IGI PUBLISHING
701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.igi-global.com

ITJ4208

This paper appears in the publication, International Journal of E-Business Research, Volume 4, Issue 2
edited by **In Lee © 2008, IGI Global**

E-Business Deployment in Nigerian Financial Firms:
An Empirical Analysis of Key Factors

Uchenna C. Eze, Multimedia University Malaysia

ABSTRACT

This research provides empirical evidence on factors that influence e-business deployment among financial firms in Nigeria. It explores possible differences that exist among financial firms using in-house e-business capabilities and those that outsource their e-business capabilities. This research contributes to the few pieces of literature on e-business (EB) experiences among firms operating in Africa, particularly Nigeria. Technology-Organization-Environment [TOE] model underpins the framework and hypotheses development for this article. The independent variables are the firm, technological and environmental factors while EB use constitutes the dependent variable. The findings reveal that all the factors were significant, but that environmental factors were key determinants of EB use among the firms. In addition, this study reveals practitioners' interests in Nigerian government agencies to maintain and enhance the existing EB legal, regulatory and security frameworks in the country. By extension, this could enable greater EB use in firms, which could improve the overall economy.

Keywords: *electronic business; financial firms; information systems; Nigeria; toe perspective*

INTRODUCTION

Globalization, enhanced by the proliferation of information system (IS), has increased national and regional markets integration, international production, distribution, marketing, and consumption. A recent eGlobal report indicates that as access to the Internet improves throughout the world, the number of active (those who spend at least 1 hour per week online) users rose to about 640.2 million in 2004 (eGlobal Report, 2005). Similarly, the eGlobal report reveals various forecasts of total world e-commerce revenues by year 2004 ranging from a conservative value of $963 billion to $4 trillion. International Data Corporation (IDC) projects e-commerce revenue by 2004 at $2.8 trillion while Goldman Sachs & Co. estimates $3.48 trillion (IDC, 2002). The report also indicates that 2003-2005 growth of e-commerce will be driven by the B2B segment not business-to-consumer (B2C) transactions. In 2002, the B2B sector accounted for 79.2% of total global e-commerce activity, but would grow to about 87% of total e-commerce in 2004 (IDC, 2002). Based on the foregoing, this article examines e-business (EB) use and performance in Nigerian

financial firms using the technology-organizational-environment framework (TOE).

E-business is often regarded as focused on e-commerce, however, the true definition is much broader. The Aberdeen Consulting Group defines e-business as the automation of the entire spectrum of interactions between enterprises and their distributed employees, trading partners, suppliers and customers (Intel, 2003). E-business encompasses the application of electronic systems to transform functional processes. Both definitions include a broad range of business processes such as multi-entity product design collaboration, electronic product marketing and information sharing, e-commerce sales of product to consumers or between firms or governments, internal business process re-engineering, multi-entity supply chain collaboration and customer relationship management. The operational definition of EB in this article includes all business transactions firms conduct using open standard (e.g., the Internet) or closed standard networks (e.g., Electronic Data Interchange (EDI)). The reason is to provide for most businesses in Nigeria that still run their operations on EDI.

Revenue generated from EB support and related services grow at a rapid rate in Nigeria, despite the insecurity in online economic transactions. With the liberalization of the telecommunication sector and the introduction of GSM services, experts predict a boom for EB activities across Nigeria including Lagos. Lagos is the commercial and economic hub of Nigeria attracting key investments in financial activities and information and communication technology (ICT). As the fastest growing industry in Nigeria, the ICT industry is projected to be the next foreign direct investment driver in the next decades. EB value was USD8.3billion in 2002 up 22% from USD6.8billion in 2001. EB values for 2004 was USD11.5billion (Ujah, 2005). The financial services industry (FSI) is a significant source of development and growth in Lagos. The Lagos corporate sector, especially the financial and oil industries are all expected to experience increased growth in their future EB activities.

Notwithstanding enormous corporate interest and many success stories on EB, there are few contextual studies on factors that determine its deployment in Africa. In addition, prior studies on e-business (EB) focused primarily on the statistics and growth patterns of e-business (EB) in terms of usage across industries and countries located in the European Union, United States of America and Asia (Eze & Gilbert, 2004). Similarly, Nigeria, like most African countries, provides little empirical studies that explain the dynamics of EB deployment in firms (Eze, 2006; Eze and Gilbert, 2004). The goal of this article, however, is to contribute empirical material to the literature on EB development in Africa by investigating factors that determine EB use among Nigerian financial firms. It also examines the dynamics of outsourced and in-house EB applications among Nigerian firms. These may provide some bases for additional future researches that might address specific issues in EB developments among firms from a comparative perspective.

THE CONTEXT FOR E-BUSINESS AND THE FINANCIAL INDUSTRY

Nigeria is located at the southwestern coast of West Africa, consists of 36 states, and covers an area of about 923,768 sq km. Nigeria shares borders with Benin, Cameroon, Chad and Niger. Its population, estimated at 130 million (comprising about 250 recognized groups, many divided into subgroups of considerable social, economic and political significance), is sparsely and densely distributed in rural areas and cities (land: 910,768 sq km, water: 13,000 sq km). Nigeria is slightly more than twice the size of California, which makes it extremely difficult to provide universal communications access to its entire population. EB activities between government agencies and private entities have not taken strong roots except in the case of government agencies such as the Central Bank of Nigeria and the private banks including oil companies. There is the potential for growth in this area and evidence suggests that more sec-

tors of the economy are following the examples set by the banking and other financial services firms in deploying EB innovation.

As noted earlier, Lagos, the specific site for this research, is the industrial and commercial capital of Nigeria, regionally known as the growth pole and center for local/international financial institutions and IT headquarters (Ujah, 2004). Lagos has a population of 13.6 million and is the most important city in Nigeria because of its strategic position in the country's development process. EB development in Lagos is driven mainly by the private sector. Firms, particularly banks, oil, and telecommunication players, are very active in EB operations supported by quasi-governmental agencies such as the National Communication Commission and the Nigeria Internet Group. The government of Nigeria is gradually developing a solid EB infrastructure to enhance operational activities among business partners. Over 75% of manufacturing and trading firms in Lagos use Electronic Data Interchange (EDI) as their key operating platform. With the rapid diffusion of the Internet, greater numbers of firms in Nigeria are moving their operations from the proprietary networks to the World Wide Web.

EB systems have the potential to add significant value to all key functional areas in Nigerian financial firms, especially the potential for integrated Web-based applications to improve customer services. Loan applications and insurance forms can be filed out, stock trades initiated, bills, and fund transferred online. Customers can now access research tools such as mortgage calculators or retirement planning applications, credit status, and account information online. Applications based on open Internet standard can enable data sharing across firms in this industry. Internally, e-business applications can also improve integration of various proprietary systems. The challenge, however, is for the Nigerian government to strengthen its social, economic, technical and legal infrastructure to enable accelerated growth of EB, not only in the FSI but also in key sectors of the economy.

