STRUCTURAL EQUATION MODELING OF RELATIONSHIPS BETWEEN ORGANISATIONAL AND E-BUSINESS STRATEGIES, READINESS, INTENSITY AND IMPACT IN NIGERIAN UNIVERSITIES

BY

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ABSTRACT

E-business promises substantial gains for educational institutions which can be realised only when they invest strategically in appropriate e-business resources and processes. Nigerian universities have been implementing various networked information resources to support their academics, administration and public outreach. However, they need to know how well their investments are helping to achieve these goals. Previous studies on e-business show that no known study was carried out on a comprehensive research on the readiness, intensity and impact of e-business implementation in Nigerian universities. This study, therefore, was designed to investigate interrelationships between organisational strategy, e-business strategies, e-business readiness, e-business intensity, and e-business impact in Nigerian universities.

Technology, Organisation and Environment framework was the theoretical model while descriptive survey design was adopted. Stratified random sampling was used to select eighteen universities, comprising one federal, state and private, from each of the six geo-political zones. Data were collected on 2% and 5% of staff and students population respectively, totaling 4,476 students, 743 teaching, 1,498 non-teaching, 160 management and 90 Information Technology staff. A checklist and questionnaires were used to collect data on organisational strategy (OS), e-business strategy (ES), e-business readiness (ER), e-business intensity (EI) and e-business impact (EM). Data were subjected to frequency counts, t-test, Pearson product moment correlation and Partial Least Squares Structural Equation Modeling (PLS-SEM) at 0.05 level of significance.

Promoting teaching and learning was the most emphasised OS. Online portal, e-mail, e-library services were available to staff and students and the public. The highly intense activities include the provision of information online (100.0%) and advertisement of programmes, services and products (94.4%). This indicates that the universities were highly disposed to e-business operations but commitment of resources was low. There were no differences in the behaviour of the variables OS, ES, ER, EI and EM across the three types of university. Significant correlations were found between the variable pairs OS and ES (.51), ES and ER (.83) and ER and EI (.49), but not between EI and EM (.46). The estimated inner model of the PLS-SEM showed statistically significant hypothesised path relationships between variable pairs OS and ES (0.48), ES and ER (0.86), ER and EI

(0.60), and EI and EM (0.43). The hypothesised path relationship between EM and OS was negative and not significant. The R2-value for the estimated PLS-SEM model was 0.46 which is higher than the threshold of 0.26. There were significant mean differences between the following pairs of variables: OS and ES (12.56), ES and ER (39.97), ER and EI (12.56) and EI and EM (7.43), indicating the outer model loadings. Only one out of the five Average Variance Extracted values is less than 0.50, confirming that there was convergent validity.

Implemented e-business strategies in the universities strongly influenced e-business readiness and intensity of use of e-business resources, except e-business impact. University management need to better synchronise organisational objectives with their e-business strategies, readiness and intensity to promote greater transformative impact.

Keywords: Organisational strategy, E-business operations, E-business resources, Nigerian universities

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CERTIFICATION

I certify that this study was carried out by Mrs. R. A. Oyekunle of the Africa Regional Centre for Information Science, University of Ibadan, under my supervision.

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CHAPTER 1
INTRODUCTION

1.1 Background to the study

Universities are fundamentally information and knowledge producing, using and sharing systems. In today's digital and global environment, universities are experiencing increasingly intense competitive pressures, for which a key strategic means to differentiate themselves and compete effectively is through innovative uses of e-business technologies. Electronic business (E-business) is defined as the delivery of key business processes through the use of Internet technologies. It entails using computer or phone technologies to perform various business transactions such as obtaining information, ordering or paying for goods or services, and participating in product research and development processes. E-business has now become a matter of survival for most businesses (Mehta, Shah and Morgan, 2005).

Today, the Internet has become one of the principal means of doing business because it can facilitate the quick and efficient movement of information among trading partners at a greatly reduced cost. E-business has radically changed not only the ways in which organisations carry out their day-to-day activities, but also the nature of the work done, the nature of business relationships, and the ways in which an enterprise structures itself (Gale and Abraham, 2005). For example, universities now conduct computer based tests, implement online registration, payment, booking of accommodation, result checking, engage in e-learning and use their websites/portals to reach prospective students, parents, institutions of higher learning and other stake-holders.

