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OPERATIONS, INFORMATION & TECHNOLOGY | RESEARCH ARTICLE

Adoption of emerging ICTs: The role of actors in a social network

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Abstract: This paper uses actor network theory (ANT) to provide further insight into ICT adoption framework by showing how the diverse actors in small service(s) businesses guarantee continuous adoption of emerging ICT amidst many influences. On the basis of purposive sampling, unstructured and semi-structured interviews were conducted with 21 respondents from fast food organizations and IT firms. However, despite the opposition amongst the actors in the socio-technical network, ICT innovations are often adopted by small service businesses though the managers' adoption decision is regularly shaped by various factors which in turn reinforce other actors' pre-conceived beliefs, attitudes and values. Adoption follows a dynamic path based on trial and error and each stage is vital, distinct, integrated and provides different implication(s). The proposed framework supports all sizes of businesses but each stage in the adoption process is treated on its own merit.

Subjects: Behavioral Sciences; Communication Studies; Information Science

Keywords: actors; adoption; EICT; ANT; small and medium businesses

1. Introduction
The complex ICT world is undoubtedly unleashing insights into predicting how small and medium-sized service businesses engage in aggressive operational transformation that spans improved

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PUBLIC INTEREST STATEMENT
This paper explains how the actor network theory (ANT) provides insight into innovation adoption by specifically unveiling the role of diverse actors in the adoption of emerging ICT. Interview data were collected from executives of small service businesses and despite the ingrained opposition amongst actors, adoption is real though it is often shaped by key actors' idiosyncrasies, which in turn reinforce other actors' pre-conceived beliefs, attitudes, and values. However, adoption of IT-innovation follows a dynamic path based on trial and error and each stage is vital, distinct, integrated and provides different significance. The proposed framework supports all sizes of businesses but each stage in the adoption process is treated on its own merit.

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interactivity and efficiency (Fang, Benamati, & Lederer, 2011; Nissan, Galindo, & Mendez, 2011). It also unveils the diverse roles played by different actors and/or stakeholders in the adoption process of emerging technologies. In keeping with such complexity, emerging ICTs describe original and/or almost unanticipated new applications, whose effective manipulation provides enterprises with new competencies and manoeuverability. Scholars (Barrett, Grant, & Wailes, 2006; Cavusoglu, Hu, Li, & Ma, 2010; Simpson & Docherty, 2004) assert that emerging ICT applications offer enterprises great opportunities though their long-term promises and the lack of cognate resources challenge small businesses and cause much more volatile environment with little support on new technology adoption. The complexities associated with emerging ICTs imply that they are becoming even more problematic and require immediate scholarships (Benamati & Lederer, 2008), especially now there are not many inquiries that report on how the various actors exert influences on adoption (Barrett et al., 2006; Cavusoglu et al., 2010; Kallinikos, 2004).

Kallinikos (2004) and Barrett et al. (2006) note that majority of the contributions on how ICT shapes the social context emphasizes user-centric position, where the role played by the technology is not adequately espoused. However, such studies align with the scholarly inquiries (Alutto & Hrebiniak, 1975; Carlsson & Karlsson, 1970; Child, 1974; Fang et al., 2011) that found that while some executives are quite aggressive in trying something new; others place greater psychological commitment to corporate status quo and are often conservative because they lack the physical and mental stamina as well as the social enablement to try something new. Fang et al. (2011) posit that often an otherwise credible innovation adoption may not align proficiently with the policies, structures and philosophies of the adopters/enterprises. Often stakeholder(s) serve as powerful decision-making coalition and influence(s) adoption processes after considering, amongst others, technology standards, privacy issues, and health and safety issues (Barrett et al., 2006; Cavusoglu et al., 2010; Fang et al., 2011). Conversely, traditional adoption theories emphasize utilitarianism and techno-centric predictions and assume that technology and not the individuals determines adoption (Benbasat & Barki, 2007; Vankatesh et al., 2007).

Scholars suggest being specific as to the technology and to focus on which aspects enable and/or inhibit organizational change instead of looking at the whole picture from the illusion of accumulated tradition, technological determinism and techno-centric predictions (Al-Natour & Benbasat, 2009; Awa et al., 2015; Eze, Awa, Okoye, Emecheta, & Anazodo, 2013; Vankatesh et al., 2007). Barrett et al. (2006) and Jacobsson and Linderoth (2010) emphasize the need for more socio-technical interactive systems to deal with the challenges of technological or social deterministic viewpoints. Amongst others, social network theory (SNT), structuration model and actor-network theory (ANT) are the major theories that recognize the socio-technical interplay in adoption process. Whereas SNT uses structures and processes of homophilous and heterophily within the social system to explain adoption behaviour (Parker & Castleman, 2009); structuration model emphasizes duality and assumes that technology is physically constructed by actors working in a given social context; thus, technology is socially constructed through the meaning the social groups attach to it and the various features they emphasize and use (Orlikowski, 1992). Mähring, Holmström, and Keil (2004) posit that ANT handles the role of technology in social settings and the processes by which technology influences and is influenced by social elements overtime.

ANT recognizes that non-technical artefacts play same role as human actors and facilitate social order through heterogeneous networks of human and non-human actors—computer software, standards and hardware (Balkundi & Kilduff, 2006; Barrett et al., 2006; Tatnall & Burgess, 2002). These theories believe that adoption of emerging ICT in small service businesses happens through rapid and ceaseless backward and forward movements, and shows a continuous flow of activities (Braun & Clarke, 2006; Hanseth & Aanestad, 2004; Kim, 2009). Recognizing that many studies (see Andrade & Urquhart, 2010; Benbasat & Barki, 2007; Chen & Hirschheim, 2004; Williams, Dwivedi, Lal, & Schwarz, 2009) appreciated ANT in studying technology adoption, this paper uses its framework to study small and medium enterprises' adoption of EICT adoption by proposing a socio-technical framework that captures how human and non-human actors guarantee such adoption (see Figure 1).

