STUDY ON THE ANTECEDENTS OF INFORMATION TECHNOLOGY ADOPTION IN THE NIGERIAN SMALL AND MEDIUM SCALE ENTERPRISES

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DEDICATION

I dedicate this research work to the love of the entire humanity; for we are all from the same Father and Mother.

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ABSTRACT

This thesis determines the mediating effects of Organizational commitment and the moderating roles of Demographic variables on the relationship between Information Technology (IT) Characteristics and Adoption in the Nigerian SMEs. The objectives of the study are to assess how IT characteristics relate to "Adoption" directly and indirectly through Organizational commitment and also how the relationships between IT characteristics and adoption are moderated by Age, Gender and Experience. This research considers complexity, compatibility, usefulness and ease of use from Diffusion of Innovation theory (DOI) and Technology Acceptance Model (TAM) respectively. It takes Age, Gender and Experience from Unified Theory of Acceptance and Use of Technology (UTAUT2) and, Commitment from Allen and Meyer Theory. For the purpose of, survey two-hundred and fifty (250) questionnaires were distributed and 183 valid ones were analyzed using SPSS software embedded with Hayes PROCESS command. The quantitative outcome from the SPSS/PROCESS command reveals that organizational commitment is a mediator of the relationship between complexity and adoption, as well as compatibility and adoption. However, there was no evidence to show that it mediates usefulness and ease of use. The research also found that age gender and experience only moderate compatibility and ease of use. Among the major contributions of this research are the extension of UTAUT2 to include DOI constructs and the use f a different sample to further the generalizability of UTAUT2 in a different context. The framework(s) proposed in this study could be used by business managers and government when taking some core-decisions relating to IT. This implies that the outcome could be used as a competitive tool to overcome stiff competitions by priotizing the appropriate areas that have the tendency of yielding fruitful outcome. Considering how the research instrumentation was conducted, likelihood of bias can not be cancelled out completely though, the researcher made efforts to ensure a random distribution of questionnaires.

ABSTRACT

Tesis ini berusaha untuk mengenalpasti kesan perantaraan yang timbul akibat komitmen organisasi dan peranan menyederhana pembolehubah demografi terhadap hubungan antara ciri-ciri Teknologi Maklumat dan penerimagunaannya oleh perusahaan kecil dan sederhana (SME) di Nigeria. Objektif kajian ini adalah untuk meniliti bagaimana ciri-ciri IT dihubungkait dengan penerimagunaan, secara langsung atau tidak langsung, melalui komitmen organisasi dan bagaimana hubungkait antara ciri-ciri IT dan penerimagunaannya ditersederhana oleh factor umur, jantina dan pengalaman. Kajian telah mengambil kira kerumitan, keserasian, kebergunaan dan kemudah-gunaan Teori Resapan Inovasi dan Model Penerimaan Teknologi. Faktor jantina dan umur dari Teori Gabungan Penerimaan dan Penggunaan Teknologi (UTAUT2) serta faktor komitmen dari Teori Allen dan Meyer telah diambil kira. Sebagai keperluan kaedah kaji selidik, dua ratus lima puluh (250) set kaji selidik diedarkan dan 183 kaji selidik yang sah telah dianalisis melalui perisian SPSS dilengkapi dengan Hayes PROCESS. Hasil dapatan kuantitatif yang menggunakan perintah ‘SPSS PROCESS’ menunjukkan bahawa komitmen organisasi adalah pengantara kepada hubungan kerumitan dan penerimagunaan, serta keserasian dan penerimagunaan tetapi tidak sebagai perantara kepada kebergunaan dan kemudah-gunaan. Penemuan juga menunjukkan bahawa umur, jantina dan pengalaman hanya menyederhana kerasian dan kemudah-gunaan. Antara sumbangan kajian ini adalah pengembangan UTAUT2 supaya merangkumi konstruk DOI and penggunaan sampel lain untuk memperluaskan generitiviti UTAUT2. Rangka kerja kajian ini boleh digunakan oleh pengurus perniagaan dan pihak kerajaan apabila membuat keputusan berhubung IT. Ini menunjukkan bahawa penemuan boleh menjadi suatu alat kompetitif semasa mengatasi persaingan dengan memberi perhatian kepada aspek-aspek yang menyumbang ke arah positif. Dengan aspek cara instrumen kajian diselenggarakan, ada kemungkian berlaku bias walaupun pengkaji telah mengambil langkah untuk memastikan pengedaran kaji selidik dijalankan secara rawak.

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LIST OF ABBREVIATIONS

AG	Agriculture
ANOVA	Analysis of variance
BI	Behavioral intention
BNT	Basic needs theory
CAC	Corporate affairs commission,
CBN	Central bank of Nigeria
CMD	Centre for management and development
CEO	Chief executive officer
CET	Cognitive evaluation theory
CFA	Confirmatory factor analysis
COMPLX	Complexity
COMPTB	Compatibility
CT	Construction
D	Standard deviation
DOI	Diffusion of technology
DV	Dependent variable
ECOWAS	Economic community of west African states
EDW	Expanded discount window
EPZ	Export Processing zone
FEAP.	Family economic advancement programme
GDP	gross domestic product
HR	Human resource
HRM	human resource management
HRMPs	human resource management practices
ICT	Information and communication technology
IIFAA	Impact investing fund for African agriculture
IITs	Indian institutes of technology

IT	Information technology
IV	Variables
KMO	Kaiser-Meyer-Olkin
KT	kurtosis
M	Mean
MDG	Millennium development goals
MF	Manufacturing
MIS	Management information systems
OC	organizational commitment
MM	Motivational Model,
MPCU	Model of PC Utilization,
NACB	Nnigeria Agricultural and Cooperative Bank
NBTE	National Board for Technical Education
NIDB	National Industrial Development Bank
NYSC	National Youths Service Corps
NBCI	Nigerian Bank of Commerce and Industries
NBS	National Bureau for Statistics
NBTE	National Board for Technical Education
NCST	National Council on Science and Technology
NDE	National Directorate of Employment
NERFUND	National Economic Reconstruction Fund
NIC	Nigeria's National Innovation Capacity
NACB	Nigerian Agricultural and Cooperative Bank
NACRDB	Nigerian Agricultural Cooperative and Rural Development Bank
NINAMB	Nigerian National Mortgage Bank.
NUC	Nigerian University Commission
NITEL	NITEL, Nigerian telecommunication
OCB	Organizational Citizenship Behavior
OCQ	Organizational Commitment Questionnaire
OECD	Organization for Economic Cooperation and Development
ORGCOM	Organizational Commitment

