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Cross-fertilization of the Impact of Technology Characteristics and Demographic Features of Manager That Determine ICT Adoption in Nigeria's Small and Medium Enterprises (SMEs)

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ABSTRACT

The purpose of this paper is to synthesize two streams of researches by way of proposing an integrated model. To achieve this, the paper drew on upper echelon theory (UET) and diffusion of innovation theory (DOI). This conceptual paper proposed a model and established relationships between varaibles of UET and those of DOI based on literature. The literature supported the claims that there exists a relationship between the characteristics of Information and Communication technology (ICT) and the demographic features of Top Management Teams (TMTs). The obvious contribution of the paper is the proposed framework that brings the two strands of researches together for better understanding of innovation adoption by SMEs owners in Nigeria.

Key words: innovation adoption, Upper Echelon Theory, Diffusion of Innovation, SMEs, ICT and TMT

Introduction

Small and Medium Enterprises (SMEs) today form the strong hold of many economies around the globe. SMEs are a fundamental part of the economic fabric in developing countries, and they play a crucial role in furthering growth, innovation and prosperity (Abdullahi and Eta, 2013). More than 95% of enterprises in the Organization for Economic Cooperation and Development (OECD) area are SMEs; these enterprises account for almost 60% of private sector employment, make a large contribution to IT adoption, and support regional development and social cohesion (OECD, 2005). Also in low-income countries, the SME sector makes a critical contribution to GDP and employment because they include a wide range of businesses, which differ in their drive and technical advancement.

This development is not unconnected with the use of Information and Communication Technology (ICT) in the area of storage, processing, retrieval, and dissemination of information. However, its use within Small and Medium Sized Enterprises (SMEs) in both developing and developed countries is surrounded with many challenges despite the progress made. This obviously requires businesses to enhance what they offer to customers, how they offer it; or they are flushed out of the market by co-competitors (Bessant and Tidd, 2011) who are capable of doing that.

To achieve this, researches that explore more critically the unique set of factors that correlate (Byron & shooter, 2005) significantly with the rate of technology adoption by bussinesses are being undertake. In a particular study, triability, household innovativeness & perceived Ease of Use were the determinants of user satisfaction with perceived ease of use as the mediating factor (Motohashi et al, 2012). A research conducted on Nigerian by Aliyu and Tasmin (2012), reveals that infrastructure, power, connectivity Problem and poor legal framework are the challenges against ICT Adoption in the country; this is quite distinct from the perspective taken by Elie-Dit-Cossaque et al. (2012), who found that external forces such as broad work environmental factors, managerial support and personal innovativeness with ICT affect Perceived Behavioral Control (PBC) on ICT adoption.

Predicating their research on the Upper Echelon Theory, Hart et al. (2011) and Sunday et al., (2011) concludes that age, experience and gender sensitivity of Top Management Team (TMT) have strong power of predicting the extent of adoption; it was equally discovered that group homogeneity has a negative impact, while education has a weak one. These studies have no doubt turned around the fortunes of a number of organizations facing challenges posed by rapid advancement in technology.

Nonetheless, researchers are consistently shifting the contemporary innovation adoption research frontiers to incorporate other issues that enjoy very limited attention. All these findings where conducted based on one theory or the other. And considering the technological, managerial and environmental changes , a study that cross-fertilizes theories relating to some of these researche areas is needed (Morgan, Kaleka & katsikeas, 2004). In an attempt to do that, it has been discovered that the Diffusion of Innovation theory has a sound theoretical base and splendid empirical support (Beatty et al., 2001; Zhu et al. 2006) and it has formed the basis for studying a variety of innovations (Moore & Benbasat, 1991). It is logical to appreciate the fact that innovation is not static, likewise their determinants; many new characteristics might have emerged in addition to what obtained in previous generations of ITC. In view of that, impacts of managers' characteristics on the nature of ICT deserve attention (Zhu et al., 2006b). As reviewed in Zhu & Kraemer (2005), 'much of the prevailing researches focused on the adoption decision and measures such as 'intent to adopt' and 'adoption decision versus non-adoption' (Fichman, 2000).