CONCEPTUAL FRAMEWORK

The TOE framework, developed by Tornatzky and Fleischer (1990), identifies three aspects of an enterprise that influence the process by which the enterprise implements an innovation. These aspects are technology, organization and environment. The technology factors describe the external and internal technology relevant to the firm, which includes existing technologies in the firm and those technologies available in the market. Organization factors define the size, scope and the management structure: the quality of human resources, risk taking ability, management policies and support and available slack resources. Environment factors define conditions in which the firm conducts its business, which includes competitors, customers, suppliers, and the government. These three factors influence innovation deployment process and consequently the performance of the firm. Although a firm has its contextual strategic approaches to address its environment, identifying the prevalent factors, which firms consider when making investment decisions on an innovation, is very important (Teo & Pian, 2003; Zhu et al., 2002, 2004). The context and TOE factors firms consider when deploying innovations vary depending on their specific needs, internal and external constraints, and the objective of the respective firms.

Applying TOE framework in IS research underscores the significance of matching information-processing requirements, often determined by environmental and firm factors, with information processing capabilities of the firm. Researchers apply this framework extensively in various areas like economics, finance, and planning (Eccles & Crane, 1988), theorizing new emerging network firms and innovation deployment. Grover (1993), for example, derived empirically a model of five factors (firm policy, technological, environmental, interfirm and support factors), which influence a firm's decision to deploy customer-based interorganizational systems. Weill and Olson (1989), on the other hand, identified seven useful factors (environment, technology, task, individual, strategy, structure, and size) in their meta-analysis of

contingency research in business information systems. In addition, King and Sabherwal (1992) studied variables in the environmental, firm, and the IS contexts. Several other researchers including Rogers (1995) identified few factors that influence the adoption of innovation including. Although, some factors identified within the TOE contexts may vary across studies and research samples, the framework has consistent empirical support. Building on the empirical evidence and literature review, TOE framework is considered appropriate for this study, and this article extends the theoretical framework to e-business practices in a region less researched, Nigeria.

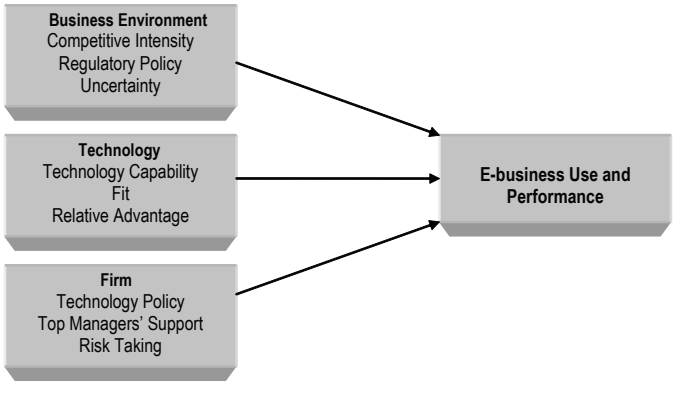
The review in this research indicates that existing literature focused mainly on technology adoption (Zhu et al., 2004). Only a few researches have directly examined how TOE factors affect the ability of firms to derive value from e-business innovation use (Zhu et al., 2002, 2004; Ramamurthy et al., 1999). Zhu et al (2004) argue that the impact of e-business on firm performance is a consequence of technological, organizational, and environmental factors. Their results were significantly affected by these factors. Based on the foregoing, this research uses the TOE framework to determine factors that may influence e-business use and performance among Nigerian financial firms.

This research model (see Figure 1) depicts nine factors within three contexts of the TOE framework: competitive intensity, regulatory policy, uncertainty, technology capability, fit, relative advantage, technology policy, top managers' support, and risk taking. These factors are proposed to influence EB use and performance among financial firms (Zhu et al., 2004; Kohli & Devaraj, 2003). As indicated earlier, literature identifies several factors that could influence technology implementation. The choice of the specific factors for this study, particularly the environment factors, was informed by the contextual and innovation deployment dynamics specific to Nigeria, the industry and the region. Nigerian political and economic conditions are quite different from those of the developed societies such as the United States, Canada, United Kingdom, Finland, Australia and Singapore where EB frameworks are much stronger, developed and are of strong international standard. The next section describes the TOE factors in this article as they pertain to the Nigerian financial services firms including the hypotheses development.

BUSINESS ENVIRONMENT FACTORS

Environmental factors entail those that create opportunities as well as threats to a firm. These

Figure 1. The conceptual model



factors are typically beyond the control of management, where the firm has to adjust to adapt to any change in the environment. This article identifies three environmental factors that could influence EB use and performance: the intensity of competition in the industry; regulatory policy; and uncertainty in the environment.

Competitive intensity: Researchers perceive competitive intensity as an important factor in the innovation adoption literature (Grover, 1993; Iacovou et al., 1995). It refers to the extent that competitors in the marketplace affect the firm. Porter and Miller (1985) analyzed the strategic rationale underlying the relationship between competition intensity and IS innovations. A business environment characterized by an increase in competition fuels the tendency for IS deployment in firms (Zhu et al., 2002; Rogers, 1995). For Nigerian financial firms to be competitive in the region, it is imperative they venture into emerging economies such as Southern Africa, China, and India, for new markets, because international experience and knowledge would create core competencies for development, expansion and growth for Nigerian financial services firms. Nonetheless, the costs and risks firms encounter in foreign investments are extremely high. Using EB to reach, coordinate, and integrate those markets, therefore, would save enormous resources. In this regard, EB offers a critical low-cost option for a firm to reach wider markets, collaborate with partners and possibly remain competitive in, at least, the region. Hence, the hypothesis:

H1: *The greater the competition intensity in the industry, the more likely a firm will deploy EB.*

Regulatory policy is recognized as a critical country factor affecting innovation use and performance. For example, Williamson (1983) summarized two ways in which government regulation could affect innovation deployment: (1) by taking specific actions to increase or decrease payoffs via tax and other measures to encourage research and development (R&D), (2) by taking actions that influence innovations via altering the climate in which they are received. Accordingly, Nigerian government could help financial firms to implement strong e-business by regulating the Internet to make it a more trustworthy business platform and establishing supportive business and legal frameworks to protect e-business activities. Sato et al. (2001) posited that regulatory environments, together with communication platform, are supporting infrastructures critical for EB, highlighting the importance of regulatory environment for efficient EB use and performance in the financial services industry. These theoretical assertions and empirical evidence leads to the next hypothesis:

H2: *An enabling regulatory environment will positively influence the capacity of a firm to use EB.*

Uncertainty describes the condition in which reasonable knowledge regarding risks, benefits, or the future is not available. It is a measure of how poorly we understand or can predict something such as a parameter or future behavior; in some cases, this is the same as a lack of precision. Uncertainty places time constraints upon decision-making and forces firms to invest in technology for coping mechanisms. Decision-makers, for example, may turn to more sophisticated information analysis such as group collaborative systems, data mining and knowledge management systems (Holsapple & Whinston, 1996). This article posits that EB will enable Nigerian financial services firms to obtain more and richer information at faster pace compared to, say, 20-30 years ago. EB also tends to enable better functional area visibility and better access to customers and suppliers. Experience from practitioners indicates that firms are able to manage the level of uncertainty in the business environment when they deploy e-business systems for coordination and collaborative business processes improvement. Hence the hypothesis:

H3: *High uncertainty in the environment will positively influence EB use and performance among firms.*

Technology Factors

Technological factors delineate the perceived features of the innovation. Teo et al. (1997) and Tornatzky and Klein (1982) observed that in addition to the many perceived innovation features in prior IS research, technology capability, fit, and relative advantage tend to predict innovation deployment.