PCA	Principal Components Analysis
PBN	Peoples Bank of Nigeria
PEOUS	perceived Ease of Use
PPP	Public Private Partnership
PSUFN	Perceived Usefulness
QUAN	Quantitative
R	Correlation
RMRDC	Raw Materials and Research Development Council
ROSH	Rurally Orientated Small Holder"
SAP	Structural Adjustment Programme
SCT	Social Cognitive Theory,
SDT	Self-Determination Theory
SK	Skewness
SMIESIS	Small and Medium Industries Equity Investment Scheme
SMC	Systems, Man, and Cybernetics
SMEDAN	Small and Medium Enterprise Development Agency of Nigeria
SMEs	Small and Medium Enterprises
SNSs	Social Network Sites
SPSS	statistical software for social science
SV	Service
TAM	Technology Acceptance Model
ASCON	Administrative Staff College of Nigeria
ITF	Industrial Training Fund
TOE	Technology Organization Environment
TPB	Theory of Plan Behavior
TR	Trade
TRA	Theory of Reason Action
UK	United Kindom,
UNDP	United Nations Development Programme
UAR	United African Company
UTAUT	Unified Theory of Acceptance and Use of Technology

VW	Virtual World
*	Weak Correlation
* *	Strong Correlation
-ve	Negative
+ve	Positive

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CHAPTER 1

INTRODUCTION

1.1 Background of the study

Small and Medium Enterprises (SMEs) today form the stronghold of many economies around the globe. SMEs are a fundamental part of the economic fabric in Nigeria, and they play a crucial role in furthering growth, innovation and prosperity (Oyefuga, Siyanbola, Afolabi & Dada, 2008). More than 95% of enterprises in the Organization for Economic Cooperation and Development (OECD, 2005) countries are SMEs. These enterprises account for almost 60% of private sector employment, thereby supporting regional development and social cohesion (Govon, 2010). In low-income countries too, the SME sector makes a critical contribution to GDP and employment because they include a wide range of businesses. This contribution is basically due to their consistent Information Technology (IT) adoption that results in better productivity and multiplier benefits (Dalberg, 2011).

The responses obtained from the participants have enabled the researchers to identify some drivers linked to IT adoption in Nigeria SMEs. IT has changed the manner in which enterprises market and sell their products. In a esearch (Yusuf, 2010) conducted in Nigeria respondents stated that a major driver for their adoption of IT is to have some sort of competitive advantage. IT can be described as a strategy for keeping at pace with current global developments. ICT is often seen as an enabler that will allow smaller enterprises to upgrade the value of their processes and thus gain higher value for their products and services (Drucker and Payne, 2010). Apulu and Latham (2010) state that appropriate use of ICT can assist SMEs gain competitive advantage by reducing costs and improving core business processes. The case studies show that all the SMEs focused on one major reason for adopting IT which is to have some form of competitive advantage. Therefore, based on the

literature review and the case results, it can be said that a major driver for adopting IT in Nigeria SMEs is to have some form of competitive advantage (Apulu and Latham, 2011) as pointed before.

In a research conducted by Yusuf (2005), the analysis reveals that the policy is inadequate to impact positively on the Nigerian education system, and that the philosophical frame of reference is market driven. The policy places little emphasis on the integration and infusion of ICT in the country's education system. Policy implications and suggestions are offered to ensure maximum use of ICT potentials in the Nigerian school system. Effective technology adoption that results in increased competitiveness in the SMEs requires systematic planning and implementation of some interventions, rather than expecting the organization to progress naturally (Jivani, 2014). Bessant and Tidd (2011), argue that businesses need to enhance what they offer to customers and how they offer it or they are flushed out of the market by co-competitors, who are capable of doing so.

This implies that businesses are forced to transform themselves fundamentally to survive in the midst of challenges. These challenges are technological, economic, cultural and demographic in nature (Kotler and Keller, 2006). According to Kourie and Snyman (2014), transformation connotes changes in the way business is conducted, the way employees perform their contributions and the way organizations perceive and manage their vital assets, which are built around the key assets of intellectual capital and knowledge – both technological and non-technological knowledge.

The business environment in which SMEs in Nigeria operate is not exempted from these challenges. These challenges collectively impact negatively on the costs and productivity (and hence the competitiveness) of the SMEs (Dada, 2014), particularly the ones in manufacturing sector. As a result, Nigerian SMEs have come under more pressures, especially from firms that are positioned within more favourable technological contexts. Although, funding schemes as offered by government are beneficial in reducing the challenges (Siyanbola, Egbetokun, Adebowale and Olamade, 2012), they are definitely not sufficient to stimulate or sustain the competitiveness of small businesses. This is partly because a lot of multinational organizations based in the country are using IT that reduces production cost, thus, suppressing the local ones.

Furthermore, political unpredictability, lack of sufficient infrastructures, inadequate human capital and local technological capacities in developing countries have been a troubling concern to the policy makers in the region (Wamboye and Adekola, 2013). It is agreed that a major way through which a firm acquires and improves competitiveness is by acquiring, adopting and remaining commited to IT that is capable of reducing the business challenges (Egbetokun and Savin, 2014). Understanding the types of IT SMEs currently undertake and their level of organizational commitment in that direction need urgent attention (Brem, and Schuster, 2012) from practioners and academics to ensure stable SMEs.

The exploration of this subject matter to know what hinder information technology usage and how organizational commitments and demography (especially within the purview of the Nigerian SMEs) could play a role is the focus of this research. This focus coincides with the government resolve to make the growth and development of SMEs a key issue of interest that should be given all the commitment it deserves (Onourah, 2015). An instance of this is the strengthening of an agency-Small and Medium Enterprise Development Agency of Nigeria (SMEDAN) established by an act in 2003, which is shouldered with the responsibility of furthering the course of SMEs.

However, contrary to the situation in many economies like the United Kingdom (Grey et,al, 2012) and United States (IMF, 2010), where SMEs' development sufficiently focuses on funding research collaboration and promoting technological innovation efforts; the Nigerian approach focuses largely on the provision of interest-free capital, despite the fact that the operating environment that supports SMEs is still fragile (Oyefuga et al, 2008; Egbetokun et al., 2011).