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Figure 1. Interplay between the human and non-human actors in socio-technical network.
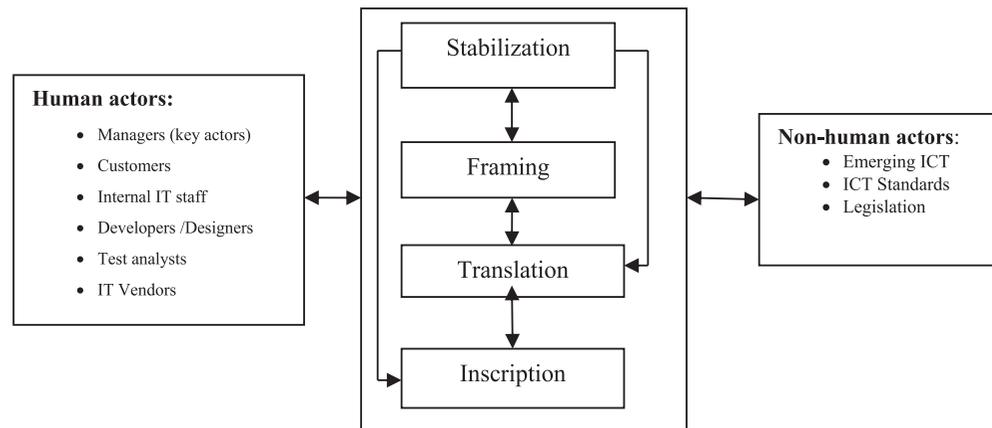
Given that small business managers have limited knowledge to try something new (Cavusoglu et al., 2010; Kallinikos, 2004), then understanding diverse actors and their roles in the adoption processes enhance the knowledge of the analysts and confirm or debunk extant studies (Chuang et al., 2009; Hambrick & Mason, 1984; Shiau et al., 2009). The adoption of emerging ICT is becoming more and more challenging (Benamati & Lederer, 2008); thus, the credence of this study hinges on helping small business managers to be more strategic and more proactive. Aside Nigeria's small and medium enterprises attempting to survive difficult times using ICT innovations, this paper focuses on the informal sector for their knowledge-base development and the re-engineered government encouragement on SMEs generally to improve wealth creation and socio-economic development. This paper is structured as follows; a review of extant studies on the subject matter and the proposition of a guiding theoretical framework on ANT epoch, research approach, testing the framework and discussion.

2. Socio-economic framework of EICT adoption

Technology adoption enjoys explosive theories (e.g. Ajzen, 1991; Ajzen & Fishbein, 1980; Caldeira & Ward, 2003; Davis, 1989; Rogers, 2003; Thong, 1999; Tornatzky & Fleischer, 1990; Venkatesh et al., 2003), which have been applied in different contexts to describe, explain and predict adoption and diffusion amongst specific groups of people. Scholars (Al-Natour & Benbasat, 2009; Awa et al., 2015; Benbasat & Zmud, 2003; Eze et al., 2013) opine that while many IS theories (e.g. TAM, TPB, SM, UTAUT2, IDT and TRA) adopt rational, attitudinal and techno-economic perspectives in determining adoption; few of them (e.g. ANT, TOE and DTOE) recognize the influence of imitative behaviour and social pressures on adoption and thus, emphasize less on utility maximization and/or economic optimization. Often rational choice models (e.g. TAM, TPB, SM, UTAUT2, IDT and TRA) are accused of illusion of accumulated tradition (Benbasat & Barki, 2007), technological determinism, utilitarianism, self-interest, conscious decision-making and techno-centric predictions (Vankatesh et al., 2007); hence, technology, rather than individuals, determines adoption.

Though ICT adoption study is often considered as one of the most mature streams in IS research (Brown et al., 2010), McAfee (2006) accused a substantial number of such studies as relying so much on extant theories in a manner to assume ICT adoption is predictable, straightforward, static and one-off event devoid of uncertainties. Often the theories focus on factors affecting decision at one decision point and undermind the interplay of the same or different factors as decisions progress (Eze et al., 2013); they focus extensively on distinct roles and some stable characteristics of technology with the least attempt to address the growing complexities of organizational life characterized by the multiplicity of stakeholders' interests in technology adoption (Barrett et al., 2006). Orlikowski (1992) maintains that technologies have objective functions accepted at one point and such functions may be challenged overtime due to diverse meaning actors assign to them. Studies (Barrett et al., 2006; Jacobsson & Linderoth, 2010) report that over two-third (2/3) of ICT projects fail

principally because of much emphasis on their economic rationality and less on the people, who affect and are affected by the project. The society (or various human actors) represents the means through which new technologies are produced and reproduced; thus, adoption is more of a socio-economic process involving diverse human and non-human actors who influence adoption (Orlikowski, 1992; Venkatesh et al., 2003).

Scholars associate adoption process with broader situations or multi-layer contexts spanning the organization's socio-economic circumstances (Jacobsson & Linderoth, 2010), where external forces including trading partners, non-entrepreneurial firms and government agencies play critical roles in influencing ICT adoption (Garud & Rappa, 1994; Parker & Castleman, 2009). Son and Benbasat (2007) proposed the "efficiency" and "legitimacy;" drives of the state-of-art technologies; the efficiency derived from cost, economic man, pleasure seeking and rational choice theories; and the legitimacy motivation aligns with institutional and socio-economic theories. The institutional properties of organizations was espoused by Orlikowski (1992) to include structural arrangement, culture and ideology, standardization, operating procedure, division of labour and specialization, communication patterns, business strategy, control mechanism, and environmental pressure such as government regulations, competitive forces, vendors' strategies and knowledge about the technology as well as the socio-economic conditions. Jacobsson and Linderoth (2010) suggest that organizational and cultural change determines the adoption of emerging ICT platforms and the cause of such change may also influence the existing power relations. The scholars suggest that often actors draw from the norms and knowledge of these contextual elements to interpret and assign meanings to actions that lead to meaningful interactions.

Supposedly, innovation adoption analysts are to thoroughly review the interrelated action of members of the society that influence the adoption, including the technology itself and the specific users in specific settings (Jacobsson & Linderoth, 2010; Orlikowski & Gash, 1994). Studying the adoption of ICT is not taken for granted; thus the socio-techno interaction must be carefully analysed, including programmes of actions inscribed in the technology by diverse actors (Barrett et al., 2006; Jacobsson & Linderoth, 2010; Orlikowski & Lacono, 2001). Jacobsson and Linderoth (2010) and Barrett et al. (2006) posit that actors who acquire information, experiences, values and norms attempt to use them to construct and reconstruct meanings that emerge into new technology. When actors impose their programme of actions on others in a socio-technical network, it is inscribed into a technology. In the world of technology, inscription is not a one-off event; it requires a clear picture of the dynamics of the organization's process, the knowledge about the intentions of actors, and the features of the information technology (Callon, 1986; Markus & Robey, 1998) since actors are not under compulsion to accept the inscribed programme of actions, which in turn leads to inscribing an improved or a completely new programme of action (Jacobsson & Linderoth, 2010; Orlikowski & Lacono, 2001).

3. Choice of theory

As earlier mentioned, structuration and ANT are amongst the theoretical models that deal with the challenges of technological determinism. Each has its strengths though ANT underpins the present paper. Irrespective of the fact that ANT's methods, techniques and theories have been vigorously challenged (see Benbasat & Barki, 2007; Silva, 2007), it underpins many studies in similar areas (see Andrade & Urquhart, 2010; Chen & Hirschheim, 2004; Williams et al., 2009) and recognizes the unpredictability of technology and rarely takes for granted the existence of neither technology nor the social worlds (Jacobsson & Linderoth, 2010; Vannoy & Palvia, 2010). ANT is particularly relevant for studying small businesses' adoption process because of their operational agility that spans faster decision (Awa et al., 2015) and has been used to examine the interactions amongst actors during technology adoption process (Tatnall & Lepa, 2003), development (Faraj, Kwon, & Watts, 2004) and implementation (Andrade & Urquhart, 2010). Scholars (Callon, 1986; Mähring et al., 2004) propose that ANT represents an alternative framework because of its socio-techno characteristic, which provides broader dynamics and lenses into understanding and predicting adoption process. Vannoy and

Palvia (2010) propose that social influence in the context of ANT leads to technology adoption and technology adoption in turns is shaped by the technology itself and the society.