Technology Capability IS literature indicates that IS capability comprises infrastructure, human resources, and knowledge (Mata, Fuerst, & Barney, 1995; Zhu et al., 2005). Consistent with past research, technology capability in this article consists of technology infrastructure and IS human resources, where technology infrastructure refers to technologies that enable Internet-related businesses (e.g., EDI, EFT, intranet, extranet), and IT human resources refer to IT professionals with the knowledge and skills to implement Internet-related applications. By this definition, technology capability is conceptualized as an integrative construct that is reflected not only by the physical assets but also by human resources that are complementary to physical assets (Zhu & Kraemer, 2005; Mata et al., 1995). Technology infrastructure establishes a platform on which EB can be built; IT human resources provide knowledge and skills to develop EB applications. Therefore, Nigerian firms with a higher degree of technology capability would enjoy greater capacity and readiness to use EB in their business processes. As a result, they would be more likely to achieve a greater depth in EB use. Hence:

H4: *A firm would use EB if it [the firm] has a strong technology capability.*

Fit entails the agreement between an innovation and a firm's culture, experiences and potential needs (Rogers, 1995). It is common for a firm to deploy innovations that align closely with its specific needs, values and the business processes, which are expected to meet specific requirements of future technological developments in the industry and those that the firm deploys (Ettlie, 1983). The agreement of a technology with the tasks and processes of potential users appear to be the widely researched facet of fit between technology and the firm (Tornatzky & Klein, 1982). This is because in Nigeria, as it is in some countries, firms encounter change resistance irrespective of the size, type of business and location of the firm, and therefore, would deploy an innovation when there is greater possibility of fit between the innovation and the firm culture, structure, existing processes and IS infrastructure. In contrast, Kwon and Zmud (1987) observe that inconsistency of new IS initiatives with existing business processes and IS infrastructure adversely affect users' attitudes and increases change resistance, which may impede innovation deployment. Hence:

H5: *The more fit EB is with a firm's culture and existing IS infrastructure, the more likely the firm will use the innovation.*

Relative advantage is the level at which potential customers observe the innovation as superior to existing alternatives. Kwon and Zmud (1987) define relative advantage as the degree to which innovation deployment provides greater firm advantage than to maintain the status quo. The degree of relative advantage is usually denoted in economic terms: savings in time and effort, costs reduction, or better reputation in innovation application. The celebrated potential benefits of using EB include creating a worldwide clientele base, rapid information access, global scale information dissemination, cost-effective document transfer, global market reach, and groundbreaking business models (Rawn, 1994). Nigerian financial services firms will derive greater value from conducting business transaction via EB systems compared to using traditional approaches, such as the telephone. Hence, the following hypothesis:

H6: *A firm will likely use EB if it [the firm] perceives greater relative advantage accruing from the innovation.*

Firm Factors

Firm factors include those variables that affect the firm structure, and which the firm could adjust or change to fit its changing environmental needs. Three factors this research discusses include technology policy, top managers' support and risk taking.

Technology policy: Ideally, technology policy is a type of long-range environmental scanning and coping mechanism, and entails actions a firm takes to outperform other firms on technology (Ettlie, 1983). Ettlie (1983) observed that firms with aggressive technology policies constantly experiment with available processing systems; actively recruiting the best possible technical, production and marketing personnel, and often showing strong commitment to technological forecasting. This suggests that these firms tend to have specialized groups who evaluate new process innovations, which may lead to the implementation of key initiatives. Therefore, firms with aggressive technology policies would consider using EB in response to the technological trends and market conditions; consistent with arguments on the contexts of IS management. Thus, this article proposes:

H7: *The more aggressive a firm's technology policy is, the more it will use EB.*

Top managers' support: Lederer and Mendelow (1988) observed that top management influence and commitment during the assessment of an innovation and the deployment of any IS initiative is often significant. Top management support for innovation initiatives tends to enable a firm's commitment in investment needs and accelerate project-planning processes (Teo et al., 1997). Without strong top managers' support for an innovation, it becomes difficult to secure the interest and motivation of the Chief Executive Officer (CEO), which may lead to possible rejection of the initiative. Top management influence is also vital to overcome corporate barriers and resistance to innovations and corporate changes in Nigerian financial services firms, which will enable efficient overall change management. Top management influence, therefore, is crucial in EB application decisions. Hence, the hypothesis:

H8: *The greater the extent of top managers' support, the more likely the firm will use EB.*

Risk taking entails a firm's willingness and ability to take risks associated with business including changes in the firm's structure, processes, and strategy (Eze & Kam, 2001). When a firm deploys EB, it faces complex and dynamic changes in communication culture and reporting patterns (Lederer & Mendelow, 1988). In the context of Nigerian financial firms, a related concern is productivity; if employees are hooked on improper use of the systems, then expensive firm time and other vital assets may be used for less productive ends. Therefore, if top management is willing to accept firm restructuring, deploy novel technologies and invest resources in IS applications then the firm may be likely to use EB for greater value. Hence:

H9: *The higher the risk-taking propensity of top management, the more likely the firm will use EB.*

METHODOLOGY

The data collection for this article was conducted using survey questionnaire. The questionnaire was designed based on the research conceptual model (see Figure 1). Previous empirical studies on innovation deployment and diffusion provide key reference for the research variables and items (Chau & Hui, 2001; Eze, 2003; Zhu et al., 2002, 2005). Table 1 illustrates the operationalization of each independent variable, the items and their sources. The dependent variable, EB use and performance was operationalized by asking the respondents to assess the improvement in their EB use and performance. Responses to the survey questions on the variables were entered on a five-point Likert-type scale as follows: **1** =

Strongly Disagree, **2** = Disagree, **3** = Neutral, **4** = Agree, and **5** = Strongly Agree. Respondents were also requested to identify whether they were users with in-house EB systems, users with outsourced EB systems or nonEB users. In addition, the survey questionnaire includes data on participants' profile including firm type (commercial banks, finance houses, merchant banks, and insurance firms), number of employees and annual revenues.