The fragile nature of the environment results from the inability of the appropriate sectors to address the lingering issues considered to be the barriers to IT adoption in the Nigerian SMEs. As partly mentioned earlier, the barriers include lack of awareness among owner-managers, management flaws, access to finance, infrastructure, government policy inconsistencies and bureaucracy, environmental factors, multiple taxes and levies, lack of access to modern IT, unfair competition, marketing problems and non-availability of raw materials locally. Lack of skills and training, cultural factors, lack of government policies that support IT adoption and integration in SMEs, electricity constraints and the need to extend IT models and theories to reflect Nigerian realities (Venkatesh et al., 2012; Ihua, 2009).

1.2 Statement of the problem

In spite of the long list of the practical and heorethical gaps ascribed to be the challenges faced by Nigerian SMEs, just a fraction would be revisited due to time and other limitations. Researchers undertake studies to make sure that improvements are made over the exiting theories and policies to ensure alignment with existing development, particularly when gaps are imminent in literature or in practice (Lieberson, 1985). The current research relates to the gaps evident both in the literature and in practice. It could be seen from the literature that Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOI) and Unified Theory of Acceptance and Use of Technology-2 (UTAUT2) that form the basis of this research were found to have limitations that need to be addressed. This is to guarantee better performance (Sun & Zhang, 2006) in developing economies, where IT adoption is more instrumental to business competitiveness. It is important because most models and theories reflect the context of developed economies (IMF, 2010).

One of the gaps evident in the previous studies is that majority of prior research on IT innovation, and indeed on organizational innovation in general, has been done within what Fichman (2004) call the dominant paradigm. This paradigm is typified by the desire to explain innovation using economic-rationalistic models, whereby organizations that have a greater quantity of what might be called "the Right Stuff" (i.e., greater innovation-related needsand abilities) are expected to exhibit a greater quantity of innovation (i.e., greater frequency, earliness, or extent of adoption). A number of SMEs in Kaduna do not fall within this domain, hence, the need to look beyond the domain in this research.

Another gap has to do with esearch sampling techniques and methodology. For example, a number of studies that employed TAM used university students or lecturers as samples and this made generalization unrealistic (Legris et al., 2003). The empirical studies carried out were mostly done with convenient samples; this does not reflect the true representative of the actual workplace (Sun & Zhang, 2003). Random sampling has been employed in this study to bridge this gap in the literature.

According to Sun & Zhang (2006), another shortcoming of TAM relates to weak explanatory power of the model and the inconsistent relationship among constructs. For instance, a review of some articles authored by Sun & Zhang (2003) and Venkatesh et al. (2012; 2003) revealed that correlations (R) among the constructs

of TAM changes from study to study. Besides, organizational commitment that is seen as employees' loyalty to further the course of an organization (Allen and Meyer, 1990) is missing in this model. This calls for the need to know how commitment can play a role in enhancing IT adoption.

With regards to DOI and UTAUT2 used in this research, some extensions need to be made where necessary, to improve the efficiency and warrant domestication of the thoeries in the Nigerian SMEs. Virtually all the studies that have bearing on users' perceptions of information technology focused on Rogers' perceived attributes of technology (Dash and Tech, 2014) or used demographic variables as determinants of adoption. This has kept IT adoption in Nigerian SMEs at its low level ever since IT became a global competitive tool (CBN, 2005; Apulu and Latham, 2011). Equally, previous studies did not combine DOI and TAM vriables to enhance the understanding of the relationship between IT characteristics and adoption. The infusion of organizational commitment as a mediator and demographic variables as moderators between the IT characteristics and adoption in Nigerian SMEs is a new development that would extend the IT theories; and contextualize them to Nigerian situation to boost adoption in SMEs (Dash and Tech, 2014).

From the practical point of view, It is important to state that the hesitation shown by SME owners and empoyees to adopt mechanized agriculture and/or use IT related gadgets have forced some SMEs to produce at less than 50% capacity (Aremu, 2011) in Nigeria. This is a negative indicator to the acheivement of the Millennium Development Goal, that set out to reduce poverty by 2015 (Kanayo, Uyi Kizito and Udefuna, 2013). Apulu and Ige (2011) suggest that marketers of IT infrastructures in Nigeria are encouraged to focus more on individual and group idiosyncrasies of decision makers measured by age, gender and experience in order to accurately predict and timely package programmes Indeed, this key Millennium Declaration Goal would continue to be a mirage in the present "global village", unless SMEs are made to appreciate the impact of IT on business growth; and how commitment can improve adoption despite the characteristics of the IT employed (Gudi, Rosenbloom and Parkes, 2014). All these are made possible by this research since the focus is to examine the mediation effects of organizational commitment and moderating effects of demographic variables on the relationship between IT characteristics and IT adoption in the Nigerian SMEs.

1.3 Research questions

Based on the statement of the problem earlier discussed, the main research questions formulated to guide the research are as follows:

1 Does organizational commitment mediate the relationship between "IT characteristics" and IT adoption in the Nigerian SMEs?
2 Do demographic variables moderate the relationship between IT characteristics and IT adoption in the Nigerian SMEs?

1.4 Objectives of the study

Achievement of research objectives is considered the reason for initiating every research. This research is primarily intended to:

1 Determine the mediating effect of organizational commitment on the relationship between IT characteristics and IT adoption in the Nigerian SMEs.
2 Determine how demographic variables moderate the relationship between IT characteristics and IT adoption in the Nigerian SMEs.

1.5 Research hypotheses

In line with the research objectives outlined in this research, the following hypotheses will be subjected to empirical test at the end of the analyses:

HO1 Organizational commitment mediates the relationship between "IT characteristic" and IT adoption in the Nigerian SMEs.
HO2 Demographic variables significantly moderate the relationships between IT characteristics and IT adoption in the Nigerian SMEs.

1.6 Scope of the study

This research is limited to the registered Small and Medium Scale Enterprises (SMEs) in Kaduna State, Nigeria. The state was selected because of the absence of a

research of this nature in the literature, as far as review is concerned. In a study conducted in by Awa (2011) in southern Nigeria, it was suggested that future research should extend data and measures to advance in-depth investigation in specific areas and industries not covered by his work, in order to build external validity and further expand knowledge.

The basis for sampling was contingent on the benchmarks of defining SMEs as business enterprises whose total costs excluding land is between five million and five hundred million naira only, and a work force of not more than 300 hundred workers. Other conditions considered are having more than one owner directly involved in Top Management Team (TMT) and using at least a computer system connected to the internet or using internet for some transactions of the firm, as used by Awa et al. (2011) in a similar research conducted in the Southern region of Nigeria. The respondents for this survey were sampled out from manufacturing, agriculture, trade, construction and education sectors. In line with the SMEIDAN report (2013), 1025 businesses fall within the benchmark of this research and they form the study population. The research is expected to be accomplished within a period of three years.