The on-going actions between human and non-human actors help in assessing the advantages of new technology and its deployment (Orlikowski, 1992). Gomart and Hennion (1999) posit that instead of treating contextual elements, people and technology as separate entities, ANT composed heterogeneous elements in the network to produce emerging actions from an indeterminate source. ANT emphasizes the collection of networks which unite the innovation to all actors that make it happen (Akrich, Callon, & Latour, 2002a); how adoption takes place, how it moves and how it dynamically spreads within the social system (Akrich, Callon, & Latour, 2002b). Andrade and Urquhart (2010) note that ANT allows researchers to observe complex network of players during and after adoption process and the disparate goals of actants by tracing their interaction since the adoptions are rarely predicted in exact terms. ANT moves beyond the stable theory of the actors and assumes the radical indeterminacy of the actors (Callon, 1999). Callon (1999) and Latour (1999) note that what actors do, how and why they do it influence others and therefore ANT identifies and combines theories and concepts that lend understanding to the social world and how technologies are constructed and reconstructed.

ANT traces the socio-technical interactions, reveals negotiation processes, and attempts to provide explicit accounts of the socio-technical inhibiting and facilitating factors (Andrade & Urquhart, 2010; Sarker, Sarker, & Sidorova, 2006). Scholars (Andrade & Urquhart, 2010; Hanseth et al., 2004) suggest that traditional theories (e.g. Ajzen & Fishbein, 1980; Davis, 1989) rarely handle ICT adoption processes that are complex, interrelated and deeply interwoven into the fabrics of the society. Traditional adoption theories (e.g. TAM, TPB, TRA and IDT) rarely challenge technology implementation (Akrich et al., 2002a; Andrade & Urquhart, 2010). Eze et al. (2013) opine that they provide minimal insight into understanding the constant technology advancements and the dynamic and evolutionary nature of technology adoption. Such theoretical frameworks are accused of being static, less adaptable and predictable in definite terms, and lack basis for integrating various actors into the adoption process (Al-Natour & Benbasat, 2009; Callon, 1991; Eze et al., 2013; Ray & Ray, 2006). Traditional adoption theories permanently separate the technology and the social worlds; they assume technical aspects of technologies and take for granted the adoption roles of human agency (Barrett, 2006; Jacobsson & Linderoth, 2010; Lee & Oh, 2006; Tatnall & Lepa, 2003; Vannoy & Palvia, 2010).

Granted that some of the traditional theories emphasize technological determinism and social constructivism separately (Faraj et al., 2004; Hanseth et al., 2004), a more integrated theory simultaneously examines how both human and non-human actors are rolled into a network. Scholars (Andrade & Urquhart, 2010; Cordella & Shaikh, 2006; Ray & Ray, 2006; Wernick, Hall, & Nehaniv, 2008) are of the view that for analysts to be accurate in making integrated representation of the real world about the contemporary adoption, the science of social and technology artefacts must be inseparably considered. Such action goes beyond the stable relationships as proposed by traditional theories and recognizes the dynamics of the interaction amongst the relevant actors (Cordella & Shaikh, 2006; Tatnall & Lepa, 2003). They emphasize dynamic and mutual influence of technical and social systems (Mahring, 2004) and demand negotiations where the key actors attempt to impose roles and definitions to others. ANT originates from science studies (Bruun & Hukkinen, 2003), draws from ethno methodology (Latour, 2005), and assumes that social scientists question who (human actors) and what (non-human/object) participate in the action must first be exhaustively unveiled. The framework regards ICT, people and any other elements as actors and named them "actants" (Hanseth et al., 2004) and defines actor as elements that bend and shape around itself, make other elements depend upon itself and translate their wills into the language of its own (Callon & Latour, 1981). However, ANT is criticized for not treating both human and non-human actors asymmetrically (Andrade & Urquhart, 2010). Reviewing Bruun and Hukkinen (2003) suggests that such criticism was based on misunderstanding of what ANT is out there to do since actors are not restricted to humans; it examines how strong the association between human and non-human actors is and traces such association to a source. Callon

and Latour (1981) argue that the construction of a network will be taken for granted in the analysis if it is assumed a *prior* that macro actors are bigger than micro actors.

Similarly, what is interesting in treating both human and non-human actors as same is not to claim that both have intension which is one of the attributes of human actors, instead ANT tries to recognize the attributes of non-human actors but not intention as both can modify a state of affair (Andrade & Urquhart, 2010; Latour, 2005). Schwarz and Chin (2007) opine technology adoption and/ or development occurs throughout the lifecycle of any living organization where other forms of innovation and acceptance may still be predominant. In examining organizational change and development process induced by ICT, Van de Ven and Poole (1995) argue that the process or sequence of activities that leads to such change is often difficult to describe and/or manage. They concluded that scholars drew from different theories and concepts to unveil new ways of analyzing organization change and development processes. It is the interplay between different perspectives that help one to gain a more comprehensive understanding of organizational life because any one theory's perspective invariably offers only a particular account of the complex phenomenon (Van de Ven & Poole, 1995). However, the explosive interest of extant studies (especially Allen, 2004; Andrade & Urquhart, 2010; Callon, 1986; Faraj et al., 2004; Kim, 2009; Sarker et al., 2006) on socio-technical strides of ANT informed the study's theoretical categories and framework—inscription, translation, framing, and stabilization—that serve as methodological tools for data collection and analysis.

Theoretically, inscription is a process whereby actors rely on organization's beliefs, experiences, previous patterns of ICT use and expectations about the technology (Faraj et al., 2004; Kim, 2009) to enact values, interests and beliefs towards technology (Sarker et al., 2006). Translation aligns diverse interests and/or beliefs of different actors with that of the key actors within the network (Callon, 1986; Sarker et al., 2006). It involves knowledge of how actors seek the interest of other human actors or directly or indirectly convince others in adopting new technologies (Faraj et al., 2004; Gao, 2005; Sarker et al., 2006; Tatnall & Lepa, 2003). Framing recognizes that actors do not only inscribe beliefs, interests and values over technology, but such values may be dissimilar and detached from one another (Faraj et al., 2004); and stabilization relates to the disappearance of problems or where the actors and others assume the problem is resolved (Bijker, Hughes, & Pinch, 1989). Stabilization of technology does not self-evidently mean that technology is not amendable; technology and business processes might change or adjust overtime to reflect redefined ordeals.

