

IT INNOVATIONS AND E-SERVICE DELIVERY: AN EXPLORATORY STUDY

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Abstract: This study investigates the process through which new innovation is adopted in the service sector in developing countries. Studies have investigated factors which contribute both to delays in the adoption of a new information technology (IT) innovation and to delays in the realization of its potentials. However, issues involved when organizations add layers of new IT innovations have not been adequately examined. Such issues include factors that influence an organization to incrementally add a new IT, the process through which the increment is accomplished and the corresponding adaptation of associated service innovation. Organizations in developing countries (DCs) have over the past decade or so invested in and implemented series of IT and service innovations with varying degrees of success. In this study we propose a framework to help take stock of the various innovations that have been implemented and to understand the myriad of issues involved in the process of implementing these technologies and service innovations – especially when transiting from one innovation to another. As this study aims to examine the patterns of adopting new IT and service innovations in DCs, we would argue that such a study would enable us to understand how services can be better delivered with newer technologies, by learning from comparison of past experiences and present situations.

Keywords: innovations, e-service, diffusion of innovations, adoption of innovations, information technology, Nigeria, developing countries.

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1. INTRODUCTION

“As the importance of innovation in developing countries increases, so does the need for research on the subject. There is need to understand the mechanisms and approaches that may characterize innovation and technical change in developing countries, so far research on the subject has been mostly focused on gathering evidence from the developed economies and building theories based on that evidence.” (Da Silveira 2001)

Existing discourse on diffusion of IT innovation has failed to focus much attention on rapid changes in IT development and its corresponding effect on service provision. What makes an organization adopt a new IT for service provision? What are the processes involved in implementing a newer technology in addition to existing ones? Answering these questions would require a more complete view of the diffusion of IT innovation that encompasses both the supply of a new technology and the demand for ad application of that technology by its users and adopters (Barras 1986). However, there has been very little consideration of these issues in diffusion of IT innovation literature. In order to take stock of IT innovations in developing countries (DCs), we proposed a framework which forms the basis of an empirical study to investigate the diffusion of IT innovations and ensuing service innovations within the banking sector in Nigeria.

While the applications of IT in services have been significant, the transition from one technology to a more advanced one is usually unnoticeable and occurs over a long period of time (e.g. mainframe computers had been in the back office for years before the PC appeared in the front office and before the processes were adjusted accordingly to utilize these new technologies). Telephone banking and ATMs were around for a long time before Internet banking and e-commerce began taking place. Thus, it is difficult to study how services are repackaged or redesigned to take advantage of new technologies in these types of settings.

However, in organizations where the gap in the utilization of a new technology has been rapid and occurs within few years, the process could still be studied and the immediate changes in services noticed and analyzed. For example, commercialization of the Internet and other advances in computing enabled an IT innovation called e-commerce and many organizations adopted this innovation. Advances in mobile telecommunications and computing is currently enabling a new innovation called m-commerce and organizations have also begun to adopt this. Within the banking sector, mobile banking is gaining increasing acceptance in addition to Internet banking. Some of the pertinent questions that need exploring include: How do banks already engaged in Internet Banking transit to Mobile Banking? What are the factors that influenced their decision to adopt m-commerce as an innovation and through what process do banks accept the new IT innovation? How are services rendered with existing technology repackaged to take advantage of the new technology? These are some of the important questions this paper aims to focus our minds on.

1.1. Goals and Research Questions

The understanding of the relationship between different paradigms in IT and service delivery could assist organizations in preparing for changes. This process could also explain the patterns of adoption and diffusion of IT innovation and what drives some organizations to utilize new technology earlier and sometimes better than others. We expect that our findings will contribute additional knowledge to the diffusion of innovation theory. The study will examine how organizations respond to changes in IT and the advantages offered. Technologically, understanding these phenomena could also drive innovation in information technology by encouraging designers to direct the system to the specific need of users. To achieve these goals, the following questions will be addressed in the study:

- What makes an organization adopt a new information technology for service provision?
- What are the processes involved in implementing a newer technology in addition to the existing technology? This will attempt to explain how an organization arrive at the decision to adopt a new(er) technology and how associated services are repackaged or redesigned to take advantage of the newer technology.
- What are the factors responsible for the incremental adoption of a new innovation? For instance, what role (if any) did the existing innovation play in the adoption and subsequent implementation of the new innovation?
- What are the main barriers that could hinder incremental adoption of IT innovations?