1.7 Significance of the study

Having discussed some of the gaps evident in technology adoption theory and practice, this section dwells on the significance of the research in addressing the outlined problems. It was seen in the previous discussion that understanding the characteristics of IT and the commitment of the managers, who are equally employees in organizations is a key to successful adoption decision in the Nigerian SMEs. In view of that reality, this research has unveiled the relationship between IT attributes and IT adoption in the Nigerian SMEs. This has practical implications for managers and consultants in management decisions, and ultimately could bring about superior performance in SMEs (Egbetokun et al., 2011). In discussing the significance of this study, theorethical managerial and practical benefits would be looked into.

Theorethi ally, this study applied the variables of TAM, DOI and UTAUT2 to the context of IT adoption in the Nigerian SMEs. It demonstrates how the commitments and demography of the owners/managers and employees mediate and

moderate between IT attributes and IT adoption respectively; by combining attributes from three distinct landmark studies (Rogers, 2003; Davis, 1986 and Venkatesh et al., 2012) in one model. By so doing, the model and theories have been extended to serve other contexts. Though, the extention of UTAUT2 by Venkatesh et al. (2012) is a significant achievement to the body of knowledge, the current research extended this theory by substituting the IVs of UTAUT2 with those of DOI and TAM.

Aside from filling the gap in the literature, it would assist managers in decision making. In addition to this, the use of a recent tool of analysis produced by Hayes (2013), is a development that undermines the condition of data normality required by other mediation/moderation analysis tools. This would give a superior result with mild estimate errors compared to parametric tools that highly emphasize data normality.

Furthermore, proposing models that combined some constructs of the TAM, DOI and with mediators and moderators is important in the sense that the models could help in understanding the relationships between technology adoption and other independent variables that interplay; especially when transiting from one technology to another, since IT keeps on changing from time to time. According to Abujarad and Yusof (2010), governments and entrepreneurs in developing countreis can use IT adoption model to keep track of prevailing trend which could be used as guide to formulate appropriate policies.

The extension of the three theories in this research has, to a very large extent, contextualized them to Nigerian situation. This is a good step towards having a robust SMEs sector that is IT driven. These IT driven SMEs would be supported as contemporary studies are geared towards shifting the frontiers of knowledge and thus offering explanations towards designing flexible firms that adopt technology with ease (Mowshowitz, 2002). This research would contribute immensely in promoting this course.

To other researchers, this research could be of significance, atleast in two ways. First, the research has opened a window through which other researchers could see other areas of study that relate to IT adoption. The chain of relationships between IT characteristics, organizational commitment, demographic variables and IT adoption explored in this research serves as a new research area that could trigger subsequent studies in the Nigerian SMEs in particular and IT domain in general. Although a great deal of work has been done on IT, none was tilted to mediation

roles of commitment and moderation effects of demographic variables (age and gender and experience) on the IT models and theories

Practically, current research also serves as a study that could be use to actualize the achievement of millennium development goal that relates to poverty eradication. Albeit the earlier time frame of 2015 was not achieved in Nigeria, the need to eradicate poverty is still imminent. Adopting recommendations from this research would serve immensely in guiding the government and the private sector on what it takes to support businesses to adopt IT with a view to creating wealth.

1.8 **Definition of terms**

The following section is designed to define the constructs of the research based on the questionnaire measures. Below are some of the relevant definitions adapted:

1. Technology adoption measures the extent of use of computer hardware and software applications to improve operations in the area of management and decision-making process (Thong, 1999).
2. Organizational commitment has been universally defined based on three general themes in the different definitions of the concept: Commitment as an affective attachment to the organisation, Commitment as a perceived cost associated with leaving the organisation, and: Commitment as an obligation to remain in the organisation (Allen and Meyer, 1990).
3. The technology acceptance model (TAM) specifies the causal relationships between system design features, perceived usefulness, perceived ease of use, attitude toward using, and actual usage behaviour (Davis, 1986).
4. Perceived usefullness is a TAM construct that defines prospective adoptser's subjective probability that using a specific application improves operations (Davis, 1986).
5. Perceived ease of use measures the prospective user's assessment of the mental efforts required to use the target applications (Davis, 1986)
6. Compatibility is the degree to which a technology is perceived as consistent with the existing values, past experiences, and needs of potential adopters (Rogers, 2003).

7. Complexity was defined as the degree to which a technolgy is perceived as relatively difficult to conceive and implement (Rogers, 2003).
8. SMEs are defined as business enterprises whose total costs excluding land is between N5million –N500 million (N5,000,000.00 to 500, 000,000.00) only and, a labour force of between 11 and 300 operating in agric, construction, trade, education or manufacturing sector (CBN, 2005).
9. Demographic variables in this research connote "age" "gender" and "years of experience" of individual respondent (Venkatesh et al., 2012), that participated in this research.
10. Age is defined as the biological age of the respective individuals who participated in the current survey (Venkatesh et al., 2012).
11. Years of experience, sometimes referred to as experience or EXP., is the number of years an individual respondent spent using IT at workplace (Venkatesh et al., 2012).
12. Gender in this research, refers to the biological sex of the respondents that participated in the survey of this research (Venkatesh et al., 2012).

1.9 Organization of the thesis

This research is organized into six distinct chapters; each chapter is dedicated to one significant fraction of the work. Below is the arrangement of the chapters as they appear in the main text. The first chapter is tittled "introduction". It begins with the background of the study that gives the general overview of the topic of discussion. All the issues surrounding the rationale or the essence of the research come under this chapter.

Chapter two is the "literature Review". It evaluates the previous studies related to the subject matter under review, with a view to spotting where gaps still exist. To achieve the objective of this chapter, the literature is splitted into the variables that are considered as the main components of this study. Furthermore, this chapter dwells into the origin of the research by critically exarmining the theories that objectively support the claims made in this research. This was done to facilitate easy synchronization of the finding with the main body of knowledge at the end of the day.

Research Methodology forms the third Chapter of this study. It presents the Methodology applied throughout the research project. Questionnaire Design, Selection of Samples, Data Collection, Main Research Questions, Data Reliability, Data Validity and the Statistical Test used were detailed under this Chapter.

In chapter four, the quantitative analyses came to the fore. At this juncture, the selected quantitative tool was used to analyse the second and third objectives of the study (the mediating effects of organizational commitment and moderating effects of demographic variables). After checking the missing data, descriptive statistics was conducted to ascertain reliability of the constructs used. The main analysis was later performed using SPSS embedded with Hayes' "PROCESS" command to execute multiple regressions. It is important to note here that "extension" strategy of mixed methods with more emphasis on quantitative technique (qual/QUAN) forms the basis of this analysis.