Several steps were taken to ensure data validity and reliability. Initially, the questionnaire was pretested with two academics and two business executives selected from the IS industry. The questionnaire was then revised for any potentially confusing items. Before the administration of the final survey, a random subset of 10 respondents was used for pilot testing to determine further areas in the questionnaire that may need improvement. Six questionnaires were returned, and their recommendations for improvement and thus the content validity of the questionnaire were incorporated into the survey questionnaire.

The questionnaires were then mailed to CIOs of the 400 firms from the Nigerian financial industry. In the cover letter, the author assured confidentiality and offered an executive summary of the findings as an incentive for participation. Prepaid reply envelopes were provided for the return of the responses. Follow-up calls were made to the participants who had not replied to the survey after the specified period.

To establish the absence of nonresponse bias, it is desirable to collect data from a set of nonrespondents and compare them with data supplied willingly. For a meaningful number of surveys and for all survey items, this method is rarely achievable. A practical preference, that has been argued to provide reliable results, is to compare the mean values of responses for earlier returns with the means from later returns (Compeau, 1995). This approach has the capacity to reveal any differences between early and late responders who required prompting. Tests were conducted on first week responses and responses after 5 weeks, and the differences between the two groups were insignificant (two-tailed t-test $P<0.05$), indicating that time had no apparent effect on the perceptions and that nonresponse bias was remote.

ANALYSIS

There were 148 completed responses in this research, producing a 37% response rate. The profile of participants is shown in Table 2. About 83% of the participants are CIOs and they have an average working experience of 6.5 years in their firms and 12.5 years in their respective industries. More than 65 percent of the participants are large, with more than 600 employees and average annual revenue ranging from $101 million to more than $500 million.

Out of 148 firms, 67.6% have sophisticated EB systems while 32.4% do not possess such EB systems. Over 80% of the participants have been using EB systems for about 8 years (This includes firms using EDI and EDI over Internet for business). Those firms with EB systems are regarded as EB users while those without the systems are regarded as nonusers. Out of the 100 users, 57% have in-house EB solutions while the remaining 43% outsourced theirs. Among the nonusers, about 69% intend to deploy EB within the next year.

Results: Model Goodness-of-Fit

There is no universally accepted indicator of goodness-of-fit, so it is usual to present several statistics as collective indicators. The Chi Square (χ^2) statistic is a fundamental measure but because it is sensitive to sample size, it is advisable to complement this measure with other measures of fit. The indicators chosen are ones used in previous IS research. These are the Non-Normed Fit Index (NNFI), the Comparative Fit Index (CFI), the Root Mean Square-Error of Approximation (RMSEA), the Root Mean Square Residual (RMSR), and the Tucker-Lewis Index (TLI). The χ^2 statistic, also a measure fit, is subject to distortion and is often replaced with the ratio of χ^2/d.f. Indexes that exceed 0.09 are acceptable for the NNFL, CFI, and TLI. Values of less than 0.06 for RMSEA and less than 0.10 for the RMSR are acceptable.

Table 1. Variable operationalization

Variable	Items	Descriptions	Sources
Environmental Variables			
Competitive Intensity (CI)	V1 V2 V3	There is stiff competition based on costs There is stiff competition based on product quality and novelty There is increasing number of competitors in the industry	Grover (1993); Zhu et al. (2002)
Regulatory Policy (RP)	V4 V5 V6	Government provides incentive Legal protection for online purchases Required for government businesses	Eze (2006) Teo et al. (1997)
Uncertainty (U)	V7 V8 V9	There is enormous diversity in customers' buying habits There is enormous diversity in the nature of competition There is enormous diversity in product designs	Toh & Low (1993); Teo et al. (1997)
Technological Variables			
Technology Capability (TC)	V10 V11 V12	There are adequate IT professionals with requisite skills in the firm There are functional ICTs in the firm There are Internet and W3 capability in the firm	Mata et al., (1995); Zhu & Kraemer (2005)
Fit (F)	V13 V14 V15	EB use consistent with firm's culture Favorable attitudes towards EB deployment present in the firm EB use consistent with firm's IT infrastructure	Reich & Benbasat (1990); Rogers (1995).
Relative Advantage (RA)	V16 V17 V18 V19 V20 V21 V22	Convenient access to worldwide information Creation of worldwide electronic presence Selling and buying products through EB Extend global market reach New business models and opportunities Improve customer service Lower operational costs using EB	Cockburn & Wilson (1996); Rawn (1994); Rogers (1995); Kendall et al. (2001)
Firm Variables			
Technology Policy (TP)	V23 V24 V25 V26	Firm's tradition of being the first to try out new technologies Firm's expenditure on developing new products as compared to competitors Firm's recruitment of technical personnel Firm's awareness of the latest technological developments	Teo and Pian (2003); Zmud (1984); Eze (2006)
Top Mangers' Support (TMS)	V27 V28 V29	Top management interested in EB use Top management considers EB use as important Top management has shown support for EB use	Grover (1993); Premkumar & Ramamurthy (1995); Teo et al. (1997)
Risk Taking (RT)	V30 V31 V32	Top management's willingness to accept organizational changes Top management's willingness to accept unfamiliar technologies Top management's willingness to invest funds in IT	Clemons & McFarlan (1986); Teo et al. (1997)

Table 2. Participants profile

Items	Value	Percent of Respondents
Number of Employees	>600	65.76
Annual Revenue	101- 500 and above	65.76
Duration of EC Use	8 year and above	>80
Annual Expenditure on EC	6% and above	57.56

N = 148

The preferred value for the χ^2/d.f. ratio is below 2 (Nunnally, 1979). The probability for the χ^2 for the final measurement model was marginal (*P=0.05*). Nonetheless, all other goodness-of-fit measures for the final measurement model suggest a strong fit of the study data to the proposed model. Because the ratio of χ^2 to d.f. was low (1.47) and all other indexes were well within the prescribed range, the results support the overall goodness-of-fit (see Table 3).

Construct Validity and Reliability

To assess the extent to which a particular empirical indicator represents a given theoretical concept, it is pertinent to assess the validity and reliability of the indicators. Therefore, to ensure rigorous research protocol, construct validity and reliability assessments were conducted (see Table 4).

Construct validity focuses on the extent to which a specific measure relates to other measures in accordance with theoretically derived propositions. Construct validity may be determined in terms of convergent and discriminant validities. Convergent validity assesses the consistency across multiple operationalizations. While convergent validity assesses whether all the items measuring a construct cluster together to form a single construct, discriminant validity measures the extent to which a construct diverge from other constructs, and is indicated by a measure having low correlation with other measures from which it should theoretically differ (Gerbing & Anderson, 1988). Factor analysis can be used to evaluate both convergent and discriminant validities.