The rest of the paper is organized as follows. In the next section we present a discussion of the theoretical perspectives underlying this research as well as the proposed framework. This is followed by a brief review of the methodology, including the criteria for the selection of case organizations and data collection. We conclude with a discussion of the relevance of the proposed framework and a brief overview of the preliminary findings.

2. THEORETICAL PERSPECTIVES: DIFFUSION OF INNOVATION

An innovation is an idea, practice, or object that is perceived to be new by a person or adopting entity. When an innovation emerges, diffusion unfolds which entails communicating or spreading of the news of the innovation to the group for which it is intended (Rogers, 1995). Adoption however is the commitment to and continued use of the innovation. The diffusion of innovations theory provide explanations for when and how a new idea, practice or newly introduced information and communication medium is adopted or rejected over time in a given society (Rogers, 1995).

Diffusion of innovations theory postulate that diffusion of innovation occur as potential users become aware of the innovation, judge its relative value and make a decision based on their judgment, implement or reject the innovation, and seek confirmation of the adoption or rejection decision (Roger, 1995). These processes take place through a channel over a period of time among people (users) within a social system. Diffusion of innovation recognizes individual as well as social factors that can influence the decision to adopt or reject a given innovation. Rogers concludes that diffusion of innovation could be affected by psychological and behavioral as well as external and environmental factors. He identifies factors like perceived characteristics of the innovation and the type of individual decision involved in the adoption process, size of the organization and socio economic status of the users of the innovation.

According to Rogers (1995), diffusion of an innovation gradually occurs over a time frame, which is categorized into two periods. The first period covers the availability of the information technology and its acquisition by the potential users (diffusion delay) and the second period covers the period between acquisition and installation to the application and realization of potential benefits of technology (realization delay) (see figure 1).

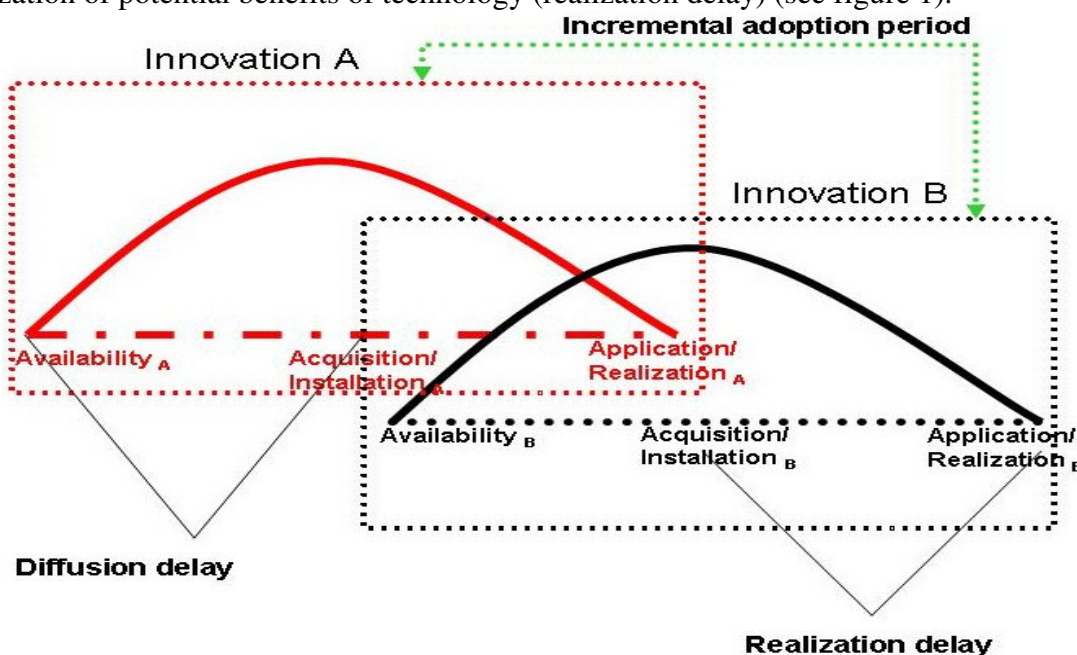


Figure 1. Diffusion/Realization Delays and the Incremental Adoption Period

Markus (1987) also proposed a critical mass theory in the diffusion of interactive media. The theory suggests that the more people on the network, the more the diffusion and adoption. For example, based on this theory the diffusion and adoption of IT innovation like internet banking could be explained that as more people have access to computers and mobile devices through which they can connect to their bank, the more the banks would want to provide services that can be delivered through those devices. Several studies have investigated factors that influence banks, especially in developing countries (DCs), to acquire and implement new technologies but most of these studies have only examined each innovation era or, to use Rogers (1995) terms - the diffusion and realization delays - in isolation. Few have specifically focused on the period of transiting from the realization delay of innovation A to the realization delay of innovation B and the accompanying changes in service provision.