Chapter five is Discussion and Conclusion. This is where the two results are discussed and integrated to reflect the true picture of mixed methods. In addition, the summary of all the previous chapters are done by reiterating in synopsis, what was designed to be achieved from the beginning (i.e. the objectives); so as to know the extent to which the research is successful. The conclusion starts with the implication of the study, then the limitations of the study and ends with suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Information Technology (IT) utilization in the Nigerian SMEs is very essential, its roles as one of the key business processes that drive organizations to the optimum level have been discussed in the literature (Kates, Lief & Avila, 2009; Hartog, 2012). Information technology in the global context is multi-dimensional; it is not restricted to technological products alone; it could be a favourable attitudinal change (Chaddah, 2010). Conceiving IT as a favourable shift makes commitment an important factor that serves as a stabilizing force which acts to maintain behavioral focus when expectancy/equity conditions prove elusive (Madi, Abu-jarad and Alqahtani, 2012). Further to that is the demographic classification of the key players in IT adoption, they equally play critical roles in determining success. However, perception of some business owners is not in keeping with this reality. Some think success is just a function of huge investment on infrastructure (Robertson & Robertson, 2012). In actual sense, success in business depends on the realistic definition of strategic intent before structuring good ideas that have direct bearing on the strategic goals of the organization. Therefore, it is important to mention that Nigerian SMEs cannot functionally operate without the configuration of external environmental factors (that cannot be controlled by the organization) and internal competencies (that are within the control of the organization) that come to play in the global scene (Hertog et al, 2010)**.** The ability to align with some universal breakthroughs in technology and business management strategies to facilitate easy interface between SMEs and customers cannot be overemphasized. This reality needs to be reflected in the general conception of small scale businesses in Nigeria.

2.2 Concept of small scale business

Small businesses have many definitions which vary from one situation to the other. The differences in these definitions are usually as a result of differences in the level of development of a country, differences in the organization and structure of industries in different countries, and other considerations. There are various criteria used in classifying small businesses, such as, employment (number of workers), assets value and turnover (Bryman and Bell, 2015). Each country tends to adopt the most suitable parameter or criterion, based on their economic policies and the roles small businesses are expected to play in the economic growth and development of the country (Bridge and O'Neill, 2012). To some writers, a business is a concern, an enterprise, or an organization set up by an individual or group of individuals for the purpose of making profits from operations of the concern (Barringer, 2012). Olagunju (2008), defines business as an enterprise that engages in the production of goods/services that provide satisfaction to consumers. Businesses in Nigeria range from micro, small, medium to large ones.

Bearing in mind that definitions change over a period of time with respect to price levels, levels of technology, and other considerations, small businesses in this context are synonymous with small and medium scale enterprises (SMEs) (Lucky, 2012). This is in keeping with the fact that SMEs are usually referred to as small businesses even in some developed countries (EU, 2003). Generally, a small business is an enterprise or an organization that is privately owned and operated with a small number of employees and relatively low volume of sales. Olagunju (2008) defines small businesses as those business concerns with a total capital investment of not more than two million (N2, 000,000) and with the number of employees not more than fifty.

However, the last defininition has been considered to be highly economical considering the kind of businesses in SMEs. In Nigeria, small businesses are commonly found in manufacturing, building and construction, trade, education etc. Furthermore, enterprises qualify as micro, small or medium-sized enterprises if they do not exceed maximum ceilings for staff headcount and either a turnover or a balance sheet ceiling. Attempts have been made to review some of these definitions.

Micro Enterprise: A firm, whose total cost including working capital but excluding cost of land is not more than ten million naira (N10,000,000) and/or with a labour size of not more than thirty (30) full-time workers and/or a turnover of less than two million naira (N2,000,000.00) only (CBN, 2005).

Small Enterprise: An enterprise whose total cost including working capital but excluding cost of land is between ten million naira (N10,000,000) and fifty million naira (N50,000,000) and/or a workforce between eleven (11) and one hundred (100) full-time staff and/or with a turnover of not more than ten million naira (N10,000,000) in a year (CBN, 2005)

Medium Enterprise: A company with total cost including working capital but excluding cost of land of more than one hundred million naira (N100,000,000) but less than three hundred million naira (N300,000,000) and/or a staff strength of between one hundred (100) and two hundred (200) full-time workers and/or with an annual turnover of not more than twenty million naira (N20,000,000) only (CBN, 2005).

Large Enterprise: Any enterprise whose total cost including working capital but excluding cost of land is above three hundred million naira (N300,000,000) and/or a labour force of over two hundred (200) workers and/or an annual turnover of more than twenty million naira (N20,000,000) only (CBN, 2005).

Another important point to make relates to the ownership of the business. To be listed among the SMEs, the business should be privately or jointly owned, and the owner(s) is/are referred to as (an) entrepreneur(s). He/they make(s) available the capital required for the running of the business. They coordinate, control and organize the business (Ehinomen and Adeleke, 2012).

According to Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), SMEs varies from one country to another and is often based on employment, assets or a combination of the two. SMEDAN defines SMEs in Nigeria based on the following criteria: a micro enterprise as a business with less than 10 people with an annual turnover of less than 5 million Naira; a small enterprise as a business with 10-49 people with an annual turnover of 5-49 million Naira; and a medium enterprise as a business with 50-199 people with an annual turnover of 50-499 million Naira. In Nigeria, SMEs cover the entire range of economic activity within all sectors (SMEDAN, 2005).

For the purpose of this reseach, Small and Medium Enterprises (SMEs) as defined by the Central Bank of Nigerian (CBN) has been adopted. CBN defines SMEs as business enterprises whose total costs excluding land is between 9,000 -12, 000,000USD only and, a labour force of between 11 and 300 operating in agriculture, construction, trade, education or manufacturing sector (CBN, 2013).

2.3 Theoretical foundation of the study

This section attempts to dwell on some fundamental theories upon which the entire work lies. The two broad perspectives (technology adoption and organizational commitment) that form the subject matter of this research have some consolidated theoretical bases that require good attention. The first part of this segment focuses on some related models and theories developed over the years with a view to having an explicit understanding of how individuals' acceptance or adoption of new products or technologies develops over time.