Brodie (2000) explained that the continuing explosion of Information and Communication Technologies (ICTs) ushered in the era of Information Society and e-business where traditional business activities are challenged and new business models are sought. Institutions cannot compete solely on past record of success in today's rapidly changing business environment that is characterized by boundary blurring, disintermediation and hyper competition. To move ahead, institutions need to seek

innovation constantly at every level of activity. Their ability to generate successful business models and strategies as well as new services, will be the key to their survival in the new economy. One of such innovations is the use of the Internet, which has caused a shift from traditional business into what is now popularly termed e-business. Being an alternative channel for marketing or selling products and services online, the Internet has triggered the Information Revolution and has led to fundamental and irreversible changes in the way business is conducted (Brodie, 2000). The web creatively links together a university's many learning communities (alumni, current student body, the general public) and affords new opportunities and ways to communicate, educate, and generate support (such as chat groups, e-mail and e-forums, personal links and listservs, ride boards, elections, and surveys) (Kvavik, 2002).

E-business technologies have a particularly strong impact on coordination due to their open standards, high capability of data transfer, and low cost (Sanders, 2007). All information technologies, particularly the Internet and the Web, have had the most profound impact on business integration and collaboration (Rabinovich, Bailey and Carter, 2003). For instance, Hoosen (2010) revealed that before Kenyatta University got a management and administrative software, the fee collection rate was about 64% or 65%, which means 35% of students were not paying their fees due to transaction processing lapses or leakages, or they were paying only when about to graduate, making the school lose a lot of revenue. But, with the introduction of the software, the fee collection rate rose to about 90% since students could not register without paying fees, which was a big income boost for the university.

Business goals made possible by e-business include improving efficiencies, reducing costs, increasing speed of transactions, expanding markets, enhancing business partnerships and, most importantly, providing additional value for clients. In addition, e-procurement which is an aspect of e-business has automated and streamlined many corporate purchasing processes (Sengupta, 2001), and firms that embrace e-business can be potentially transformed into a networked entity with seamless supply chains and value creation processes (Sawhney and Zabin, 2001). Ani and Biao (2005) have argued that the integration of Information and Communication Technology (ICT) in scientific research

enhanced resource sharing and scientific collaboration through the application of virtual structures and networks, for example, computerized library, virtual laboratory and so on.

Although, e-business is being adopted by countries of different sizes, different cultures, and different economies, the European Commission (2008) observed that different firms and industries are migrating toward e-business at varying speeds. This inevitable transition to e-business affects all sectors of the economy including the education sector. However, today's e-business does not solely refer to systems and technology, but encompasses: optimal management of relations with customers, suppliers and business partners in a complex and frequently global competitive environment; more than the realization of electronic transactions in purchasing and sales, including access to, securing and sharing of information in the business network; and doing business in an advanced digital economy (European Commission, 2008).

Worldwide, universities have initiated a wide variety of campus networked information resources to support instruction, research, administration, and public outreach, there are still many areas that could benefit greatly from implementing new electronic means of service. Internationalization of higher education, which is a strategy to increase delivery of higher education and ideas across national boundaries (Thune and Welle-Strand, 2005), is one of the ways e-business is impacting the education sector. Other specific benefits include: an increase in the number of open and distance learning institutions; an increase in cross-border academic activities, students and faculties; the use of entrepreneurial and marketing approaches in higher education; enhancement of courses and programs to align them to career needs, and to new content, knowledge and skills, etc. It is clearly evident that e-business is contributing to an unparalleled transformation of service delivery in the education sector. Although, one dilemma facing organisations that have embraced e-business is that there seems to be little value in coming up with a comprehensive e-business strategy if operating in such an unstable environment will almost certainly render such strategies obsolete in the near future. However, the danger inherent in not having an e-business strategy is that success will most likely be achieved only by accident (Porter, 2001). Nevertheless, universities must develop and implement an e-business infrastructure, which provides a flexible framework for implementing and

integrating new business applications or services for faculty, staff, students, alumni and other stakeholders.

1.1.1 Key concepts

This research investigated the relationships among five variables, i.e. organisational strategy, e-business strategy, e-business readiness, e-business intensity and e-business impact. These concepts are explained briefly here with more details provided in the literature review chapter.

Organisational strategy

The strategy of a goal-directed organisation is invariably directed on its identified vision and mission. Organisational vision is described as a short, succinct statement of what the organisation intends to become and to achieve at some point in the future, often stated in competitive terms, it also refers to the category of intentions that are broad, all-intrusive and forward-thinking (Thompson and Strickland, 2001). A mission statement on the other hand is usually a short and concise statement of goals and priorities for achieving the stated vision. In turn, goals are specific objectives that relate to specific time periods and are stated in terms of facts. For instance, the vision of the University of Ibadan is to be a world-class institution for academic excellence geared towards meeting societal needs. The vision is intended to be achieved through a mission, stated as "by expanding the frontiers of knowledge through provision of excellent conditions for learning and research, producing graduates who are worthy in character and sound judgment, contributing to the transformation of society through creativity and innovation, and serving as a dynamic custodian of society's salutary values and thus sustaining its integrity".