4. Methods and strategy

The credence of any scholarly inquiries is rich data (Schultze & Avital, 2011); to ensure that, the opinions of executives of fast food cases as well as those of IT developers, vendors, developer/designers, consultants, and security and social media executives were sampled in Port Harcourt metropolis. We want to see how these actors influence the decision of key actors of fast-food firms to adopt emerging ICT. Information from these participants guides analysis, provides knowledge on how EICT is misaligned or aligned in the socio-technical network (Jacobsson & Linderoth, 2010), and identify critical factors influencing managers' interplay with other actors that leads to adoption. Aside Port Harcourt playing host to most multinational and national enterprises as well as different Nigerian tribes, the city was chosen based on scholars' (Bingham, 1976; Bouchard, 1993) reliance on critical mass theory and warning that cities with higher socio-economic status (and are in close proximity) are more prone to amenity-based values than low socio-economic cities, who often emphasize necessity-based (e.g. innovations designed to correct some specific deficiencies). Conventionally, the socio-economic strength of fast-food and the IT organizations in Port Harcourt (in particular) and in Nigeria (in general) confirmed they are strong informal elements in the Nigerian economy (Table 1).

However, the mixture of opinions was based on Miles et al. (1994) categorization of businesses, which implies that answers from managers of one grouping alone rarely help to develop an in-depth and cross-fertilized knowledge in complex contexts. The cases chosen were those (1) duly registered with Corporate Affair Commission (CAC) and other agencies as demanded by the laws; and (b)

Table 1. Interview profile		
Case	**Status of the interviewee**	**Frequency**
A1, B2, C3	Managers/owners	3
A1, B2, C3	Security and social media executives	3
A1, B2, C3	IT managers	3
A1, B2, C3	Service-support executives	3
D4, E5, F6	IT consultants	3
G7, H8, Q9	IT designer/developers	3
J10, K11, L12	IT/marketers/vendors	3

Table 2. Case organizations				
Case	**Technology exploitation**	**Firm size**	**Technology exploitation behavioral capability**	**Year formed**
A	Uses technology to create interaction and to resolve managerial issues.	Approximately 10 ICT operators	PoS used mainly as mobile payment device	2010
B	Routine uses of technology to enact, develop, refine, and routinize specific and substantive actions	Approximately 20 ICT operators.	Almost all critical operations/areas are characterized by integration with technology. PoS is used too	2000
C	Not so much is done in using technology to create interaction and to resolve managerial issues.	Approximately 8 ICT operators.	Software is used to secure customer-interface	2006
D-L	Develops and consults for firms IT software and applications that integrate operations and strengthens inter-firm's alignment	Very small outfits, staff strength ranges from 3 to 9	Vast in software manipulations and renders services to firms of all sizes	2011–2014

operating where there is huge store-traffic. By the second criterion, those operating within the axis of University of Port Harcourt, Rivers State University of Science and Technology and Trans-Amadi industrial layout were chosen. However, three cases of fast food simultaneously operating in these areas were chosen on conditions of having overall staff strength of at least 40 (see OECD, 2000), parking lots and branches across the city (see Table 2). For the IT firms, nine (9) were chosen; we literally chose this number (and interviewed one from each) because they are predominantly small firms with owners and at most three (3) staff. To generate richer insights into the processes or activities involved in EICT adoption and to follow the pace of extant studies (see Gilmore & Carson, 2007; Williams et al., 2009), interview was used. The informants were sampled using purposive sampling; experience and personal judgements were used to pick initial key informants. Mason (1996) posits that sampling informants in this form allows in-depth discovery and reasonable comparison in relation to the research objectives and not for statistical generalization.

5. The interview

The interviews span unstructured and semi-structured approaches. Scholars (Myers & Newman, 2007; Schultze & Avital, 2011) provide theoretical support to such structure; Schultze and Avital (2011) posit that the structure provides a deep sense of knowledge about the dynamic interplay of the various actors that influence adoption; and describes people's experiential life in terms of unveiling the critical factors that influence continuous adoption. The scholars opine that interviews attempt to substantiate knowledge claims by addressing methodological issues instead of the quantity of empirical materials and the coding techniques used. Myers and Newman (2007) note that

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Table 3. Reliability analysis			
Scope	**Number of judges**	**Reliability result**	
		First two judges	**Second two judges**
Factors	4	0.87	0.83

interviews provide in detail all the processes involved, from the initial setting, analysis and reporting of findings. Unstructured interview questions tapped the informants' narratives and experiences about the current states of nature on their firms' adoption rate of EICT. Gilmore and Carson (2007) note that firms in the informal sector rarely have formal ways of doing things and thus, unstructured interviews provide open, flexible, experimental and holistic pattern of studying complex and dynamic interactive situations and get the researcher closer to realities of the phenomena under investigation.

Further, 21 semi-structured interviews were conducted for 12 cases and the questions relate to the theoretical categories of inscription, translation, framing and stabilization; they were intended to further elicit actors' experiences and how they challenge and are being challenged by adoption process and to explore further factors identified during the unstructured interviews. However, because the data generated were participants' narratives (Schultze and Avital, 2011), semi structured interview generates full richness of the respondents' view expressed in their own language (Oates, 2006). The semi-structured interview questions were sent out to the participants few days ahead of the interview in keeping with Oates (2006) suggestion of allowing the participants to feel relaxed and think through before making judgements. The initial paragraph of the questions stated the specific purpose and duration of the interview as well as the confidentiality of responses. These were re-emphasized before the main business, which lasted for about 25–35 min with each participant, kicked off.

In most cases, the initial question(s) relates to identifying any ICT platform(s) that the participants currently use and why they consider it/them emerging. In some cases too, probing questions were asked in the process to get in-depth information especially on questions with non-specific responses. With the permission of the participants, i-phone was used to provide supportive documents and to record the conversation since Oates (2006) opines that memories may be prone to biases and errors.

6. Psychometric checks

Facts verification in qualitative research is an ongoing thing; reliability and validity checks were repeatedly done. Extensively, different adoption theories were reviewed and so, concepts/codes (inscription, translation, framing and stabilization) were drawn from literature to form the bases for categorizing the raw data. The definitions and characteristics of these theoretical codes were simplified using code name; the definition of what the codes are; and the description of how to know when themes associated with each code occurs. To ensure that codes generated from the theories would be applicable to the raw data, the transcribed interview results in the first round of interviews were cross-checked by experts (face validity) and manually coded into both pre-defined (theoretical) and post-defined (data driven) categories and reliability analysis was subsequently measured to ensure that the theoretical codes were credible and would be applicable to subsequent raw data. Following the preliminary coding process of the first round of the interviews, four informed judges related the quotes to the categories.

Inter-coder reliability involving percentage agreement and internal consistencies (Boyatzis, 1998) with additional two colleagues was adopted for the study considering the fact that data coded were nominal and requires little or no judgements by the coders. The instruments were quite reliable since the extracted quotes internally relate to the themes and the cross-case analysis of supporting evidence of the first and second rounds of judges proved effective at levels above Miles and Huberman's (1994) threshold of 0.70 (Table 3).