Extant literature revealed that the major contributions in this field came from the Psychologists and the information system specialists. For instance, Psychologists had a chain of contributions that started from the Theory of Reasoned Action, TRA (Ajzen and Fishbein, 1980), to the Theory of Planned Behaviour, TPB (Ajzen, 1985), to the Decomposed Theory of Planned Behaviour, DTPB (Taylor and Todd, 1995) and to a number of contemporary models. From their own perspective, Information System specialists have made some landmark contributions in the world of technology adoption or acceptance. Among the popular theorists are Rogers' Diffusion of technology, DOI (1983), the Technology Acceptance Model, TAM (Davis, 1986), Unified Theory of Acceptance and Use of Technology-2 (UTAUT-2) (Venkatesh et al., 2012) which evolved as an extension of Theory of Reasoned Action.

Attempts have also been made in this part to discuss organizational commitment theories. The totality of research in the field of organizational commitment were broadly categorised as distinct eras, based on the line of thinking adopted by the researchers. Becker (1960) and Porter et al. (1974), all belong to the uni-dimensional era. This era opined that organizational behavior is a single indivisible behavior, while multi-dimensional era entails the view of commitment as Affective, Normative and Continuance. Two leading multi-dimensional approaches

were further advanced in the 1980s; one from O'Reilly and Chatman (1986) and the other from Meyer and Allen (1984).

It is important to stress that these theories and models are not without weaknesses. This warrants that the models and theories developed earlier are overviewed with a view to improving them. In view of this, some relevant theories and models are discussed below:

2.3.1 Diffusion of Innovation Theory (DOI)

According to Kinnunen (1996), the early work on diffusion started way back a centuary a go. He stated that, sociologists (Tarde, 1903) in France and (Simmel & Wolff, 1950) in Germany, and anthropologists (mainly groups in Britain & Germany- Austria) were the first to use the word "diffusion". The famous research of Ryan & Gross (1943) have been documented as the earth-breaking research that set a new paradigm in the world of diffusion research. Thereafter, literature was flooded with diffusion studies coming especially from USA.

Theory expansion in the 60s involved the spread of diffusion research in developing nations such as Latin America, Africa, and Asia. Different disciplines led the development of the diffusion theory; the first involved was Anthropology. Other research traditions (series of investigations on similar topics whereby successive studies were influenced by the proceeding inquiries) that led to the expansion of this theory were: early sociology, rural sociology, education, public health/medical sociology, communications, marketing, geography, and general sociology (Al-Qeisi, 2009). The two marked events that contributed to the theory's development were the Iowa Hybrid Seed Corn study conducted by Ryan and Gross (Rogers, 2003; David, 2011) and Tarde's analytical observations made from viewing legal cases and social trends. Tarde used imitation; which came to be known as adoption today. He explained the adoption or rejection of innovations as an important outcome variable in diffusion research.

Diffusion of technology theory is basically all about providing technology inclined organizations and individuals with a conceptual master-piece for understanding the process of technology adoption and social change (Harriger, 2011). Diffusion of innovation theory provides well developed concepts and a large body of empirical results applicable to the study of information

technology evaluation, adoption and implementation, as well as tools (both quantitative and qualitative) for assessing the likely rate of diffusion of a technology, or identifies numerous factors that facilitate or hinder technology adoption and implementation (Lim et al., 2013). These factors include the innovation–decision process, innovators' characteristics and attributions of the innovation: this is the bane of DOI theory by Rogers (1995). The technology-decision process entails the channels through which a decision maker passes through from the initial knowledge about the technology to formulating an attitude towards it, to a decision regarding its adoption or rejection, to implementation of the new idea, and to confirmation of this decision. This process consists of five stages as discussed below:

- Knowledge**:** when the decision maker gets to know of technology existence. This could be awareness, how-to-knowldge or principles knowledge.
- Persuasion: when the decision maker developes a 17ositive attitude towards the technology. There is psychological involvement at this stage.
- Decision: the decision maker engages in activities that translate into adoption or rejection. Rejection could be after trial (active rejection) or before trial (passive rejection).
- Implementation: when the individual puts an innovation into use. Up till this stage, the individual involved in the innovation-decision process has been engaged in a mental exercise of thinking and deciding (except for the physical trial part).
- Confirmation: any element of doubt is dispelled at this stage. Decision makers have taken concrete position to adopt the technology.

Regarding the adopters, DOI theory sees innovations as being communicated through certain channels over time and within a particular social system. Individuals are seen to show different degrees of readiness to adopt innovations and thus, it is generally observed that the portion of the population adopting an innovation is approximately normally distributed over time (Rogers, 2003). Breaking this normal distribution into segments leads to the segregation of individuals into the following five categories of individual innovativeness: innovators, early adopters, early majority, late majority, laggards (Rogers, 1995). Members of each category are, often time, associated with certain distinguishing characteristics as can be seen below:

- Innovators – venture-some, educated, multiple information sources
- Early adopters - social leaders, popular, educated
- Early majority - deliberate, many informal social contacts
- Late majority - skeptical, traditional, lower socio-economic status
- Laggards - neighbours and friends are main infomation sources, fear of debt.

In addition, Rogers (1995) in his landmark study of the classic theory of Diffusion Of Innovation (DOI) attributes organizational usage of an innovation to its characteristics. Among the major constructs of DOI that were subjected to a number of findings later are the two (compatibility & complexity) that form part of the proposed model of this study. Within the context of technology adoption research that link technology characteristice with adoption, the following elements are the ones that repeatedly appear in extant sudies: Figure 2.1 depicts the major IT characteristics acoording to Rogers (1995).

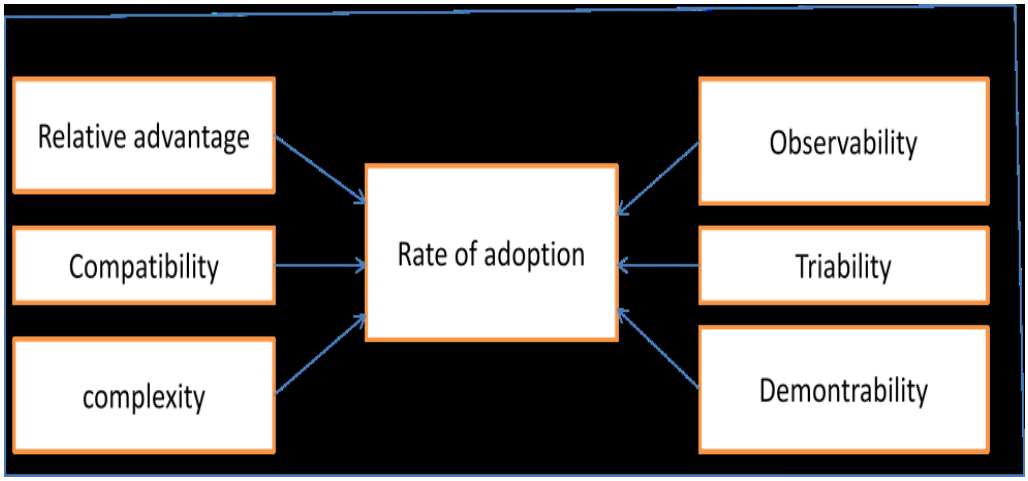

Figure 2.1: DOI Adapted from (Rogers, 1995)