Once organisational vision and mission are set, the next step is strategic road-mapping or strategic planning, which involves gathering all necessary information and the setting of goals for a specific long or short periods (which must be specific and realistic) for the organisation, based on its vision and mission statement. The set goals then inform the types of operational or business strategies needed to achieve the goals. In today's digital world, organisational strategies that are supported and propelled by information

technologies are among the critical success factors that organisations need to implement to promote and sustain their growth and development.

E-business strategy

E-business strategy defines both short-term and long-term e-business goals and involves careful and skilled planning. It is part of the corporate strategy and business plan, and also interconnects with other plans including marketing, organisational and IT strategic plans (Combe, 2006). There are at least three different viewpoints as to what e-business strategy constitutes, the appropriate viewpoint being defined by organisational context (Economy Watch, 2010).

1. *E-business strategy is organisation/corporate strategy*. In this viewpoint there is little or no distinction between organisation strategy and e-business strategy. This definition is appropriate if the e-business is effectively the entire corporation, as is the case in so-called 'clicks-only' companies – companies that run their entire business through electronic channels.
2. *E-business strategy is business unit strategy*. In many companies the e-business strategy may only be applicable to a particular business unit. For example, some companies run their e-businesses as separate but parallel operations.
3. *E-business strategy is a process strategy*. A key organisational process or human activity system, or perhaps an integrated set of such processes, may be chosen for radical redesign with ICT innovation. For example, a company may decide that it wishes to concentrate on redesigning its supply chain or customer chain processes with ICT innovation. It is argued that this is the most ubiquitous form of e-business strategy. For example, the National Open University's (NOUN) online learning applications.

E-business readiness

E-business readiness refers to the state of preparedness of an organisation to embrace or adopt e-business technologies. It emphasizes technological, organisational, and environmental determinants of ICT adoption (Fuchs, Höpken, Föger and Kunz, 2010). Whereas the Organisation for Economic Co-operation and Development OECD (1999)

posits that e-business readiness indicators describe the technical, commercial and social infrastructures that are necessary to support e-business. These indicators comprise, for instance, technological infrastructure (e.g., Internet access, W-LAN technologies), those concerning economic infrastructure (e.g., resources to cover implementation and operation costs, respectively), and those relating to social infrastructure (e.g., ICT skills, perceived pressure from business partners).

E-business intensity

E-business intensity refers to the level of use of available e-business infrastructures in an organisation. Fuchs et al. (2010) explains that e-business intensity measures actual usage levels of e-business technologies, while according to OECD (1999), e-business intensity indicators describe the level of usage of e-business resources in terms of volume, diversity, sophistication and value of electronic transactions. Although there are other indices for measuring e-business intensity, that of the OECD is chosen because of its coverage and popularity.

E-business impact

E-business impact is measured by the value creation process induced by e-business applications (Fuchs et al., 2010). Value creation processes, according to Zhu and Kreamer (2005), are defined as positive effects of implemented e-business strategies on both internal operations and external procurement processes (efficiency driven) and on sales processes (driven by growth or by improved quality of stakeholder relationships) of an organisation. These include impact on sale, efficiency, business relationships and customer satisfaction. On the other hand, the OECD (1999) describes e-business impact indicators as the differences made by e-business in terms of efficiency and/or the creation of new sources of wealth.

1.1.2 Interconnections of organisational strategy and e-business strategy, readiness, intensity and impact in universities

E-business is premised upon finding ways of adding value to established and linked business processes. By analogy, e-business in education focuses on finding value in

various administrative, teaching, learning, research and other processes. In the teaching process for example, e-business technologies and applications are key game changers in curriculum development (programming), content development (production), content delivery, learner acquisition, assessment, articulation, and credentialing (Kvavi, 2002). Also, higher education value chains involve service areas and include marketing (providing information to prospective students), admissions (qualifying and selecting students), enrollment services (registration, billing, and financial aid), academic support (advising and tutoring), student services (placement, counseling, and information technology help), and credentialing (grades, degrees, certificates, and transcripts).

While, e-business impacts have been observed in different areas for example, there is greater customization of courses and programs combined with enhanced flexibility of delivery; the communication of research is more varied with formal publication playing a less significant role; current improvements in access to research findings and the acceleration of library collections; an increased emphasis on establishing and maintaining effective learning relationships with students throughout their lives; the Internet has become a far more interesting tool for distance education because it provides much more than two-way video and voice communication; lower inventory costs, faster production, lower supply costs etc. (Kvavi, 2002; OECD, 1999). Realizing these vibrant gains depends to a large extent on the way in which universities integrate e-business strategies into their strategic objectives because technology can alter existing or create new operating models and therefore influence overall strategy (Fuchs et. al., 2010).