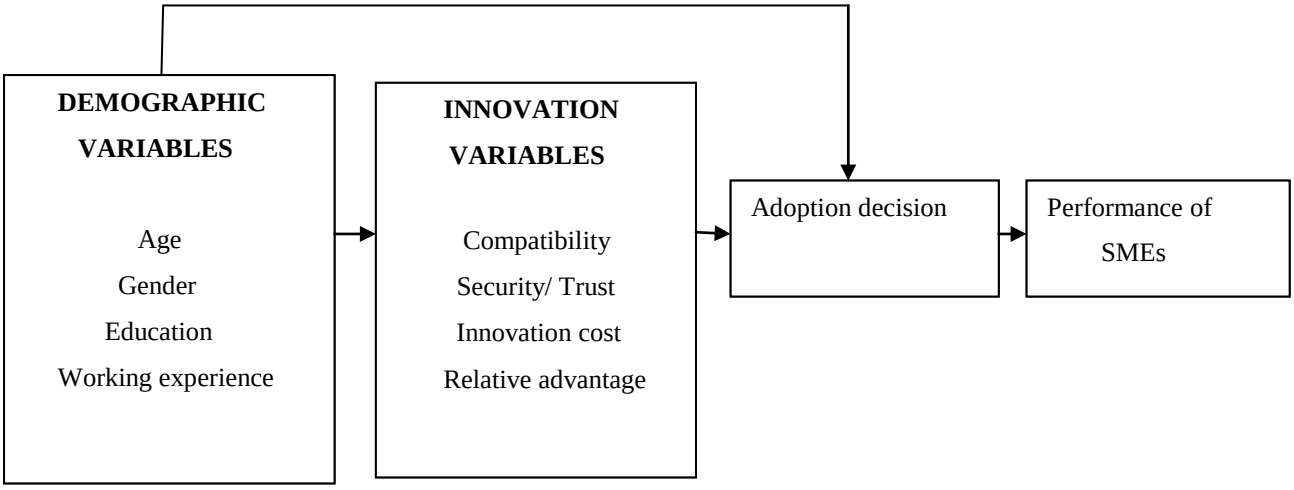
Although previous researches have aided in understanding adoption decisions generally, we also need a better understanding in the Nigerian context. Consistent with Thong's (1999) study, IT adoption in this study defines "using computer hardware and software applications to support operations, management, and decision making in the business". Each SME is expected to computerize, for example, employing more than one software application and a number personal computer. Within the rapidly changing global picture, organizations are compelled to keep track of six major factors: demographic, economic, social-cultural, natural, technological and political-legal. It is important for businesses to understand how these factors interact with one another (Kotler & Keller, 2006) considering the fact that interactions among these variables are basis of opportunities and threats to the businesses. Brassington and Pettitt (2006) group their environmental variables using an acronym (STEP) that depicts socio-cultural, technological, economic and competitive, and political and regulatory environments. The combination of these environments determines to a very large extent, how successful businesses are in adopting innovations. They can directly influence the adoption behavior of the top management team members; the socio-cultural environment, for example, includes age distribution, ethnic mix, educational level (Kotler & Keller, 2006) is capable of changing attitudes and behavior in relation to innovation adoption. Motivated by these issues, this study seeks to improve our understanding of determinants of ICT.

A model was proposed based on synthesis of two theoretical perspectives – the diffusion of innovation (DOI) theory (Rogers, 1995) that emphasizes the characteristics of an innovation and the upper echelon theory (UET) (Hermbrick & Mason, 1984) that emphasizes the demographic features of managers. Four innovation characteristics (relative advantage, compatibility, costs and security concern) and four manager's features (age, gender, education and experience) were examined as determinants of innovation adoption that have direct link to innovation adoption in Nigeria (Eze et al., 2011). In a research conducted by Thong's (1999), IT adoption connotes using computer hardware and software applications to support operations, management, and decision making in the business in view of that, adoption and usage are used interchangeably in this paper, since the aim of small business managers to adopt IT is to carry out their business activities (Eze et al., 2011).