Barras (1986) identified three main factors affecting the rate of realizing the potentials of a new technology. The first factor is “opportunity”, defined as the suitability of the activities carried out within the user sector for applications of the new technology. This of course affects the rate at which the technology is initially adopted within an industry, but more important in the longer term, it affects the rate at which process and product innovations can be generated once the technology has been introduced. The second factor Barras (1986) discussed is the “usability” of the technology. Usability is defined to cover both the availability and quality of software, which provides the direct embodiment of the service sector applications of the technology, and the “user friendliness” of the system’s basic operating procedures. The final factor identified affecting the realization of the potential of a technology is the “adaptability” of the organization installing the equipment: this includes workforce or managerial resistance to the introduction of new technology: the extent to which working procedures can be adjusted; and the rate at which the workforce can be trained in the necessary skills to use the technology.

In order to assist organizations in DCs, especially banks to critically assess their IT innovations experience, this period of transitioning from one innovation to another, which we refer to as the incremental adoption period, needs to be carefully analyzed. In figure 1, the period between innovation A (red dotted box) and innovation B (black dotted box) is the incremental adoption period (green dotted line). This incremental adoption period and the issues surrounding it are the focus of this present study. We argue that a focus on this transition period and allowing decision makers to reflect on 'opportunity', 'usability' and 'adaptability' issues (Barras, 1986) between the 'old' and 'new' IT innovations will offer DCs organizations a valuable tool to assess and critically evaluate some of the assumptions and initiatives that go into acquiring and implementing new IT innovations.

While factors have been identified for diffusion delay and realization delay, we are not aware of any empirical study and subsequent theory that explains how an organization arrives at the decision to adopt a new(er) technology to the extent of repackaging/redesigning a given service to take advantage of a newer innovation (incremental adoption). This study has a unique opportunity to examine how a service has been supported with different phases of development in IT. Applications of IT affect all sphere of human endeavor - from manufacturing to agriculture. It is thus significant for us to understand how services can be better delivered with new technologies, by learning from comparison of the past experiences and present situations. The outcome of this study could present a knowledge base for late adopters and facilitate learning from innovators' mistakes. We can theorize about patterns of adopting newer information technology innovation through a better understanding of the adoption process.

3. METHODOLOGY

3.1. Description of the methodology

In this section, the purpose of the exploratory case study and the methodology to answer the study questions are reviewed. The methodological procedures are also described. Data analysis procedures are reviewed with expected results as a representation of the study. The relationship between dynamism in IT and service delivery was examined through an exploratory case study and analysis (Yin, 1994) of different organizations.

Case study is typically qualitative in nature and focus upon behavioral documentation and explanation. In a case study, the researcher does not, or cannot control or manipulate the situation. This exploratory case study constitutes an in-depth study of 8 banks in Nigeria in an attempt to answer the research questions stated above. The qualitative nature of the study is established on the analysis and interpretation of qualitative data: transcribed audiotapes of the interviews that were not controlled and a review of historical documents and observations. In support of case studies, Yin (1994), considered the case study method appropriate to investigate a contemporary phenomenon (or event) within its real-life context, especially when the boundaries between the phenomenon and the context are not clearly evident. On this note, this study relies on multiple sources of evidence and data gathering is based on prior development of theories in technology diffusion and concept of service and service delivery.

This exploratory case study investigates the phenomenon of dynamism of information technology and how it affects service delivery in Nigerian banks. Yin (1994) also supported the capabilities of multiple case study research in provision of scientific generalization. Yin observed that the triangulation of multiple sources of evidence permits convergence and corroboration of findings and build a stronger, more convincing basis for conclusions. While the conduct of multiple-case study can require extensive resources and time, the evidence

from multiple cases is often considered more compelling. This research design has been used extensively to conduct research in information systems and organizational sciences (Orlikowski and Baroudi 1991) and has been extensively used to examine IT issues in developing countries (Krishna and Madon, 2003; Bada and Madon, 2006). The exploratory case study is appropriate for answering research questions that seek to establish how an outcome can be derived. The view of the participants in all the organizations was captured through interviews and recorded on audiotapes with field notes as a guide. Relevant questionnaire (Weill and Vitale, 2002) was used to assess the infrastructures that are required to implement IT-enabled services.