1.2 Statement of the research problem

The European Commission (2008) has established that e-business promises substantial impact and gains for institutions and firms. But the gains can only be realized when they strategize for, and invest adequately in appropriate e-business infrastructures, human resources and processes. Thus, much depends on, initially the organisational strategy, e-business strategy, readiness and subsequently, the e-business intensity, of an organisation at the microeconomic level or in an economic sector at the macroeconomic level.

It is evident that e-business supports the education sector the same way it assists companies in general. It helps to improve efficiency, reduce costs, increase speed of transactions, expand markets, provide additional value for clients, etc (Kvavi, 2002). It is believed that new e-business strategies will radically change the service culture of educational institutions and greatly improve the efficiency and effectiveness of service delivery.

Some previous studies (e.g. Achimugu, Oluwagbemi, Oluwaranti and Afolabi, 2009; Agyeman, 2007; Amassoma and Ayanda, 2013; Anim, Akpan, Okon, Sunday and Eyo, 2012) have looked into ICT adoption and use in the Nigerian education system and agreed that the successful adoption of ICTs in developing countries is one of the current pressing developmental issues. They also identified some constraining factors like the low percentage of teachers who have ICT skills, absence of ICT policy at various institutional levels, and uneasy access to computer equipment and other accessories, etc.

Specifically, Achimugu, Oluwagbemi and Oluwaranti (2010) evaluated the impact of ICT diffusion in Nigeria's higher educational institutions. Amassoma and Ayanda (2013) conducted a study to investigate the impact of e-readiness on educational development among undergraduate students of selected private universities in Nigeria. Anim, Akpan, Okon, Sunday and Eyo (2012) examined the status of ICT deployment in four Nigerian universities. These studies of e-business and ICT development initiatives and issues in some Nigerian universities are all partial in their scope, because they focused on only one or at best two of the key variables in the e-business value creation chain in Nigerian universities, often on either the IT infrastructure deployment aspects or on the IT or e-business impact aspect. However, it is pertinent to emphasize that the experienced, measured or perceived impact of e-business investment in universities is invariably the end result of a chain of interconnected or interdependent processes which begin from the formulation of ***e-business strategies*** that are synchronized (correctly or otherwise) with institutional or ***business strategies*** (visions, mission and goals), through the implementation of the e-business strategies (effectively or otherwise) that define the ***e-business readiness*** of the universities in terms of policies, infrastructures and human resources. Thereafter, the actual use of the e-business readiness resources (which may be efficient or otherwise), defines ***e-business intensity*** of use of the resources, which might

translate optimally or otherwise, into the experienced, perceived or measured impact of the e-business investments.

Despite extensive literature searches of the Internet and accessible libraries and databases, no known research was found that have investigated and modeled empirically the relationships among these variables, and specifically between organisational strategies (OS) of Nigerian universities and their e-business strategies (ES), and between these strategies, and their e-business readiness (ER), intensity (EI) and impact (EM). There is a clear need to investigate these e-business processes and linkages in Nigerian universities, as it is the only way Nigerian universities would be able to understand themselves better in terms of what they have been doing regarding e-business investments, how they have been doing it and what they have been doing to translate into transformational institutional changes and impact.

Hong and Songan (2011) had revealed that the massification, internationalisation, diversification and marketisation of higher education are some potential areas of e-business impact; however, Fuchs et. al. (2010) concluded in their own study that there was relatively low e-business impact level with regard to some aspects of costs savings. Meanwhile, Nigerian universities continue to invest in various e-business technologies, which raise some pertinent research questions, including: what has been the impact of these investments to date, as experienced, measured or perceived by the various stakeholders of these universities such as students, academic staff, non-teaching and administrative staff, and IT operational units and staff? How do these impacts differ across stakeholders? What are the linkages between the key strategic organisational goals, processes, output and impact in the e-business value chains of the universities? Consequently, this study was undertaken to investigate and fill the existing knowledge gap as discussed above, in order to enhance knowledge of the evolution, current status, processes and future prospects of e-business in Nigerian universities and also support improved e-business policy making and implementation in the universities.