Theoretical Base of the Study

It is clear from the body of knowledge that some of the well established theories and models are the technology acceptance model (TAM) (Davis 1986, Davis 1989, Davis et al. 1989), theory of planned behavior (TPB) (Ajzen 1985, Ajzen 1991) that emphasize facilitating conditions which influence both intention and behavior. According to Venkatesh et al., (2003), Unified Theory of Acceptance and Use

of Technology (UTAUT) has distilled theoretical factors and contingencies that predict behavioral intention to use a technology primarily in organizational contexts. The unified theory of acceptance and use of technology (2) (UTAUT2) (Venkatesh, Thong; Xu, 2012) incorporates three constructs: hedonic motivation, price value, and habit. Another widely used theory is Upper Echelon Theory (UET) by Hambrick & Mason (1986). This theory sees a firm as a reflection and extension of its owners; adding that the firm's strategic choices, behaviors, and performances are to a large extent influenced by the demographic characteristics of its owners or top managers. The Technology Organization Environment (TOE) framework (Tornatzky and Fleischer 1990) views adoption determinants from the perspectives of the Technology itself, the Organization's internal and external Environment. It is therefore, rational to admit that a research is required to extend the existing frontier by integrating DOI and UET in a single model considering what appears to be a gap in the existing body of knowledge (Zhu et al., 2006).



(Figure 1.1) proposed integrated models

Linkages between UET and DOI theories

Many studies came to conclusion that IT adoption by SMEs may be influenced by the internal characteristics of small businesses managers. This section would spotlight what appear to be recurring characteristics in most of the previous researches.

Working Experience and Innovation Characteristics

The past experiences of the manager about technologies already existing in an organization also influence the subsequent adoption of a new technology in many occasions. For instance, the incremental cost and knowledge required to adopt the subsequent technology might much smaller if a firm manager already adopts a computer and a telephone. Empirically, past studies have found that so called "innovators" of a new product are drawn from the heavy users of other products within the product category (Gatignon and Robertson, 1991; Dlakia & kshetri, 2004). Different SMEs managers may react differently to changes. Some might welcome these changes, while others might resist or even kick against them. Manager's resistance to changes brought about by new technologies, mostly because of their in-experience, is often the main reason an information technology project fails to see the light of the day (Venkatesh, Morris, & Ackerman, 2000). Managers who have used a particular innovation in the past, and thus have experience, may develop certain beliefs about it that are different from the beliefs of those who never used it before (Odev & Ye, 2008).

A number of studies have revealed that in SMEs, the role of top management (owner/manager in most cases) is central to enterprise since their decision influences all the SMEs current and future activities (; Smith, 2007). This also refers to IT adoption decision from planning stage to the implementation, maintaining, and system upgrade stages (Bruque and Moyano, 2007; 2002; Nguyen, 2009 & Bbobakhloo, 2011). Another research suggests that managers' decisions are mainly based on

their experiential knowledge gathered by synthesizing existing competencies of knowledge, personal experience, judgment, and their communication skills (Carson and Gilmore, 2000). The experience can also influence the type of behavior taken by managers (Hambrick and Mason, 1984) . New experienced managers might bring a tremendous of know-how and focus with regards to adopting and implementing technology, than those promoted to management level from within the organization (Eze et al., 2011). This may allow the technological capabilities of the organization to grow and exploit the potential of technology to streamline work tasks (Viswanath, 2000). Eze et al. (2011), in exploring the relationship between executive experience and IT adoption processes in SMEs, found that as experience in IT adoption intensifies, the more likely an organization can harness the true potential of technology to improve business processes. Hence, working experience is an important determinant of innovation adoption in SMEs and can influence workers' perception of ICT characterisics.