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7. Data analysis and testing the framework

Often complex qualitative information like ours uses thematic content analysis on a latent level to facilitate coding of data into appropriate categories and to provide the core skills to explore and transform themes and issues emerging from the data. The approach is theory and data driven as well as inductive; the theoretical concepts were used as the basis for addressing the latent-level theoretical coding while the second questions used the latent-level inductive coding. Through the theoretical and inductive coding at latent level, we identified and examined the underlying ideas, assumptions and conceptualization instead of focusing on the surface meaning of the data at the semantic level. Data reveal themes and relevant constructs and associations amongst constructs. We use constant comparative technique to facilitate more rigorous analysis; this involved assessing and re-assessing of transcripts along with emerging new data in order to find and refine the themes and/or categories. The results were organized to reflect the researchers' interpretation of the short narratives and quotes; from inscription to stabilization stages, the paper traced actors' activities and revealed the outcomes and unique situations that shape the entire network of actors, otherwise rich insights about the contradictory actions of actors in each stage will not be gained.

The interpretations do not only explain the sequence of activities that continually lead to EICT adoption but identified entities involved and their roles as a system of relations involving different associations in each stage. Such interpretative outcome unveils the world from a new perspective (Jacobsson & Linderoth, 2010) and is suitable in small businesses (Hine & Carson, 2007); it is both convincing and transferable (Orlikowski, 1992; Orlikowski & Baroudi, 1991) and appropriate when researchers seek to understand the emerging process of organizational change (Jacobsson & Linderoth, 2010). Technology is not just an artefact, but it is also embedded in organization and human behaviour (Bygstad et al., 2005). Organizations are not only made of actors though actors influence adoption and use of any technologies. Adoption decision in small business context is intertwined because it is holistic; it involves inputs from managers, customers, IT experts, IT vendors, suppliers and government agencies, and non-human factors included in EICT and technology standards and legislations. The proposed framework in Figure 1 demonstrates the interplay between the human and non-human as well as the factors that shape the interplay of key actors with other actors that leads to EICT adoption. It takes a holistic view of how the social-technical network optimizes the interplay between the diverse actors that shape adoption. The framework may not be exhaustive and all-encompassing; arguably, it represents a wide spectrum of insight about actors as well as the challenges to deal with when dynamic process of adoption arises.

Interestingly, the framework illustrates that the evolution of EICT and its adoption and/or re-development activities are not a one-off and static event; rather it is a continuous and iterative process (Bruun & Hukkinen, 2003; Hanseth et al., 2004; Kim, 2009) formed and reformed by actors on how to keep up with developments. It classifies actors' roles across stages to reflect their relevance since some are believed to be critical at some stages and others in the whole stages based on the complexity of the network and the proposed technology. Key actors competing amongst themselves may have major influence in the entire process since they are the appropriate channel through which IT-innovations are introduced into the social system. The actors' action across stages is influenced by some of factors; thus, the factors' influence cross-cuts. This process may be hindered by disagreement/resistance amongst members of the network; thus, the process may cease to continue at any stage leading to re-evaluation of some or all of the stages. The focus of this study is to understand how small business managers constantly keep up with EICT, and the four stages used in tracing the evolutionary process reveal some inherent factors that specifically shape key actors' beliefs, attitudes and values about EICT adoption. Technology readiness, degree to which actors communicate and collaborate, performance and values anticipated of the EICT are the critical factors shaping key actors interplay with other actors which in turn lead to EICT adoption.

8. Inscription

Subject to the nature and structure of the micro and small enterprises, the adoption decision is predominantly determined by key actors (e.g. managers/owner family members), who compete

amongst themselves and define the need to structure perhaps with the assistance of external parties. Evidence supports this but for fairly large (medium) enterprises; the key actors bring in other experts and other informed persons, who possess useful knowledge and skills (see B2 and cross case support). Enterprises that have in-house IT units use the experts therein to crucially evaluate the suitability of the innovation bearing in mind the decision of the key actors and the functional aspects of the organization. The key actors possess innovative minds, and often develop and drive novel ideas within the organization though the present study suggests that not all key actors in small enterprises encourage new ideas. They define the interests and the roles of the others and ensure that others support their claims and initiatives. It was evident that the interests, values and expectations of competing key actors at this stage are greatly shaped and reshaped by internal forces (e.g. experiences, organization belief and philosophy, other employees, norms and prejudice about the technology's perceived values) and external actors—vendors, customers, government and her agencies, IT consultants, etc. The interviewees (G7, B2, A1, C3, J10, L12 and D4) note that actors that influence and/or challenge the decisions of key actors are predominantly the key actors' customers and government agencies.

8.1. Target customers
Customers are the key reasons enterprises exist and so their needs and aspirations guide managerial processes. They evaluate the pros and cons of any proposed innovation based on their expectation and interest on the problem intended to solve (Akrich et al., 2002a). Often inscription stage is besieged with clash of interest between the key actors and their lead clients over the potentials of a new technology. Observations from A1, B2, C3, D4, Q9 and F6 go to confirm the strategic position of customer in shaping and reshaping the interest and expectation of key actors. Thus, with across case supports, values, interests and ideas of small enterprises' key actors over adoption of any emerging ICT can be greatly challenged by consumers. This is not to undermine that the key actors that enact values and integrate business intelligence and other activities are often challenged by other actors leading to the reinforcement of key actors' initial adoption and/or development interests. Faraj et al. (2004) posit that where manager–consumer interest dichotomy constantly persists, unfavourable outcome and of course conflict result and thus, it often takes time to resolve the conflicts as key actors try to conform, ignore, modify or usurp the original designers' interest. Resolving the conflicts always results in reconsideration to accommodate the long-run interests of both parties, especially to incorporate customers' perceived ideas and interests. However, most key actors are cautious about ideas they consider; they focus on those from active customers (from loyal through advocacy in the customer loyalty ladder).

8.2. Government
Statements from A1, B2, C3, E5, F5, Q9, L12 and D4 show that government substantially shapes and reshapes values, interests and norms of the key actors at the inscription stage through overtime enactment of legislations while government agencies like NCC influence most key actors through support activities, advice and other encouragements. Simple change in legislation and regulatory framework directly or indirectly shapes key actors' values and interests about emerging ICT adoption and ultimately the business' strategic position. Majority of the key actors interviewed note that such legislative changes (especially the recent removal of fuel subsidy and the devaluation of Naira) have significance in the present global village, where interconnectivity has made legislative changes in one country to have direct or indirect impact on others. Such legislative changes were rarely anticipated but adherence was immediate to avoid the wrath of the law.