1.3 Research objectives

The broad objective of this study is to examine organisational strategies pursued, the type of e-business strategy used, the levels of readiness, intensity and impact of e-business

in Nigerian universities and also to find possible relationship among the various e-business variables explained in the background and statement of the research problem above. Specifically, the study investigated the:

1. Organisational strategic objectives Nigerian universities are focusing on;
2. E-business strategies that Nigerian universities have been pursuing towards achieving their strategic objectives;
3. Current level of e-business readiness in Nigerian universities;
4. E-business intensity levels in the universities in terms of diversity, variety and scope of actual e-business operations;
5. Impact of e-business activities in Nigerian universities in terms of measurable organisational strategy variables;
6. Major differences in the behavior of the variables across type of universities and geo-political zone;
7. Challenges faced by Nigerian universities in the adoption of e-business.

1.4 Research questions

The following are the research questions for the study:

1. What are the organisational strategic objectives that Nigerian universities are focusing upon?
2. What are the e-business strategies that Nigerian universities have been pursuing towards achieving their strategic objectives?
3. Is the current level of e-business readiness in Nigerian universities adequate?
4. What is the e-business intensity level in the universities in terms of diversity, variety and scope of actual e-business operations?
5. What are the impacts of e-business activities in Nigerian universities in terms of measurable organisational goal and strategy variables?
6. Are there any major differences in the behavior of the variables across type of universities and geo-political zone?
7. What are the challenges faced by Nigerian universities in the adoption of e-business?

1.5 Hypotheses

Hypothesis One: There is no significant relationship between organisational strategy and e-business strategy.

Hypothesis Two: There is no significant relationship between e-business strategy and e-business readiness.

Hypothesis Three: There is no significant relationship between e-business readiness and e-business intensity.

Hypothesis Four: There is no significant relationship between e-business Intensity and e-business Impact.

Hypothesis Five: There is no significant relationship between e-business impact and organisational strategy.

Hypothesis Six: There is no significant structural equation model that predicts the path relationships of organisational strategy with e-business strategy, of e-business strategy with e-business readiness, of e-business readiness with e-business intensity and of e-business intensity with e-business impact.

1.6 Scope and limitation of the study

In pursuance of the objectives of the study, attention focused on organisational strategy in terms of mission, vision and objectives; the e-business strategies pursued i.e. computerization of both internal and external processes; the readiness of e-business in terms of technical infrastructures, commercial infrastructures, social infrastructures and behavioral factors; the intensity of e-business in relation to usage, volume and value; and the impact of e-business in terms of effectiveness and efficiency, in Nigerian universities. This study utilized a triangulation approach to explore all aspects of the study construct and samples were drawn from all six geo-political zones of the country to include federal, state and private universities. A main limitation of this study is that it is partly exploratory in nature.

1.7 Justification of the study

E-business readiness, intensity and impact have been regularly researched in different sectors. A few studies (Fuchs et. al., 2010; Akinyele and Mbanefo, 2011;

Amassoma and Ayanda, 2013) have also investigated only one or two of the variables of focus in this research work. However, no previous study had investigated the simultaneous relationships among various key facets of e-business developments in Nigerian universities, particularly the interrelationships of e-business readiness, e-business intensity and e-business impact, and how they relate to the strategic organisational objectives of the universities.

The result of this research work is expected to provide insights on the performance drivers of Nigerian universities in their development and use of e-business technologies. The findings would therefore guide tertiary institutions in Nigeria in focusing their energies on those e-business policies, technologies and applications which are more likely to lead to increased efficiency and output.

The study identifies and measures comprehensively the detailed sub-variables of organisational strategies, e-business strategies, e-business readiness, e-business intensity and e-business impact in the general context of universities worldwide, as well as relationships among these sub-variables specific to Nigerian universities. This level of detail had not been attempted before and provides insights that Nigerian universities can use to improve the policy making and implementation of their e-business strategies. This would help Nigerian tertiary education policy makers and university administrators to define, target and synchronize appropriate micro-level organisational strategies and capabilities to ensure effective implementation of their e-business systems.

1.8 Operational definition of terms

- **Organisational strategy:** The pattern or plan consistent with the organisation's vision that integrates an organisation’s major goals, policies and actions into a cohesive whole.
- **Organisational Vision:** this is a short, succinct statement of what the organisation intends to become and to achieve at some point in the future, often stated in competitive terms.
- **Organisational Mission:** a concise internally focused statement of the reason for the organisations existence, basic purpose and values that guide employee activities.