- Relative advantage, the degree to which an IT can bring benefits to an organization;
- Compatibility, the degree to which an IT is consistent with existing business processes, practices and value systems;
- Complexity, the degree to which an IT is difficult to use;
- Observability, the degree to which the results of an IT are visible to others;
- Trialability, the degree to which an IT may be experimented with; and

- Demonstrability, Potential adopters can better understand the advantages of using a new technology and its implications for their job when tangible results of the technology are directly apparent.

The literature proves that the DOI theory has a solid theoretical foundation and consistent empirical support (Zhu et al., 2006a,b). Both researchers and practitioners are unanimous that the theory is among the ground breaking theories of our comtemporary time (Karnowski, 2011). Prior empirical studies have suggested some significant correlation between the characteristics and technology adoption. A number of models have emanated to support the work, either by extending it or just using different contexts to apply the IT theory (Horbach, Rammer & Rennings, 2012).

Nevertheless, inspite of the large volume of research on DOI, it has been argued that it does not provide evidence on how attitude/behavior can lead to accepting or rejecting a particular IT and, how IT characteristics fit into the decision process (Balkin, 2010). This line of reasoning assumes that DOI is silent on the decision process that starts from satisfaction with Human Resources (HR) practices, which is viewed by employees as organization's commitment that needs to be reciprocated back to the organization by employees through positive innovative behavior that supports IT adoption (Sanders, 2010).

In the same vein, there was no mention of how organizational commitment can affect the constructs of DOI (Umar and Wahab, 2013). This theory also fails to be clear about how demographic variables could play moderating roles to actualize adoption. Some of the lapses mentioned demand that emphasis be placed on demographic and behavioral variables (age, gender, experience and commitment) that place control over behavioural responses to stimuli or intervene/interact to alter the rate of IT adoption.

As one of the foundation theories in this study, DOI provides the two constructs that form part of the proposed model of the study due to its strength in IT research field. This makes DOI more relevant and accepted for the current research.

2.3.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) specifies the causal relationships between system design features, perceived usefulness, perceived ease of use, attitude toward using, and actual usage behaviour. Overall, the TAM revolves around the idea that the nature of the technology determines its adoption; hence, it is regarded as a means of evaluating user adoption or utilization of that technology (Lawrence and Lawrence, 2010). TAM as a model that explains technology usage was first documented by Davis (1986).

The model was developed based on the work of Fishbein and Ajzen (1980). The goal of TAM is to provide an explanation of the factors determining computer acceptance that are general, capable of explaining user behavior across a broad range of end-user computing technologies and user population, with sound theoretical justification (García & Gómez, 2013). Theory of Reasoned Action (TRA) is a well researched model from social psychology which is concerned with the determinants of consciously intended behaviors (Domíngu, 2013; Fishbein and Ajzen, 1975).

TAM uses TRA as a theoretical basis for specifying the linkages between two key sets of constructs: (1) Perceived Usefulness (PSUFN) and Perceived Ease of Use (PEOUS), and (2) user's attitude (A), behavioral intentions (BI) and actual computer usage behavior (Kigongo, 2011). PSUFN is defined as the user's disposition that using a specific technology will increase his or her job performance within an organizational context (Koritos, 2008). PEOUS refers to the degree to which the user expects the target system to be free of effort". Both PSUFN and PEOU predict attitude toward using the system, defined as the user's willingness to use the system (Kholoud, 2009).

Leong et al., (2011) opines that PSUFN in TAM is influenced by PEOU because, other things being equal, the easier a technology to use, the more useful it can be. Consistent with TRA, the effect of external variables on intentions is mediated by PEOUS & PSUFN. The external factors in the model refer to a set of variables such as objective system design characteristics, training, computer self-efficacy, user involvement in design, and the nature of the implementation process (Davis, 1996; Achampong, 2010).

However, as TAM continued to evolve, new variables were introduced as external variables affecting PSUFN, PEOUS, BI, and actual use or behaviour. Among the most frequently referenced are: system quality, compatibility, computer anxiety, enjoyment, computing support, and experience (Behrend et al., 2011). The relationship between TAM's four major variables (PSUFN, PEOUS, BI and B) is hypothesized to use PSUFN as both a dependent variable affecting BI directly; and as an independent variable, since it is predicted by PEOUS. Actual Use or Behaviour is usually measured by amount of time using IT, frequency of use, and actual number of usages and diversity of usage.

TAM has evolved beyond its original form during the past twenty years. Wixom & Todd (2005) illustrated TAM extension in three primary ways. The first approach involved including factors from related models (e.g., SN & PBC from TPB). The second approach involved introducing additional or alternative beliefs to the model (mostly from diffusion of innovation theory such as triability, compatibility, visibility or result demonstrability). The third approach involved examining external variables affecting PEOUS & PSUFN such as personality traits and demographic characteristics. It was pointed out that since its introduction; TAM has progressed through three phases of development: adoption, validation and extension.

TAM was tested and adopted across a wide range of information technology applications such as key office applications (e.g., Spreadsheet, Lotus 1-2-3, Word Perfect, Word, Excel). The validation phase of TAM took two directions; one was to validate TAM's PSUFN & PEOUS instruments to prove their psychometric properties and the other was to validate the causal links among TAM component constructs. The extension phase also was divided into two parts; one was for the extension of the two major constructs (PU & PEOU) while the other was about incorporating relevant variables as important antecedents of the two constructs, PSUFN & PEOUS (Boakye, 2012). According to a meta-analysis carried out by Lee et al. (2003), TAM evolvement (1986- 2003) can be divided into four periods: introduction, validation, extension**,** and elaboration.