Education (Academic Qualification) and Innovation Characteristics

A number of studies (Chuang et al, 2007; Dwivedi and Lal, 2007) have found that professionalism and the formal education level of executives can influence the IT adoption process. It has been found that managers with higher education levels have a greater awareness of the value and potential which technology can bring to the organization (Eze et al., 2011).Well educated SMEs managers have a greater probability of learning technology and diffusing its benefits into the mainstream organizational personnel than managers that lack that qualification. Furthermore, education, to some extent, serves as an indicator of managers' skills and their propensity to seek innovation (Hambrick and Mason, 1984). Executives with weak education often exhibit high levels of risk aversion because they feel threatened by change and only invest after first-mover advantages have been lost to other managers who, perhaps, have better education backgrounds. The knowledge of the information technologies possessed by managers has an effec on the adoption of e-commerce (Thong & Yap, 1995b), and their knowledge of the technologies and of e-commerce also has a positive influence on the degree of use of e-commerce (Chieochan et al., 2000; Joen et al., 2006). Having said that, it could be extrapolated that level of education can affect compatibility of new technology to all ones, security/ trust and cost in relation to the advantage of the new technology over an existing norm .

Age and Innovation Characteristics

Decision making has been conceptualized as a process, and it is affected by behavioral factors; the behavior of senior managers is important to understanding the strategic decision making process. By implication the age of a manager can influence his behavior, since the behavior is in part derived from the characteristics of the individuals (Hambrick & Mason, 1984; Mador, 2000). Some empirical studies have come to conclusion that IT adoption may be more profound in firms managed by younger managers than those managed by older ones. This may have significant influence on how the technology is perceived to be secure, compatible with the existing norms in the organization and the relative cost and benefit of the technology contemplated. A study conducted to determine the managerial factors influencing company performance suggested that younger executives are more driven by risk-taking, innovation and achievement compared to their older counterparts ((Child, 1974). A number of studies (Hambrick and Mason, 1984; Venkatesh and Morris, 2000; Morris; 2000; Chuang et al, 2009) have found that the age of the managers can significantly determine the extent of IT adoption within organizations. This may be explained by the apparent conservative stance taken by older managers when it comes to innovation (Chown, 1960; Child, 1974; Alutto and Hrebiniak, 1975) or older executives avoiding any risky action capable of disrupting their social norms or infringing on his or her retirement benefits (Carlsson and Karlsson, 1970).

Gender and Innovatrion Characteristics

Studies (Heilbrun, 1976; Hofstede, 1991) have attested to the fact that gender can determine human behavior and management decision-making processes. Indeed, gender can have a significant role in determining how users respond to and use technology (Gefen and Straub, 1997; Zheng et al, 2006). Jimmie and Somnath (2010) in examining the relationship between gender and IT adoption

found that females possess fewer computers at home compared to males. Geffen and Straub (1997), in extending Davis' technology acceptance model to investigate perceptual differences and use of E-mail, found that men and women differ in their perceptions of E-mail. This is not unconnected with the tendency of men to feel more comfortable using technology than women. Furthermore, in technology-driven markets, often early adopters of new technological innovations are primarily young male executives (Lu et al, 2003). One possible reason is that females are less inclined and motivated to adopt and use technology than males (Qureshi and Hoppel, 1995). As women tend to process information in a more comprehensive and less aggressive manner than men do (Darley and Smith 1995), older men mostly rely on heuristics and schema gathered from usage experiences to determine their behavioral intention, paying little attention to environment cues (Venkatesh et al., 2012). By extension, this can affect the perception about the rate of compatibility of the new technology to existing one, relative advantage, trust or the confidence reposed on the technology in question and hence the adoption decision that influence performance too.

Conclusion

It could be concluded that Nigeria's SMEs have over time avail themselves of the opportunities accruing to the adoption of ICT in all spheres of their operations. Like their counterparts around the globe, they are faced with some factors that determine the success or otherwise of ICT adoption. Prominent among these factors are the ICT and SMEs characteristics. As obvious contribution of this research, these determinants were cross-fertilized and relationships established. Nevertheless, further research is required to examine the impact of each TMTs factor on each ICT determinant as depicted by the proposed framework, through empirical research.

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