- **E-business:** the use of the Internet for all business processes: from communications, information sharing, delivering sales and services, conducting financial transactions, delivering training to handling employee payroll and benefits among others.
- **E-business strategy**: action(s) taken to accomplish long-term e-business objectives.
- **E-business readiness**: this refers to the state of preparedness of an organisation to embrace or adopt e-business technologies.
- **E-business intensity**: this is the level of availability of e-business infrastructures in an organisation; it measures actual usage levels of e-business technologies.
- **E-business impact:** it describes the differences made by e-business in terms of efficiency and/or the creation of new sources of wealth.
- **E-business infrastructure**: is the architecture of hardware, software and data used to deliver e-business services to employees, customers and partners.
- **Information and Communication Technologies (ICT):** an umbrella term that encompasses a wide array of systems, devices and services used for data processing plus telecommunications equipment and services for data transmission and communication.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This chapter presents a review and evaluation of existing literature on the key concepts, theories and models relevant to the focus, objectives, research questions and hypotheses of the study. The review focused on, among other issues: information and communication technologies, divergent view on the concepts of organisational strategy, e-business strategy, benefits and risk, e-business strategies in higher education, e-business readiness, intensity and impact, Nigerian ICT environment for e-business in education. The review also highlights and evaluates theoretical e-business frameworks and empirical studies. The review provided the foundation for the conceptual framework of the study.

2.2 Conceptual review

2.2.1 Information and communication technologies

According to Meroño-Cerdan, and Soto-Acosta (2005), ICT is referred to as a general-purpose technology with three basic characteristics: it is pervasive as it spreads to all sectors; it improves over time and hence keeps lowering the costs for users; and it spawns innovation, i.e. it facilitates research, development and market introduction of new products, services or processes. This last property, the two authors termed, the "enabling role of ICT for innovation".

In the emerging global economy, e-business has increasingly become a necessary part of business strategy and a strong catalyst for economic development. The significant rise in e-business has changed and is still changing the way business is conducted around the world. For many business organisations, e-business has become one of the most promising and opportunistic tools for reaching out to customers, communicating with business partners and the running of business operations (Andam, 2003). The application of the Internet in the business world has become a major trend in practice and generated a stream of research in the recent literature. The integration of information and communications technology (ICT) in business has revolutionized relationships within

organisations and those between and among organisations and individuals. Specifically, the use of ICT in business has enhanced productivity, encouraged greater customer participation, and enabled mass customization, besides reducing costs (Andam, 2003). With developments in the Internet and Web-based technologies, distinctions between traditional markets and the global electronic marketplace - such as business capital size, among others - are gradually being narrowed down. With its effect of leveling the playing field, e-business and e-commerce coupled with the appropriate strategy and policy approach enables small and medium scale enterprises to compete with large and capital-rich businesses (Andam, 2003).

ICT use has become commonplace in modern business. Nearly all companies use e-mail, many have a website, and many businesses offer basic e-commerce services on their website. It is recognized that in the Information Age, Internet commerce is a powerful tool in the economic growth of developing countries. In the past few years, e-business seems to have permeated every aspect of daily life. In just a short time, both individuals and organisations have embraced Internet technologies to enhance productivity, maximize convenience, and improve communications, globally. From banking to shopping to entertaining to educating, the Internet has become integral to daily activities. According to Kvavi (2002), the era of edifice complex and its basic belief that respectable learning takes place only in buildings and on campuses is coming to an end. Adults are beginning to demand that their learning take place at a time, place, and pace convenient to them. He further stated that most educational services by the end of this century will be delivered electronically.

2.2.2 E-business

Electronic business is defined as “the conduct of business transactions and activities using in large part electronic means and typically involving use of the Internet and the world-wide-web” (Clegg, Johanson and Bennett, 2001). IBM has also defined e-business as the transformation of key business process through the use of internet technologies (Schneider and Perry, 2001). E-business is a broader definition of E-commerce, not just the buying and selling of goods and services, but also servicing

customers, collaborating with business partners, and conducting electronic transactions within an organisation.

Wolf (2000) defines e-business as "the use of the Internet for all business processes: from communications, information sharing, delivering sales and services, conducting financial transactions, delivering training to handling employee payroll and benefits". Lallana, Quimbo and Andam (2000) on their part see e-business as "The transformation of an organisation's processes to deliver additional customer value through the application of technologies, philosophies and computing paradigm of the new economy". According to Lal (2004), e-business encompasses applications of ICTs in all business processes such as office automation, production processes, co-ordination with other plants, customer relations management, supply chain management, and management of distribution networks.

Also, Mesenbourg (2001) defines electronic business as any process that a business organisation conducts over a computer-mediated network. This definition is similar to that of the OECD, where e-business is said to be automated business processes (both intra- and inter-firm) over computer mediated networks (OECD, 2004). According to Meroño-Cerdan and Soto-Acosta (2005), e-business can be defined as the management of relationships, electronic data interchange, collaboration, communication and the establishment of workflow processes with business partners, customers, employees, government and other business agents, as long as these tasks or processes are performed by electronic means. Electronic commerce (e-commerce) which is sometimes used interchangeably with e-business is the provision, buying and selling of information, products, and services with the assistance of computer and telecommunication networks that use internet technology to perform commercial activities (Bauer and Glasson, 1999). While Rayport (2002) defined the term e-commerce as the "exchanges mediated by the technology between several parties (individuals, organisations or both), as well as the electronic activities inside and between organisation that facilitate these exchanges". The main distinction between e-business and e-commerce is that while e-commerce focuses only on commercial transactions, the scope of e-business includes information exchange, commercial transactions and knowledge sharing between organisations (Cullen and

Webster, 2007). E-business is therefore an umbrella term and e-commerce is a sub-set of e-business.

