarity in organizations by guiding employees to focus on specific goals (Andrews and Mostafa, 2019). Moreover, teams benefit from clear communication of organizational goals feedback which are linked to the improvement of performance and organizational effectiveness (Chen et al., 2019).

The use of goal-setting to achieve high performance has gain traction in recent years. Highly ambitious goals have been sets by nation-states and multinational organisations such as the United Nations. According to Baron and Armstrong (2004), based on a survey conducted recently, 62% companies in the United Kingdom, used some form of goal-setting to managing employees' productivity. For instance, In July 2017, the United Kingdom Government announced a goal to have 100% electric vehicles sales by the year 2040 to facilitate its zero net emission target in the year 2050 (Work and Committee, 2018). In the same vein, in 2015, the United Nations established and set the 17 sustainable development goals to serve as 2030 agenda for prosperity and peace for the people and planet (Assembly, 2015). Incidentally, goals number 11 and 13 are related to a sustainable environment and climate action. This demonstrates the importance of goal setting for implementing organisational sustainable policy. However, to the best of knowledge of the researcher, this is among the first attempt to integrate goal-setting into Green IT study, particularly at the organisational level.

Finally, despite the large concentration of computers, ubiquitous device and supporting ICT infrastructure in higher educational institutions, Green IT adoption studies in the higher education sector receive less attention (Tushi et al., 2014, Lei and Ngai, 2014, Chai-Arayalert and Nakata, 2011a). An extensive literature review conducted in this study found that Green IT studies from the perspective of higher education are limited, and only one study found to have studied Green IT from a perspective Sub-Saharan African countries like Nigeria (Thomson and van Belle, 2015, Petzer et al., 2011). By studying organisational Green IT adoption from the context of the higher education sector, this research expands the Green IT adoption literature.

## **1.5 Problem Statement**

From the Green IT literature, three main gaps were identified as illustrated in Figure 1.1. Thus, based on the preceding discussion, the underline problem addressed in this research was a lack of a suitable model to facilitate Green IT adoption, particularly in Nigerian higher education institutions. The focus of this study was to investigate factors influencing chief information officers' (CIOs) decision to adopt Green IT adoption in higher education institutions. Investigating the factors influencing organisational Green IT adoption from the perspective of IT policymakers is important in developing IT policies and strategies to facilitate institutional Green IT adoption. The aim was to develop a model based on the factors influencing the decision to adopt Green IT in Nigerian higher education institutions.

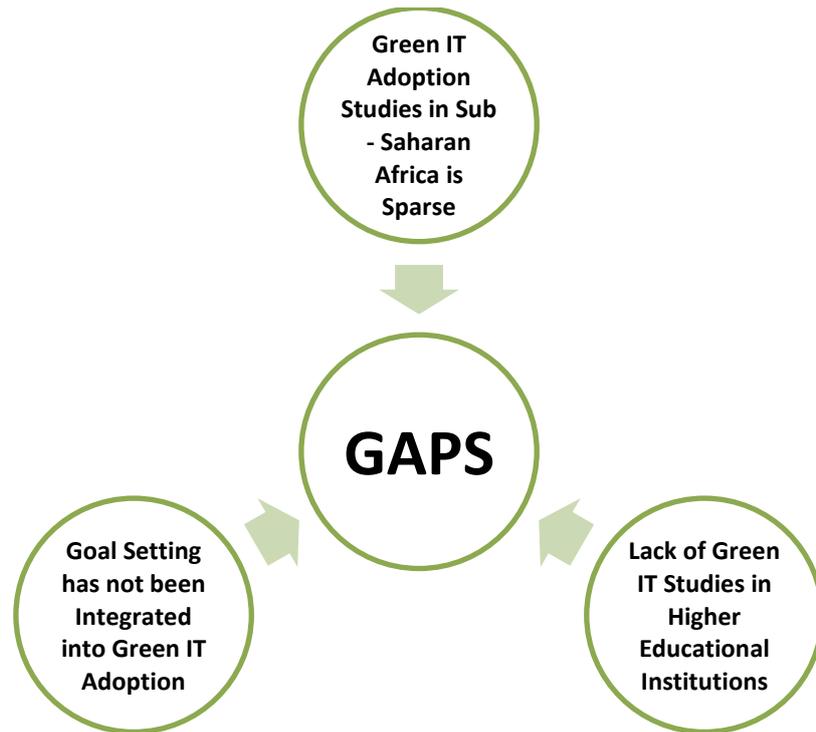


Figure 1.1 Research Gaps

## 1.6 Research Questions

Based on the problem statement, the specific research questions were as follows:

1. What factors influence the policymakers to Green IT adoption?
2. What is the appropriate Green IT adoption model to reflect the influence of identified factors?
3. What are the implications of the most important factors influencing the policymakers to Green IT adoption?
4. How do relevant demographic factors moderate the Green IT adoption?
5. What recommendations will facilitate the effective implementation of Green IT in Nigerian higher education institutions?

## **1.7 Research Objectives**

The following were the objectives formulated to address the research questions:

1. To analyse the factors influencing the organisational Green IT adoption.
2. To develop and validate a model for Green IT adoption among Nigerian higher education institutions.
3. To analyse the most important factors influencing the organisational Green IT adoption among Nigerian higher education institutions.
4. To analyse the moderating effect of relevant institutional demographic factors on Green IT adoption.
5. To provide recommendations for the effective implementation Green IT in Nigerian higher education institutions.

## **1.8 Research Scope**

The study was within the scope of technology adoption in general and focused specifically on Green IT adoption in higher educational institutions. The study covered Nigerian Universities from the southern and northern parts of the country. The study only covered federal, state and private Universities in Nigeria. Other institutions of higher education such as polytechnics, colleges of education and colleges of administration, school of nursing and schools of health technology, colleges of agriculture and other specialised training centres were outside the scope of this study. The unit of analysis was organisation, and the respondents were the IT policymakers such, CIOs and senior managers in Nigerian Universities.

## 1.9 Research Significance

The research was one of the first attempts in the field of Green IT in the context of higher education institutions. It was also one of few attempts to examine Green IT adoption in Nigeria. The study was one of the pioneer studies to investigate the effect of goal-setting in Green adoption. Findings of this study will be beneficial to CIOs and IT senior managers faced with the managerial decision and policy-making on technology adoption in general and Green IT in particular to formulate well-informed policies. The result of this study would facilitate the development of organisational IT strategic plan and strategic orientation.

In addition, the methodical and theoretical approach used in this study may be adopted by fellow researchers in Green IT adoption studies in particular and IS studies in general. The study will contribute to overall Green IT literature by providing a perspective of the higher education sector in developing nations, particularly in sub-Saharan Africa. The remaining part of the thesis was structured as follows:

## 1.10 Summary and Thesis Structure

The introductory chapter provides an introduction to the study by describing the research background, research questions, research objectives and research scope. The expected research contributions were also outlined in this chapter. The remaining part of the thesis was structured as follows:

**Chapter Two:** The literature review chapter was divided into three parts. The first part examined the general background, concept, and definition of Green IT adoption. The second part identified the factors influencing organisational Green IT adoption and underlying theories used Green IT adoption studies. The third part discussed the research hypotheses that lead to the development of initial research model.



























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