9. Translation
The key actors identify the intention of the proposed technology, recognize the opinion of other potential actors, and critically craft strategies to translate all to conform to common beliefs and interests at the initial and translation stages. Faraj et al. (2004) note that when actors are in a network; they display cohesiveness and share contents, motives and intentions which they attempt to impose on the intended technology. Similarly, Akrich et al. (2002b) emphasize that innovation provokes reactions and moves from negotiation to negotiation and from redefinition to redefinition; everything

depends on the identity of the mobilized protagonists. Most interviewees admit conflict in the views of key actors' intentions and those of other actors. Whereas key actors make substantial efforts to win over all other actors to accept their interests and beliefs, transcription is difficult to attain because of unresolved conflict of interest amongst actors. In view of comment A1 and its cross-case supporters (C3, B2, D4, E5, H8, K11, L12), Latour (2005) notes that linking one actor to another in this stage was regarded an ongoing process full of uncertainty, fragility, controversy and ever-shifting ties and/or grounds.

The analysis from the interviews indicates that the opposing interests amongst actors often results in two implications; subject to the nature of the organization, the key actors either persuade others to accept their views (see C3 and cross case support) or ignore them especially where the other actors refuse to yield. The latter amounts to looking for new experts who will be ready to adhere to their, and/or resolve conflict of, interests. Akrich et al. (2002a) note that actors that intercede to make decisions are so numerous and so entangled with one another that at the end of the process it is difficult to attribute credits or blames. Key actors in most cases go back and front (Faraj et al., 2004) as evidenced in this study; they vary in what has been initiated in the early stage and what has been revealed in the translation stage in a bid to consider the best option taking into account their interest, belief, timeframe and all other actors that influenced decisions at the initial stage. This statement suggests that key actors are not always clear about how they intend to achieve their values and interests (Table 4).

9.1. IT consultants

Most key actors maintain that IT consultants in most cases offer limited help in planning and implementing emerging ICT. Respondent A1, B2 and C3 lamented that the consultants perform less than expected in solving their problems and their interests often contradict those of their clients though some clients rely heavily on them. This poses threat to key actors, especially when they have preconceived and undefined ideas that need to be fleshed out by the consultants and believe that consultants are proactive and make independent decisions that reflect the long-term benefits of the emerging ICT. Often key actors either hire consultants to write business case based on agreement and resources at their disposal (the key actors) or they do that in-house if the cognate resources are available. Nevertheless, there are strong indications that the business cases or proposals may not be feasible.

9.2. ICT designers/developers

Subject to clients' needs, IT designers and developers evaluate and re-evaluate emerging ICT options on accounts that small and medium enterprises' interest is predominantly driven by applications that satisfy immediate needs. The developers/designers develop and implement emerging ICT from the scratch or they acquire off-the-shelve application; though both approaches are expensive, they can be modified to suit specific clients' needs. It is the responsibility of the designers/developers to weigh all options, educate the key actors, and suggest plausible options which may challenge the consultants' initial decisions and possibly lead to re-assessment of the business case. This suffices that consultants sometimes make proposals that are rarely feasible because they do not always have proficient understanding of clients' needs. Interviewees (A1, C3, D4, E5, F6, G7, H8, Q9, J10, K11, L12) note that key actors have little knowledge about ICT and whatever propositions made by the consultants they tend to adhere to it; they are preoccupied with ideas which might be perceived differently by the designers and developers.

Developers and designers echo that they need consensus with key actors at this point; this requires understanding of the needs of the key actors and the methodologies for developing and delivering such need to structure, otherwise the project suffers or raises further conflicts. Benamati and Lederer (2008) posit that constant change in IT requires revisiting the methodologies with respect to delivering the technology's advances. The key role played by developers as identified in the interview was to select appropriate methods that suit the intended ICT. B2, C3, D4, E5, F6, G7, H8 and Q9 note that some applications are rarely compatible and adaptable across systems. The key actors need be

Table 4. Key activities in each instrument with supporting evidences		
Instrument	**Case evidence**	**Cross-case support**
Inscription	For small enterprises like ours, adoption decision is basically the business of the key actors (that is owners/managers), who sometimes seek the assistance of external parties (e.g. IT experts and vendors, IT consultants, and customers) to shape their interest and value structure. Supposedly the key actors possess innovative mindset and go to influence other actors to embrace their interests and expectations; they define the interests and roles based on internal and external forces and influence other actors and ensure support for their initiatives (B2)	A1, C3, D4, E5, F6, G7, H8, Q9, J10, K11, L12
	Customers and government agencies are the only entities that challenge key actors' decisions (B2). Customers are much more informed and empowered; they take control, resist the intended interest and alter beliefs and values. Whatever we do, the customer sovereignty remains high; customer interest drives the wheel (C3). The users' inputs are invaluable because they look at it from the perspective of what they want to see from the system. They contribute immensely in terms of what we want and what we do not want from the system (D4). [–] lots of organization would have a chain of customers so what they [–] may use these customers to seek for some unmatched competencies (B2). It is ideal to address clash of interest to avoid losing your customers (A1)	E5, F6, G7, H8, Q9, J10, K11, L12
	Legislation drives action [–] which technology can emerge [–] that is what will drive organization to make changes which will impact the way they do business [Such legislation] can be anything simple as government changing tariffs or removing fuel subsidy and how does the organization deal with the fact that it is going to affect its invoicing [–], all its customer pricing and the fact the organization will notify its customers that such is actually happening? (A1)	B2, C3, E5, Q9, D4, F5, L12
	Government through CBN, NCC and other agencies has been singing loud on different incentive packages (e.g., tax holidays, financial support, training, and advice) to encourage small and medium enterprises to adopt IT-based innovations and to be job creators but to date no meaningful implementation. Taking ordinary small amount of money in the form of loan demands lots and lots of stringent and frustrating conditions. There are no follow-ups to ensure promises are actually achieved. Many of us are left to ourselves to operate within the confine of cash and experience (B2)	A1, C3, D4, E5, F6, G7, H8, Q9, K11, L12
	Government programmes are not serving the overall needs of small businesses. We are aware how developed and emerging nations have been improving upon their economy through ICT; something has to be done urgently by the current administration of President Mohammadu Buhari (C3)	A1, B2, D4, E5, F6, G7, H8, K11, L12
Translation	The stage is quite stressful; you can imagine that IT experts would work out programmes that would ordinarily facilitate our operations, to them the programmes are perceived simple but to many of us the programmes are something complex to understand in the context of our operations. Many of us do not have the patient to engage in complex learning; effortlessness matters in any IT programmes (A1)	C3, B2, D4, E5, H8, K11, L12
	As a fairly medium business we do not have bunch of 10 web developers setting in an office [–] when we have projects we outsource the projects to outsource developers however, they need to access the company internal information and keep up to how the company do business (C3)	B2, A1, D4, E5, F6, G7, H8
	Surprisingly consultants whom we expect to help us as small and medium businesses show untrustworthiness despite our heavy reliance on them; they us what we want to hear and not what will help us improve our business processes because they fear losing us (C3)	A1, B2
	Most times the issue we usually have with customers (key actors) is that they have a fix idea of what they wanted. And I don't just sell solutions. [–] I take into consideration what is trendy, what is going to move their market. I also take into consideration my make because that is very important; that is, the quality of what I do. So usually we tend to have conflict of interests and this can lead us stopping the project (A1)	B2, C3, D4, E5, F6, G7, H8, Q9, K11, L12
	Some applications that run very well in one system may not in other systems; we have to identify the requirement and methodology for the software for our client. [–]. It is our responsibility to make it clear [–] (B2)	C3, D4, E5, F6, G7, H8, Q9
	From management's point of view we need to control; look at cost and the value each of the solution will add to the business (C3)	B2, E5, F6, G7, H8, Q9, K11, L12