2.2.3 Benefits of e-business

1. Improvements to client service: E-business tools can empower the client to find many of their own answers, make transactions, monitor order status and check account details. The global market is evolving from a supply driven to a demand-driven system: Even now, it is possible for clients to specify their requirements for a product precisely and directly to the manufacturer over the internet. This potential is fast spreading to a wide range of everyday products including computers, toys, investment portfolios, sports equipment. In the education sector, information technology will present the possibility of greater customization of courses and programs, combined with enhanced flexibility of delivery (Bynoe, 2002).

2. Cost saving: E-business can result in reduced wage costs by automating business processes which require less human intervention (Akoh, 2002).

3. Cash flow improvements: Online payment systems are now well known features of electronic transactions between businesses, and between businesses and consumers. E-business can result in reduced interest charges, bank fees and collection fees by using electronic funds transfer (EFT) to reduce the cost of money transfers, point of sale (PoS) and electronic banking facilities (Basu and Muylle, 2007).

4. Improved marketing: With a well designed and effective website, e-business provides another avenue for your business to market and promote itself. E-business has brought the world to people's doorstep. One of the great benefits of having a website and email as part of e-business is that it can help break down geographical constraints that previously existed. By using these tools, one can now broaden client base and access new markets all over the world-at relatively little cost. It is no longer necessary to conduct business face to face (Bynoe, 2002).

5. Better supply chain management: Through e-business, wholesalers, retailers and businesses can compete with manufacturers in the supply chain by creating interactive, online systems which provide clients with purchasing and delivery options. This puts greater choice and control in the hands of the client (Basu and Muylle, 2007).

6. E-business serves as an "equalizer": It enables start-up and small- and medium-sized enterprises to reach the global market. For example, Amazon.com is a virtual bookstore. It does not have a single square foot of bricks and mortar retail floor space. Nonetheless, Amazon.com is posting an annual sales rate of approximately $1.2 billion. Due to the efficiencies of selling over the Web, Amazon has spent only $56 million on fixed assets.

7. E-learning: ICT in education, develops learning at the pace of the student, and puts the student in control of the learning method since learning becomes personalized. Learning online, removes the geographical barriers of learning for the students and or teachers, thus making knowledge available on demand anytime, anywhere and anyhow. Not only can students receive information, they can also practice the application of that information in the context of previous knowledge. The Internet provides much more than two-way video and voice communication. It allows authenticated and confidential submission of homework assignments and even tests, the ability to replay lessons or information on a 24x7 basis, and the ability to collaborate remotely with other students on projects (Kvavik, 2002). Services will be provided electronically rather than in a paper mode and without intermediation by the staff. Services will be increasingly accessible at any time from any place. Intermediary services become less relevant as students, faculty members, and staff members are able to have direct contact with the producers of services.

8. Saving clients' and businesses' time: Publishing frequently asked questions (FAQs) on a website saves clients and businesses time and money waiting on the phone for a response. They also allow the business to concentrate on generating more business rather than dealing with often simple issues (Windrum. and, De Berranger 2002).

9. Strengthening of business-client relationships: Web sites with interactive features-e.g. chat line, bulletin board, email, e-forms and useful information about products, services and prices-help keep the client in touch with the business. Automatic email responses provide clients with instant information about their enquiries, answering general queries more quickly and comprehensively. With interactive databases and electronic loyalty programs, personalized and targeted direct mailing can strengthen client relationships and increase sales. As well, shopping cart software for clients on websites is also proving popular, particularly with retailers. It allows clients to have the control to add

and remove products from a shopping cart list and make payment to complete the transaction when they're satisfied with their selection (Basu and Muylle, 2007).

E-businesses also create websites that are digital versions of stores, catalogues, sales offices, branch banks, help desks, trading exchanges, and telephone and mail communications. These sites afford self-service or partially self-service sales transactions, eliminating or shortening the time sales and administrative support workers spend with customers. E-mail is used by sellers to communicate with customers, answer their questions, and inform them of the status of their orders or transactions, as well as to develop long-term relationships with those customers, offering them personalized, useful advice, articles of interest to them, and information on new products. Customers can submit product reviews and evaluations, register complaints, obtain product or procedural information, and resolve problems, dealing with workers in a customer service center. E-mail is also used for direct-mail marketing and advertising.