Considering the sample size and the number of items in this article, individual factor analyses were performed on the firm, technological, and environmental factors to ensure that the ratio of variable items to the sample size is maintained at 1:10. This rule-of-thumb suggested by Kerlinger (1986) has also been used previously (Grover, 1993; King & Sabherwal, 1992; Premkumar & Ramamurthy, 1995; Teo et al., 1997). Separate factor analysis was performed to ensure stability of the factor loadings of the research constructs. During factor analysis, items were retained according to the following criteria: (i) factor loadings greater than 0.5 and (ii) no cross-loading of items. In other words, items were dropped where they have a loading of less than 0.5 or where their loadings are greater than 0.5 on two or more factors (King & Teo, 1996).

The results of two rounds of factor analyses for the firm, technological and environmental variables are shown in Table 4. Both convergent and discriminant validities were satisfied as the items measuring each factor clustered together to form distinct factors and there were cross-loading of items. With respect to reliability, Cronbach alpha was computed for each variable. Nunnally (1978) suggested that average reliability scores of 0.7 are sufficient for basic research. From Table 4, we see that the Cronbach alpha scores range from 0.68 to 0.89. Because the lowest score is fairly above

Table 3. Goodness-of-fit for the final measurement model

Item	Suggested Range	Measurement Model Value
χ^2	*P*>0.05	P =0.05
χ^2/d.f.	<2.00	1.47
Non-Normed Fit Index	>0.90	0.99
Comparative Fit Index	>0.90	0.96
Tucker-Lewis Index	>0.90	0.98
RMSEA	<0.06	0.04
RMSR	<0.10	0.07

Table 4. Rotated factor matrix of the variables

Items	Factor 1	Factor 2	Factor 3
Organizational Variables			
V1	0.2543	**0.7032**	0.2165
V2	0.2465	**0.7327**	0.2843
V3	0.1762	**0.8320**	0.0903
V4	**0.8241**	0.2120	0.1968
V5	**0.9043**	0.3198	0.1023
V6	**0.9397**	0.2921	0.1760
V7	-0.3263	0.1094	**0.7948**
V8	0.1202	0.2761	**0.8012**
V9	-0.1234	0.1032	**0.7123**
Eigenvalue	3.7	2.1	1.1
Variance (%)	32.6	16.9	13.9
Cronbach alpha	0.89	0.79	0.72
Technological Variables			
V10	0.1342	**0.7328**	0.1283
V11	0.1245	**0.8123**	0.3425
V12	0.1912	**0.7911**	0.0023
V13	**0.8453**	0.0766	0.4322
V14	**0.6124**	0.1981	0.1553
V15	**0.7078**	0.1678	-0.1122
V16	**0.8192**	0.1232	-0.3222
V17	**0.8212**	0.2154	0.2553
V18	**0.8872**	0.3456	0.5442
V19	**0.7834**	0.2198	0.1253
V20	0.3031	0.3112	**0.7322**
V21	-0.2667	0.3442	**0.8390**
V22	0.1334	-0.1425	**0.7890**
Eigenvalue	4.3	2.3	3.1
Variance (%)	41.1	17.1	21.7
Cronbach alpha	0.82	0.78	0.83
Environmental Variables			
V23	0.2342	0.2198	**0.8911**
V24	0.1211	0.1875	**0.7881**
V25	-0.2122	0.0117	**0.7119**
V26	0.2218	0.2865	**0.7295**
V27	**0.7932**	-0.0043	0.2111
V28	**0.8333**	-0.1004	0.1003
V29	**0.9133**	0.3110	-0.1212
V30	0.0111	**0.9001**	-0.3110
V31	0.2122	**0.8778**	0.3004
V32	-0.2111	**0.8279**	0.1232
Eigenvalue	3.5	2.4	1.9
Variance (%)	19.5	18.5	14.9
Cronbach alpha	0.75	0.81	0.87

0.70, all the constructs are considered to have adequate reliability.

Table 5 illustrates the correlation matrix for the factors. The table indicates that the factors—top managers' support (TMS) and fit (F) relatively correlated highly. A probable explanation is that it is unlikely that top management would support the adoption of EB, if its use is considered inconsistent with the firm's culture, business processes and existing IS infrastructure.

Table 5. Correlation matrix

SOURCE	CI	RP	U	TC	F	RA	TP	TMS	RT
CI	1.0000								
RP	0.0878	1.0000							
U	0.6734	0.1100	1.0000						
TC	0.5678	0.2295*	0.0924	1.0000					
F	0.0899	0.1119	0.2231	0.6233**	1.0000				
RA	0.1100	0.1299	0.0310	0.4320**	0.3782	1.0000			
TP	0.3991	0.0098	0.1269	0.7560**	0.6512**	0.3782	1.0000		
TMS	0.0764	0.1287	0.0876	0.4829**	0.8611**	0.4102	0.7600**	1.0000	
RT	0.0986	0.1199	0.0564	0.5673**	0.0328	0.0437	0.5253**	0.0277	1.0000

**p < 0.05; **p < 0.01*

In testing the hypotheses, multiple regression analysis was conducted using hierarchical regression procedure. The first regression performed was on firm and e-business value variables, and the second regression was on environment and e-business variables. The level of significance to enter the framework was set at 0.20 and the level of significance to stay in the framework was set at 0.10. Being a directional hypothesis, these values are equal to the one-tailed test with values of 0.10 and 0.05, respectively. The research data supported all the hypotheses (see Table 6). However, the strengths of the coefficient of determination vary among the factors. The data supported H1 indicating that industry features characterized by competitive intensity tend to enable firms to generate value from e-business, which confirms Grover and Lederer (2004) findings. Also, the data supported H2, which indicates that efficient regulatory environment would enable more possibilities for firms to generate greater value from e-business. The findings also supported H3, suggesting that environmental uncertainty tend to enable greater EB and performance.

The research indicates that firms operating strong technology policy have the tendency to use EB for greater business performance. This result underscores the importance of a solid framework for IS systems planning in firms to compete effectively in this 21st century. H8 was supported as well by the analysis and suggests that, as in most business decisions, top manager's support for the deployment and use of EB is very important to enable firms derive the best performance from an EB initiative. This is consistent with the findings of Zhu et al. (2004). The data also supported H9, indicating that for firms that are proactive and less risk averse, the chance of deriving greater advantage from EB use and performance is would be very high (see Eze & Kam, 2001). The data support for H9 was stronger compared to H7 and H8.

ANOVA FOR EB USE BEHAVIOR

Table 7 presents the results of one-way Analysis of Variance (ANOVA) used to compare the three categories of participants along the nine factors. Comparisons were made between three groups of firms (users with in-house EB systems, users with outsourced EB systems, and non users).