(Continued)

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Table 4. (*Continued*)		
Instrument	**Case evidence**	**Cross-case support**
Framing	When first developed, the original package was difficult to understand (G7)	B2, C3, A1, B2, G7, H8
	Software is never perfect. There are things we overlook and [–] those developing the software will not overlook. As a software developer I have to test it in house and also send for my client to come and test it [–].We have to follow the entire requirement and if we develop, we communicate back to our clients (K11)	B2, C3, D4, E5, F6, G7, H8, Q9, L12
	I get a wide range of people; I put them in an environment and time them because I know what I am looking for. If they have issues, I go back to resolve that and then call back again for testing. When completed I now call the client to evaluate the product (L12)	B2, C3, D4, E5, F6, G7, H8, Q9, K11
	[–] it is possible consultants could introduce issues and misunderstand the users and what the requirement is. We are checking what has been produced to see that it is in line with the requirements.[–] we are testing against the requirement to see that the quality of the application is good and user friendly to make life easier for the user audiences (C1)	B2, A1
	We reject a technology because it was used longer than it was required [–]; it is complicated and does not save us time. So we had to tell them to take some part off (B1)	A1, C3
	User acceptance testing where customers are invited to attest the suitability of the product at the early stage of development (Q9). We tried it internally and with three of our clients externally because we don't want counter chain reaction resulting from some error while the process is on, we test and retest (E5)	D4, E5, F6, G7, H8, Q9, K11, L12
Stabilization	[–] I do not need to ask the employees, I am in a position to make that decision because I know what will benefit the business. So I don't need to boarder them rather, [–] I talk to the company to make it quicker, and get it implemented (A1)	
	Employees are important because they run the system; they give feedback on where the system has weaknesses and how to enhance it and what package we may need. That gives us a better idea on the package we may need in future (C3)	A1, B2, D4, E5, F6, G7, H8, Q9, K11, L12
	When you are an entrepreneur you need to act fast [and] to continue to evolve. You must always have that mentality. [–] we are already starting looking for the other technologies that add to our competitiveness. Perhaps, this is because there are other things that are better. [–] Am really looking at the next evolvement of the whole process (A1)	C3, B2, D4, E5, F6, G7, H8, Q9, K11, L12

well-informed by the developer/designer as to the possibility of the emerging ICT adapting to the existing philosophy and new organization's arrangement otherwise there may be need for re-negotiation. If the interests and values are not aligned, re-negotiation results; hence, key actors try to obtain a myriad of intelligent information and knowledge and learn from such to ensure that initiatives meet their needs. Participants echo that the nature and complexity of the social-technical network at this point requires control otherwise objectives will rarely be achieved.

10. Framing

Framing stage is quite critical and risky because of key actors' financial commitments; everything agreed in common is transformed into physical object, especially where the ICT is developed from scratched. Faraj et al. (2004) posit that the acceptance of the new ICT is successful to the extent that the features and functionalities of the technology become part of organization's expectations, standards and the beliefs of the key actors. Experience shows that emerging ICT standards are not always achieved initially and key actors make constant evaluation and changes. A manager (B2) interviewed was sceptical about new ICT following his past ugly experiences about similar applications. Aligning key actors interests and values to the emerging ICT is regarded as most difficult issues since values were perceived dissimilar across individuals. To ensure that the key actors' interests align with what has been initially agreed upon at the transcription stage, developers, test analysts, IT vendors, key actors and their customers further shape and standardize the value of the network.

10.1. Developers and test analysts

The developers and designers test the prototype emerging ICT in an environment and market conditions similar to those of the clients. For instance, if the new ICT application is to adapt to a particular system in the client organization, the developer may also use a similar system to test the application. A1, B2, C3, D4, E5, F6, G7, H8, Q9, J10, K11 and L12 recognize the value of product testing and

emphasize doing that to minimize clients' perceived risks. Also, test analysts or quality control specialists from the client organizations may be invited by the developer where necessary to further verify that the product is likely going to meet what their employer exactly wants. Such people introduce unmatched competences that proffer hints to successful development of an innovation.

10.2. Key actors, customers and IT vendors

The designers and developers strengthen the functions to incorporate in the technology and still involve key actors to test and re-test them to ensure they meet the envisaged standard. Often key actors want to know the extent to which the emerging technology addresses socio-technical issues in line with their predetermined interests and/or beliefs. Respondents (A1, B2 and C3) noted that some technologies were rejected because they take longer time to process information. Thus, time is of essence when considering the adoption of emerging ICT; platforms that cut lead-time are adopted faster (Jacobsson & Linderoth, 2010). Further, participants suggest that the lead customers play a crucial role to ensure that adoption satisfies their needs. D4 to L12 agreed that they minimize waste by subjecting the proposed technology to internal and external clients, who now check and report back on the suitability in satisfying their needs. Subject to the contractual agreement, participants (A1, B2 and C3) maintained that different IT vendors are sometimes invited to modify the product based on mutual agreement especially where the emerging ICTs are not accepted. One issue here is that these vendors modify the applications to suit their own company specification; thus, leading to vendor competitiveness and adaptation problems and/or delays. Evidence shows that voting may take place before the problem is resolved and the application accepted. However, depending on the nature and the type of business, activities here are still transitory since the emerging ICT may or may not be accepted and thus, leads to re-evaluation. The extent to which all actors agree at this stage determines whether or not the initial stages may be revisited.

11. Stabilization

Stabilization takes place when the proposed technology turns acceptable and adaptable to present and future organizational arrangements. Key actors expect emerging ICT to stabilize operations; they are convinced about the value of most actors in the network but evidence from interviewees indicates that stabilization of operation does not mean that technology is not amendable or that other new ones may not be adopted. Employee orientation and training are emphasized here to get everybody on the same page and to interact together and align EICT into the organization's routine and procedures. Employees and IT vendors at this stage further shape the entire value network. Often employees (especially older ones) are eluded by change; they exploit the system but do not use it properly. The interview transcripts show that A1 notes that key actors, especially those in micro and small businesses, do not encourage employees' ideas nor recognize their initiatives in most cases. B2 and C3 as supported by A1, B2, D4, E5, F6, G7, H8, Q9, K11 and L12 reported otherwise.