3.2. Selection of case organizations and Data collection

According to Stake (1998), the most unique aspect of the case study methodology is the selection of the cases to study. It was recognized that understanding of the phenomena depends on the appropriate choice of the cases. In alignment with the research design advice of Yin (1994) Merriam (1988), sixteen banks were selected on the basis of the track record in IT based service delivery and the e-banking awards. The banking industry in Nigeria was chosen due to its leadership role in the utilization of information and communications technology (ICT) compared to other sectors (Woherem 2000). According to a report by the Central Bank of Nigeria (2003), banks and financial institutions play an important role in Nigerian economy through gathering of deposits, repackaging of those deposits into a variety of financial products and services for customers and the public. In the process of delivery of these products and services, the use of ICTs has been identified to provide improved efficiency and effectiveness. It has also been recognized that advancements in ICTs have impacted positively on service delivery in the financial sector of the Nigerian economy.

All the banks included are engaged in electronic banking and IT is heavily used in their primary banking service delivery. Access and cultural proximity were among the criteria for choosing these particular organizations. According to Taylor and Bogdan (1998), an ideal research setting is one where the observer has easy access, is able to establish immediate rapport with participants, and can gather data that is directly related to the research interests. The researchers also have previous experience in working and conducting research in Nigeria banks.

The study uses several methods of data gathering: semi-structured interviews, which was complemented with short time on-site observations and surveys with quantified responses. Organizational documentation and presentations by senior management about their IT enabled services and initiatives was collected and analyzed. Multiple respondents was sought in each organization to achieve triangulation of data and insights. The issue of under-reporting or over-reporting that could result from imbalanced selection of the informants (Gold, Malhotra, and Segars, 2001) was addressed by including people at various cadres. We spent part of the summer of 2004 visiting eight banks in Nigeria for preliminary data collection and to lay the groundwork for a longitudinal study. The project was originally introduced to sixteen banks of which eight agreed to be partners on the project. A detailed proposal was then sent to them with a tentative 5 year plan. One of the banks could not participate at data collection stage due to some changes in the management structure. Visits were again made to some of the banks again in the summer of 2005 for clarification of some issues in the preliminary findings.

4. CONCLUSION

Based on the preliminary analysis of the data, we found that the banks are being driven by customer's need, availability of technology, competition to adopt a new information

technology and subsequently apply it to service provision. Most of these banks consider IT based service innovation as part of their strategic plan and not a technology issue on its own. Most of the services are championed by the customer care unit business improvement unit and tied closely to retail banking services that traditionally deal with customers. Customers of 21st century are more knowledgeable and demand high service qualities.

In this study we propose a framework that can assist service organizations, especially in DCs, in taking stock of their IT investments by understanding the myriad of issues involved in the process of transiting from one innovation to another and in the corresponding change in service provisions. Information technology (IT) has had significant impact on every stage of service provision, production, delivery, and quality. Today, the increased use of IT by service providers has in many ways changed the nature of service delivery. The dynamism and rapid changes in IT, which progresses from traditional business IT to mobile and pervasive IT, have posed serious challenges to service globally. Dynamism in the production and application of IT also requires corresponding dynamism in its applications to service provision. *However, there is lack of adequate attention to these issues in information systems research and practice. There is little understanding of how the rapid changes and developments in IT affect service provision in DCs.*

Although there have been several efforts to study how IT affects organizations in general (i.e. in organization design, organization strategy, organization and human resources development, organization communication etc). However, there has not been any detailed systematic study of the actual process of how (and why) organizations repackage their services each time there is a change in the capability of supporting IT. There has not been a clear understanding of theories that explain the ways service provision respond to the dynamism in information technology, specifically what happens during the incremental adoption period. Therefore, an understanding (taking stock) of the relationship between different paradigms in information technology and innovations in service delivery could assist organizations in preparing for changes. This process could also explain the patterns of adoption and diffusion of IT innovation and what drives some organizations to utilize new technology earlier and sometimes better than others.

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