Post-hoc analysis using Turkey procedure was carried out to determine which groups are significantly different from the others. Based on Table 7, the analysis indicates significant difference with respect to the respective factors with the exception of *regulatory policy and uncertainty*. This result suggests that environment factors tend to affect equally the financial ser-

Table 6. Results of regression analysis

Hypotheses	Standard Error	E-business Use Coefficient of Determination
H1. Competitive Intensity	0.13	0.32**
H2. Regulatory Policy	0.17	0.36**
H3. Uncertainty	0.21	0.43**
H4. Technology Capability	0.16	0.35**
H5. Fit	0.11	0.23 *
H6. Relative Advantage	0.13	0.27*
H7. Technology Policy	0.11	0.25 *
H8. Top Managers' Support	0.17	0.24 *
H9. Risk Taking	0.09	0.42**

**p<0.05; **p<0.01*

Table 7. ANOVA testing

Factors	Users with In-house Systems Mean (S.D.)	Users with Outsourced Systems Mean (S.D.)	Nonusers Mean (S.D.)	F-Ratio	Turkey Test
CI	4.09 (0.61)	3.93 (0.68)	2.67 (0.57)	12.87**	[1]>>[2]>>[3]
RP	3.87 (0.62)	3.91 (0.72)	3.74 (0.83)	1.66	Not significant
U	2.99 (0.87)	2.84 (0.91)	2.81 (0.87)	1.52	Not significant
TC	3.98 (0.63)	3.67 (0.61)	2.76 (0.58)	11.37**	[1]>>[2]>>[3]
F	3.91 (0.65)	3.71 (0.59)	3.32 (0.66)	16.36**	[1]>>[2]>>[3]
RA	4.11 (0.51)	3.79 (0.63)	3.69 (0.77)	4.54*	[1]>>[2]>>[3]
TP	3.63 (0.54)	3.37 (0.59)	2.91 (0.73)	12.33**	[1]>>[2]>>[3]
TMS	3.87 (0.71)	3.70 (0.78)	3.21 (0.71)	14.65**	[1]>>[2]>>[3]
RT	3.34 (0.49)	3.11 (0.62)	3.13 (0.80)	7.91**	[1]>>[2]>>[3]

**p<0.05; **p<0.01*

vices firms in Nigeria (discounting the surprise result for *competitive intensity*), irrespective of the category of EB participants.

Discussions

The results reveal significant difference among the three groups in terms of *competitive intensity*. All three groups perceive that they operate in relatively different competitive sectors. This result is consistent with the findings of King et al. (1989), who found that pressure from competition is an important facilitator of a firm's effort to deploy strategic information systems. However, Thong and Yap (1995) and Teo et al. (1997) observe competitiveness of the environment to be insignificant in the decision to deploy IS. This article establishes firms deploying B2B e-commerce do so, partly, because of the business environment they operate in, because both users and nonusers of EB may have different strategies and orientation regarding their business environments. Hence, the competitive

intensity in an environment is a key determinant for firms deploying EB.

Regulatory policy is a significant determinant for EB use among financial services firms in Nigeria, but it is not a significant dedifferentiating factor among EB users and nonusers. The relevant authorities in Nigeria such as the Nigeria Internet Group and the Information and Communication Technology Agency, should work very closely with the industries to develop comprehensive information technology frameworks that could support both national and global business operations. This could be done by using benchmarks from, say, Singapore, United States and Finland. Similarly, the results indicate that *uncertainty* is a significant factor in firms EB use, which illustrates the growing necessity for businesses to employ electronic systems to enable business operations in unstable emerging markets, such as Nigeria. However, uncertainty was not a significant factor determining differences among financial firms use of EB. This may be because of the relatively stable political structure and governance in the country for the past 8 years following the inception of civilian governance in Nigeria.

Technology capability emerged as a significant determinant of EB deployment and performance in the firms. This indicates the prominent position advances in technology takes in business dealings. New technology applications such as the Internet and wireless applications are driving significant changes in business landscape and direction for future business opportunities. Technology capability also emerged as a differentiating factor among the business groups. The stronger and advanced the technology used by the firms, the greater the tendency for better performance.

The results depict that *fit* is a strong determinant of EB system deployment. Post-hoc analysis indicates significant differences among the three groups. Users with in-house solutions view EB as an innovation more consistent with their firms' culture and information system infrastructures, compared with users with outsourced EB solutions. Similarly, users without in-house solutions perceive EB to be more consistent with their firms' culture and information system infrastructure compared to nonusers. This result reveals the significance of fit between EB and the firm, which is consistent with the findings of Tornatzky and Klein (1982). The result also corroborates the contention that firms would deploy technologies with features that relatively match the firms' business processes and experiences (Ettlie, 1983). Similarly, *Relative advantage* of the innovation is a significant determinant in EB deployment. The results in Table 6 indicate significant difference among the three groups. This implies that users with in-house solution perceive their firms as having a relative advantage, by way of the benefits of EB deployment. In addition, users with outsourced systems gain relative advantage using EB.

The results also illustrate that *technology policy* is a significant determinant in the deployment of EB. Further, Post-hoc analysis suggests that all the three groups of firms are significantly different from one another. EB users without in-house solutions tend to have more aggressive technology policy compared to non-users of EB (Teo et al., 1997; Ettlie & Bridges, 1982). Early users of innovation will thus consider technology policy to be a key component of their corporate strategy formulation. In addition, *Top managers' support* is a significant EB use determinant in Nigerian firms. In addition, Post-hoc analysis reveals that all three groups of firms are significantly different from one another. Users with in-house EB tend to have the highest level of top management influence, followed closely by users with outsourced systems, and nonusers.

The results illustrate that *risk taking* is a significant determinant in EB use and performance. This implies that the risk-taking propensity of top management has enormous impact on the implementation of EB. The participants in this research perceive EB deployment as risky because it commands substantial financial investment and often, requires changes in the firm and management structure, strategy and practices, but are willing to take the challenges because of anticipated competition intensity. In addition,

security and standardization issues are currently being resolved, and with the commitment from the government, commercial activities involving EB will grow even stronger.

CONCLUSION AND IMPLICATIONS FOR PRACTICE

This article illustrates that all three TOE constructs are very important in EB use and performance among financial firms in Nigerian. This article identifies 9 significant determinants of EB use in firms within Nigerian context. They are technology policies, top managers' support, risk seeking, fit with firm culture, beliefs and IS infrastructure, relative advantage, technology capability, competitive intensity, uncertainty, and regulatory policy.

The outcome of this article would be critical for the financial services industry in Nigeria as they plan further investments in EB systems. By applying the TOE framework, firms could successfully identify and address key factors in the environment, in the enterprise and related EB issues necessary to enable effective and functional financial firms in Nigeria and at the international level. The intensity of competition in the financial industry increases with every new technological application and therefore, it is imperative for financial practitioners in Nigeria to be cognizance of the fact and prepare their firms for the business challenges of the next decade of 21st century. In essence, although the competitive use of EB is permeating all businesses today, firms that are more sophisticated and aggressive in deploying and using advanced EB systems would be able to keep up with the competition if not gain competitive advantage. The pressure to provide unique and acceptable services and products at reduced costs means increased deployment of EB innovations even in traditionally low information and knowledge intensive sectors.