Subsequent to TAM introduction in 1989, research around TAM was mainly channelled in two directions. One direction was keen on replicating TAM with other technologies to verify its parsimony. The other direction was keen on comparing TAM with TRA, looking for a differentiation between the new and the original

model and whether the latter is superior to the original. In comparing the two theories, Taylor and Todd (1995b) found that DTPB and TPB gave a fuller explanation than TAM. However, they asked for caution in interpretations of findings due to the trade off between explanation power and complexity. TAM is more parsimonious than DTPB which consists of eight more variables.

During the "elaboration" period, TAM studies were focused on developing a newer version that encompassed the external variables affecting PSUFN & PEOUS and the limitations raised by previous studies. For example, in one year Venkatesh and Davis (2000) investigated the determinants of TAM's constructs PSUFN & PEOUS. Together they investigated the PSUFN determinants and introduced a new model called TAM2. Later in the same year, Venkatesh (2000) worked on another extension to investigate the PEOUS determinants in relation to a specific system (at introduction and after gaining experience with target system). He proposed a control/adjustment–based theoretical model. Figure 2.2 depicts the original model by Davis (1989) from which PSUFN & PEOUS were adopted to formulate the proposed model of the current research.

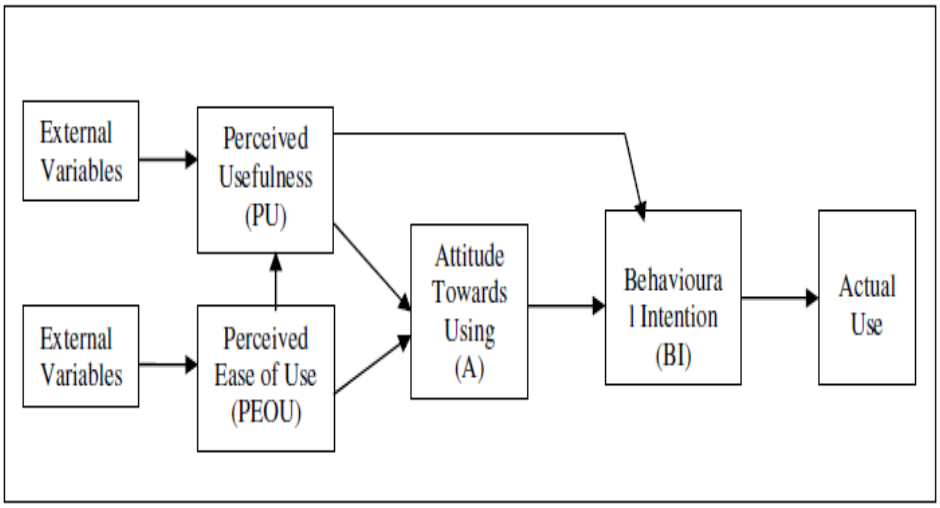

Figure 2.2: Technology Acceptance Model (Davis, 1989)

The model set of anchors are: control processes (internal and external) conceptualized as computer efficacy and facilitating conditions respectively; intrinsic motivation conceptualized as computer playfulness; and emotion conceptualized as computer anxiety (Venkatesh, 2012). The anchors influence early PEOUS of a new system, but with increasing experience with the system, an individual is expected to

adjust his/her PEOUS of the system (Morris et al, 2003). The model was tested in three different organizations using three measurements taken over three months-period. Results showed that the proposed model of determinants of PEOUS explained up to 60% variance in PEOUS (Venkatesh, 2000). The findings suggested that initial drivers of system-specific PEOUS are largely individual difference variables and situational characteristics, whose effect becomes stronger with experience. This study served as a test to one of TAM's assumptions related to the mediation effect of external variables on intention by the TAM constructs of PEOU & PU (Venkatesh, 2000).

Sun & Zhang (2007) proposed an extension to TAM and suggested ten moderating factors identified and categorized into three groups: organizational factors (voluntariness and the nature of task/profession), technology factors (technology complexity, individual versus group technologies, and the purpose of using technology: work versus entertainment oriented) and individual moderators (intellectual capacity, cultural background, gender, age and experience).

The frequently discussed limitations of TAM relate to the measurement of usage by relying on respondents' self-reporting and assuming that self-reported usage reflects actual usage, the type of respondents or the sample choice, the explanatory power of the model and the lack of consistent relationship among variables (Venkatesh and Davis, 2000). Another weakness is that TAM studies provide only limited guidance about how to improve usage through design and implementation (Sun & Zhang, 2007; Bugembe, 2010). These and other limitations require that the current research introduces some mediating and moderating variables to extend this model for further investigation.

TAM is no doubt relevant to this study considering the fact that "ease of use" and "usefulness" are all constructs adapted from it. Even though many studies have been conducted to extend the model, very scanty studies have been done with current units of analysis. Moreso, they are all constructs that appeared to have reasonable power in the field of IT adoption as cited ealier in this section.

2.3.3 Extension of Acceptance Model (TAM2)

Just like a number of theories and models, TAM model has exprienced some modifications that were geared towards limiting the deficiencies observed in the original version. An outstanding modification was the one done by Venkatesh and Davis (2000). They observed that the original TAM that emanated from TRA failed to incorporate the subjective norms construct. This made it imperative upon the authors of TAM2 to add some theoretical constructs that would address social influence and cognitive processes. According to Venkatesh and Davis (2000), the social influence processes focus on subjective norms, voluntariness and image, while the cognitive processes centre on perceived ease of use, result demonstrability, job relevance and output quality.

Venkatesh & Davis explained the role of social influences in computer usage contexts. According to them, TAM2 theorizes that the subjective norms direct effect on intention over PSUFN & PEOUS will occur in mandatory system usage settings. The model posits voluntariness as a moderating variable to distinguish between mandatory versus voluntary compliance with organizational settings. Nevertheless, subjective norms can influence intention through PU or what is called internalization. In addition, TAM2 theorizes that internalization rather than compliance will occur no matter whether the usage context is voluntary or mandatory. That is, even when usage is mandated by the organization, it is the user's perception of a system's usefulness through persuasive social information that will increase his/her intention towards adoption or usage of the system. On the other hand, through identification, subjective norms will positively influence image. An individual will harbour intentions to use a target system if important members within his social group believe he should.

TAM2 theorizes that identification such as internalization will occur whether system usage context is voluntary or mandatory. Experience is theorized to mediate the relations between subjective norms and intentions on one hand and subjective norms-PU (internalization) on the other. Previously, the relation between SN and intention would be stronger in mandatory usage context and prior to implementation or at early stages of use. Yet, the relation is expected to weaken with gained experience during system usage. Experience would have the same effect on the SN-PU relation. In contrast, TAM2 does not theorize that experience affects the image-

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