Employees and even the consumers may be dissatisfied with innovations, especially when they are not meeting their needs; such feedbacks are indications to reinvent and/or to realign actors' frames of reference to the new technology. Feedbacks help the inventors to act fast and to keep evolving. This is in keeping with Walden and Browne's (2009) assertion that ICT evolves quickly but it is not clear when it will reach a stable equilibrium.

12. Discussion

This study provides further insight into the role played by various actors in the adoption of emerging ICT; specifically, it reports how actors continually adjust to one another's opinions/interests/beliefs to attain a fruitful adoption. Small and micro businesses are not always ready to embrace new ideas, neither do they support initiatives from others or even have time to go through the stress associated with adopting emerging ICT. They are besieged with acute resource issues and thus, maintain short-run alliance and/or collaboration with other actors and seek innovations that offer immediate benefits. Jacobsson and Linderoth (2010) posit that, this is devastating especially where adoption leads to acquisition and development knowledge that go far beyond a stipulated time-frame. The time required of an adoption greatly shapes the values attached to it; ICT features facilitate adoption

provided it permits management to realize the immediate benefits within a short period. Functional features as adaptive capability, operational efficiency, safety issues and the level of infrastructural standard that leads to expected performance shape key actors' interest. These features align through testing and evaluation amongst diverse actors who ensure that the emerging ICTs are adaptable.

However, despite the oppositions amongst the various actors in the socio-technical network, ICT applications are often adopted by small service businesses though the adoption decision is often shaped by various factors/forces (especially customers and governments) which in turn reinforce and/or reposition other actors' beliefs, attitudes and values. Adoption follows a dynamic path based on trial and error throughout the lifecycle and each stage is vital in small business context though it provides different implications to managers. Akrich et al. (2002a) suggest that the process follows a rapid movement of continual backward and forward and the stages are not carefully separated but integrated. In attempt to discover temporal forces exerting influence on emerging ICT, this study theoretically contributes to knowledge by revealing the several actors and their roles in challenging adoption and implementation specifically in small business context. The human and non-human actors currently play crucial role across stages of the adoption process. Several government agencies established to encourage SMEs were perceived to be evident only at inscription stage and they exert little or no influence on the different small business actors. Such support activities rarely serve the overall needs of small businesses (Simpson & Docherty, 2004); government, for instance, seldom considers the differences in business sectors despite the fact that settings and contexts of operation differ (Beaver, 2002). Hence, the roles these agencies play are not sufficient to enable the services SMEs to cope with challenges associated with emerging ICT although governments influence most key actors through legislations.

The translation stage is critical, difficult and time-consuming because the complex nature of the actors leads to misunderstanding that calls for regular control; and at framing stage, ICT reinforces human actors' values and interests especially when it is not adaptable to the organizational arrangement. This results in interpretation of new phenomena which often result in new meaning. The action that leads to new meaning, according to (Jacobsson & Linderoth, 2010), is desirable to various actors and leads to long-term benefits since more profitable consensus is often reached through the process. It is important to note that organizations' routines and procedures affected by the emerging ICT should be adaptable in the stabilization stage in order to facilitate its (emerging ICT) continuous use, especially where it is perceived to help the business solve its immediate problems. Often, this requires the knowledge and experience of external parties (e.g. consultants, designers, developers and vendors) regarding the context specific condition in small business and how the use of the emerging ICT will affect SMEs to be adaptable and competitive. However, being proactive and continuously developing routines that facilitate understanding and use of the emerging ICT obviously is essential in building competitive advantage.

13. Conclusion and implications

Today's rapid changing business environment is challenging and small businesses need to survive and cope through emerging ICT by understanding this process and the various roles played by diverse actors. Many factors reinforce key actors' beliefs, attitudes and values in making sense of emerging ICT with other actors and may subsequently lead to adopting new ICT. If values anticipated from the technology are achieved, it creates a subsequent need for emerging ICT adoption; emerging ICTs that are readily available have a greater chance of being adopted continually if it progressively moves the business forward in terms of return on investment, growth, customer satisfaction and service delivery. Applications readily available and require less effort and time imply immediate benefits and of course adoption. Thus, using ANT to examine the process of emerging ICT adoption has helped to unveil the dynamic nature of ICT and its adoption and use by SMEs. The findings of this paper point out that whatever decision made, the stages are transient, ambiguous, difficult to attain or predict as a result of the learning and development of knowledge that emerge during technology adoption and use.

The key actors are more likely to adopt emerging ICT if they perceive such application to offer instant and effortless values since the conflict that often arises between actors takes time to resolve due to actors' different perceptions and the fact that small business managers come with pre-conceived ideas based on their previous experiences, business norms and values or imposed by IT consultants and try to impose them on the potential ICT, which may or may not align based on what may have been enacted at the inscription. To ensure such challenges are minimized, key actors should de-emphasize the preconceived ideas on how emerging ICT should be adopted and implemented. While the findings also confirm that small business managers play central roles in the sense-making of the emerging ICT and ensures it aligns with appropriate actors, key actors engage with emerging ICT adoption continually if they are technology ready, constantly engage with other actors to understand and adopt the right technology so the expected performance is achieved and finally the values anticipated by the ICT is always realized. Implicit is that there is no hard and fast rule on how the stages in the framework are followed when considerations are given to all SMEs although the framework is expected to support businesses of all sizes (micro, small and medium).

There are three major reasons advanced for that; first, the size of a business substantially plays a role in various ways these stages are adhered to. SMEs are heterogeneous in terms of size, structure and formation; the way they make decisions and utilize business information and knowledge differ. Even within a sector, the way they undertake varieties of different activities varies. Parker and Castleman (2009) note that most small business managers have desperate business goal; while some have rational goals, others choose to remain small while family members most often exert substantial influence that affect the key actors in their adoption process. Medium-sized firms are to a large extent prone to following the stages strictly because they have some form of established mindset or formal way of doing things. Micro and small businesses may not strictly adhere to all these stages; this makes for adoption agility because the decision rests on few persons perhaps the own managers. Simmons, Armstrong, and Durkin (2008) assert that SMEs are adaptive, flexible and responsive to changing conditions than large organizations because of their peculiar nature. However, the problem that leads to ICT failure in most micro and small business is that adoption is based on what will bring immediate benefit for the actors concerned (Jacobsson & Linderoth, 2010) while the long-term benefits are not envisaged.

Second, time plays a significant role for the success of emerging ICT adoption. SMEs are constantly short on time, and predominantly decisions are made by one or two senior persons (often the owners), who may be attempting to manage a business that lacks resources, mostly cash. This creates a very different decision-making environment and always leads to adopting a solution that does not benefit the business in a long-run. Finally, the firms' growth pattern (e.g. in terms of staff strength, returns on investment, and ability to acquire other companies) plays a critical role on how businesses adhere to emerging ICT adoption process. It was widely perceived by a number of participants that SMEs that witness sufficient growth may consider changing the way they do business. Hence, businesses that are growing may need some form of formal process to control and ensure that the ways they conduct businesses are more likely to adhere to the four stages.

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