The outcome of this article will also be useful to the Nigerian government and its agencies. All the economic sectors of Nigeria recognize government's role in facilitating EB deployment, however, existing regulatory policies are at best inadequate and less comprehensive to enable the complex dynamic legal and structural frameworks needed to, successfully allow maximum business use of EB innovation. In this regard, the Nigerian government, as a matter of urgency, needs to work closely with the private sector to determine the gaps in ICT policy implementations and initiate concrete directions for a stronger EB processes.

Implications for Research

Findings in this article are consistent with traditional academic models of technology-organization-environment [TOE] framework (Zhu et al., 2002; Eze & Kam, 2001) in a new substantive area, Nigeria. In this regard, it extends the field of IT, EB, and the diffusion and TOE perspectives of the firm. In addition, this research builds on previous innovation research, and corroborates some of the findings of these studies indicated earlier (e.g., the importance of top management influence), and raises some vexing questions as well. For example, in the context of Nigeria, are uncertainty and regulatory policy still significant factors differentiating financial firms deploying EB from those that do not, given the complexities in the Nigerian economy? This puzzle is one already being addressed in a follow-up research within the African region to determine the extent environmental uncertainty, regulatory policy, and competitive intensity influence ICT deployments in firms operating in West Africa. These findings, based on the perception of users and nonusers of EB, suggest that although the external environment appears to push firms to deploy EB, the internal environment (firm and technological factors) is still important in determining innovation systems deployment. This indicates that while the external environment are critical key factors in the deployment of EB, the firm's internal environment complexities tend to be significant considerations in IS deployment decision processes among Nigerian financial firms.

Finally, this article contributes to EB literature and creates additional poll of resources practitioners and academics could use to further enrich and extend our knowledge of the evolving phenomenon. Empirical data on EB develop-

ment and growth in Nigeria is a small step, a step nonetheless, toward enhancing and extending the discussion on EB as a global platform for business, economic and industrial activities.

Limitations of this Research

There were some study limitations. First, the conclusions drawn from the data, while theoretically sound, are based upon perceptions of single informant. While CIOs are expected to be knowledgeable, study results would have been more reliable if paired with a second informant outside the IT area. Although all responses were anonymous, it is still possible that the CIO responses are biased in favour management information systems benefits. Second, the survey instrument relied primarily on perceptual data. Although, Venkatraman and Ramanujam (1987) and Dess and Robinson (1984) argue that subjective data correlate with objective data, further studies may consider a mix of both subjective and objective data. Third, the sample composition was, on average, large firms and as a result, inferences on the findings would be most appropriate in related cases such as South Africa and Malaysia with respect the firms that participated in this investigation.

Agenda for Future Research

Possible further research areas from this article include; first, it would be useful to gain greater understanding of EB deployment in small firms from multiple industries. Comparison between these categories of firms in terms of EB implementation purposes, and usage patterns, may be useful for the firms to, properly chart the direction of the innovation implementation. Second, extending future studies to include comprehensive performance impacts of EB, how such impacts can be evaluated, and the evolution of EB, would be useful for firms competing in 21st century. In addition to using a static cross-sectional approach, a longitudinal study on the EB deployment may provide insights on the dynamics of the innovation implementation processes that may be more useful. Future research may also consider a comparative study involving Asian, African and European or American firms to determine any underlying dynamics across business cultures, policy issues and entrepreneurial activities in e-business deployment. This would provide some contingency frameworks for practitioners and policymakers at an international level as EB continues to evolve into a universal business phenomenon across the globe. Finally, future studies may consider using additional TOE factors and possibly revising some of the factors in this article to provide for more content coverage and generalization. This, however, should be done with particular respect to the research circumstance.

REFERENCES

Anderson, J.C., & Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411-423.

Chua, P.Y.K., & Hui, K.L (2001). Determinants of small business EDI Adoption: An empirical Investigation. *Journal of Organizational Computing and Electronic Commerce, 11*(4), 229-252.

Clemons, E.K., & Hitt, L. (2001). Financial services: Transparency, differential pricing, and disintermediation. In R. Litan & A. Rivlin (Eds.), *The economic payoff from the Internet revolution* (pp. 87-128). Washington, DC: Brookings Institution Press.

Clemons, E.K., & McFarlan, W.F. (1986). Telecom: Hook up or lose out. *Harvard Business Review*, *64*(4), 91-97.

Cockburn, C., & Wilson, T.D. (1996). Business use of the World Wide Web. *International Journal of Information Management*, *16*(2), 83-102.

Compeau, D. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, *19*, 189-211.

Cooper, R.B., & Zmud, R.W. (1990). Information technology research: A technological diffusion approach. *Management Science, 36*(2), 123-139.

Dess, G.G., & Robinson, R.B. (1984). Measuring organizational performance in the absence of objective measures: The case of privately-held firm and conglomerate business unit. *Strategic Management Journal*, *5*, 265-273.

Dun, & Bradstreet. (2000/01). Key business directory of Singapore. *ASEAN series* (Vol.1). Singapore.

Eccles, R.G., & Crane, D.B. (1988). *Doing deals: Investment banks at work*. Boston: Harvard Business School Press.

eGlobal Report. (2002). Retrieved November 18, 2007, from www.eMarketer.com

eGlobal Report. (2005). Retrieved November 18, 2007, from www.eMarketer.com

Ettlie, J.E. (1983). Organizational policy and innovation among suppliers to the food processing sector. *Academy of Management Journal, 26*(1), 27-44.

Ettlie, J.E. (1986). Implementing manufacturing technologies: Lessons from experience. *Managing technological innovation*. San Francisco: Jossey-Bass.

Ettlie, J.E., & Bridges, W.P. (1982). Environmental uncertainty and organizational technological policy. *IEEE Transactions on Engineering Management*, *EM-29*, 2-10.

Eze, U.C. (2006, May 5-6). The impact of firm and business environment contexts on e-business value. In *Proceedings of the MWAIS 2006 Conference*, Grand Rapids, Michigan, USA.

Eze, U.C., & Gilbert, A.L. (2004). The significance of e-commerce to firms' operations in relation to business location. *Australiasian Journal of Information Systems*, 12, 75-93.

Eze, U.C., & Kam, T.S. (2001). The impact of enterprise strategy and enterprise structure on the level of e-commerce deployment in enterprises in Singapore. *Journal of Global Information Technology Management*, 4(2), 38-54.

Fan, M., Stallaert, J., & Whinston, A.B. (2000). The Internet and the future of financial markets. *Communications of ACM*, 43, 83-88.

Floyd, S. (1988). A micro level model of information technology use by managers. In U.E. Gattiker (Ed.), *Studies in technological innovation and human resources*: *Managing technology development* (pp. 123-142). Berlin & New York: Walter de Gruyter.

Galbraith, J.R. (1973). *Designing complex organization*. Reading, MA: Addison-Wesley.

Grover, V. (1993). An empirically derived model for the adoption of customer-based interorganizationl systems. Decision Sciences, *24*(3), 603-640.

Grover, S.K., & Lederer, A.L. (2004). The impact of industry contextual factors on IT focus and the use of IT for competitive advantage. *Information & Management*, *41*(7), 899-919.

Holsapple, C.W., & Whinston, A.B. (1996). *Decision support systems*. New York: West Publishing Company.

Iacovou, C.L., Benbasat, I., & Dexter, A.S. (1995). Electronic data interchange and small organizations: Adoption and impact of technology. *MIS Quarterly*, *19*(4), 465-485.

Intel Information Technology White Paper. (2003, May). *Defining the value of e-business: Seventeen standard measures* (pp. 1-14). Intel Publishing.

Kerlinger, F.N. (1986). *Foundations of behavioral research*. CBS College Publishing.

King, W., Grover, V., & Hufnagel, E. (1989). Seeking competitive advantage using information-intensive strategies: Facilitators and inhibitors. *Information technology and management strategy*. Englewood Cliffs, NJ: Prentice Hall.

King, W.R., & Sabherwal, R. (1992). The factors affecting strategic information systems applications: An empirical assessment. *Information and Management*, *23*(2), 217-235.

King, W.R., & Teo, T.S.H. (1996). Key dimensions of facilitators and inhibitors for the strategic use of information technology. *Journal of Management Information Systems*, *12*(4), 35-53.

Kohli, R., & Devaraj, S. (2003). Measuring information technology payoff: A meta-analysis of structural variables in firm-level empirical research. *Information Systems Research*, *14*, 127-145.

Kwon, T.H., & Zmud, R.W. (1987). *Unifying the fragmented models of information systems implementation: Critical issues in information systems research*. New York: John Wiley.

Lederer, A.L., & Mendelow, A.L. (1988). Convincing top management of the strategic potential of information systems. *MIS Quarterly*, *12*(4), 526-536.

Mata, F., Fuerst, J., & Barney, J. (1995). Information technology and sustained competitive advantage:

A resource-based analysis. *MIS Quarterly*, *19*(4), 487-505.

Nabseth, L., & Ray, G.F. (1974). *The diffusion of new industrial processes*. London & Cambridge: University Press.

Nunnally, J.C. (1979). *Psychometric theory*. New York: McGraw-Hill.

Porter, M.E. (1985). *Competitive advantage* (3rd ed.). New York: Free Press.

Porter, M.E. (2001, March). Strategy and the Internet. *Harvard Business Review*, *March*, 62-78.

Premkumar, G., & King, W.R. (1992). An empirical assessment of information systems planning and the role of information systems in organizations. *Journal of Management Information Systems*, *9*(2), 99-125.

Premkumar, G., & Ramamurthy, K. (1995). The role of interorganizational and organizational factors on the decision mode for the adoption of interorganizational systems. *Decision Science*, *26*(3), 303-336.

Ramamurthy, K., Premkumar, G., & Crum, M.R. (1999). Organizational and interorganizational determinants of EDI diffusion and organizational performance: A causal model. *Journal of Organizational Computing and Electronic Commerce*, *9*, 253-285.

Rawn. (1994). *The business of the Internet: An introduction to the Internet for commercial organizations*. Retrieved November 18, 2007, from http://www.rtd.com/people/rawn/business.html

Reich, B.H., & Benbasat, I. (1990). An empirical investigation of factors influencing the success of customer-oriented strategic systems. *Information Systems Research*, *1*(3), 325-347.

Rogers, E.M. (1995). *Diffusion of innovations*. New York: The Free Press.

Sato, S., Hawkins, J., & Berentsen, A. (2001). E-finance: Recent developments and policy implications. *Tracking a transformation: E-commerce and the terms of competition in industries* (pp. 64-91). Washington, DC: Brookings Institution Press.

Teo, T.S.H., & Pian, Y. (2003). A contingency perspective of Internet adoption and competitive advantage. *European Journal of Information Systems*, *12*, 78-92.

Teo, T.SH., Tan, M., & Buk, W.K. (1998). A contingency model of Internet adoption in Singapore. *International Journal of Electronic Commerce*, *2*, 96-118.

Teo, T.S.H., & Too, B.L. (2000). Information systems orientation and business use of the Internet: An empirical study. *International Journal of Electronic Commerce*, *4*(4), 105-130.

Tornatzky, L.G., & Klein, K.J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions of Engineering Management*, *29*(1), 28-45.

Ujah, E. (2004, June 21). E-business infrastructure: A factor for business growth in Nigeria. *Nigeria Business Times*.

Ujah, E. (2005, October 10). Electronic business and small business development in Nigeria. *Nigeria Business Time*s.

Weill, P., & Olson, M.H. (1989). An assessment of contingency theory. *Journal of Management Information Systems*, *6*(1), 59-85.

Williamson, O.E. (1983). Organizational innovation: The transaction cost approach. In J. Ronan (Ed.), *Entrepreneurship* (pp. 101-133). Lexington, MA: Lexington Books.

Zhu, K., & Kraemer, K.L (2005). Post-adoption variations in usage and value of e-business by organizations. *Information Systems Research*, *16*(1), 61-84.

Zhu, K., Kraemer, K.L., & Xu, S. (2002). A cross-country study of electronic business adoption using the technology-organization-environment framework. Presented to the *Twenty-Third International Conference on Information Systems*, Barcelona, (pp. 337-348).

Zhu, K., Kraemer, K.L., Xu, S., & Dedrick, J. (2004). Information technology payoff in e-business environments: An international perspective on value creation of e-business in the financial industry. *Journal of Management Information System*, *21*(1), 17-54.

Zmud, R.W. (1984). An examination of "push-pull" theory applied to process innovation in knowledge work. *Management Science*, *30*(6), 727-738.

Uchenna Cyril Eze is a faculty at Multimedia University Malaysia. He holds a BSc in banking and finance from ASU, Nigeria, a master's degree in technology management from UTM, Malaysia, and a Ph.D. in e-commerce strategic value and industrial development from NTU, Singapore. Earlier, he worked in First Bank PLC Nigeria, after which he joined Lawdon Maritime Ltd. Nigeria. He is in extensive joint research efforts with practitioners and researchers in Malaysia, Nigeria, Singapore, Hong Kong, India and USA. He has published papers in several journals and international conferences including GITMA conferences, Americas Conference on Information Systems, the JGITM, and AJIS. His research interests include knowledge management as a strategic innovation, IS and e-business value, and ethical issues in new technology applications. His current research includes a study on ISP service quality and customer satisfaction in Southern Malaysia.