10. Easier access to research findings: The communication of research is likely to be more varied, with formal publication playing a less significant role, while the current improvements in access to research findings and library collections are likely to accelerate (Mejabi and Babatunde, 2010).

Furthermore, Lallana et al. (2000) reported that the three primary processes that are enhanced through e-business are:

1. Production processes, which include procurement, ordering and replenishment of stocks; processing of payments; electronic links with suppliers; and production control processes, among others;
2. Customer-focused processes, which include promotional and marketing efforts, selling over the Internet, processing of customers' purchase orders and payments, and customer support, among others; and
3. Internal management processes, which include employee services, training, internal information-sharing, video-conferencing, and recruiting. Electronic applications enhance information flow between production and sales forces to improve sales force productivity. Workgroup communications and electronic publishing of internal business information are likewise made more efficient.

2.2.4 E-business infrastructure

According to Mesenbourg (2001), e-business infrastructure is the share of total economic infrastructure used to support electronic business processes and conduct electronic commerce transactions. It includes hardware, software, telecommunication networks, support services, and human capital used in electronic business and commerce. Examples of e-business infrastructure are:

a) Computers, routers, and other hardware. Computers are device, usually electronic, that processes data according to a set of instructions, it can also be referred to as a programmable machine that performs high-speed processing of numbers, as well as of text, graphics, symbols, and sound. Routers on the other-hand are small physical devices that join multiple networks together. Technically, a router is a Layer 3 gateway device, meaning that it connects two or more networks and it operates at the network layer of the OSI model.

b) Satellite, wire, and optical communications and network channels. Optical fiber and satellite cables are used to transmit telephone signals, Internet communication, and cable television signals. Through the use of a cable modem, a broadband Internet connection that is designed to operate over cable TV lines is established. Cable Internet works by using TV channel space for data transmission, with certain channels used for downstream transmission, and other channels for upstream transmission. Wireless communication uses radio frequency bands; it provides an always-on connection which can be accessed from anywhere - as long as one is geographically within a network coverage area.

c) System and applications software. Application software are those that handle a specific job, such as a program to track inventory within an organisation. They also include revised existing packaged software or customized generic applications which are can be purchased from independent software vendors. Systems software are those that maintain and control computer systems, such as operating systems and database management systems. The systems software determines how the network, workstations, and CPU of the computer handle

the various jobs they have been given and how they communicate with peripheral equipment such as printers and disk drives.

d) Support services, such as web site development and hosting, consulting, electronic payment, and certification services. Web development support services ensures that a website is kept up to date, error free and to keep clients informed and advised on key performance metrics related to all areas of website development and maintenance. Certification services are authentication schemes on the Internet used to ensure trust.

e) Human capital, such as programmers. Many technical innovations in programming — advanced computing technologies and sophisticated new languages and programming tools — have redefined the role of a programmer and elevated much of the programming work done today. Computer programmers write, test, debug, and maintain the detailed instructions, called computer programs that computers must follow to perform their functions. Programmers also conceive, design, and test logical structures for solving problems by computer.

f) Electronic payment system. Briggs and Brooks (2011) stated that an Electronic Payment System (EPS) is a form of inter-organisational information system (IOS) for monetary exchange, linking many organisations and individual users. This may require complex interactions between the stakeholders, the technology and the environment. It is also referred to as a system of financial exchange between buyers and sellers in the online environment that is facilitated by a digital financial instrument (such as encrypted credit card numbers, electronic checks, or digital cash) backed by a bank, an intermediary, or by legal tender. EPS plays an important role in e-commerce because it closes the e-commerce loop. EPS encompasses the total payment processes, which include all the mechanisms, technological systems, institutions, procedures, rules, laws etc. that come into play from the moment a payment instruction is issued by an end-user. Different kinds of rules, regulations, mechanisms, technology and arrangements have therefore been put in place by trading partners, markets and governments (stakeholders involved in EPS

development) in all countries and throughout time to develop effective infrastructure of monetary exchange, commonly referred to as payments systems (Bossone and Massimo, 2001).

2.2.5 Organisational strategy

Organisational strategy typically concentrate on the determination of the desired outcomes and how to achieve them, analysis of organisational environment and resources, allocation of resources, and design of organisational structures and control systems proportional to the centralized strategy (Flood, 2000). In the same vein, Stargick (2013) opined that organisational strategy is the creation, implementation and evaluation of decisions within an organisation that enables it to achieve its long-term objectives. It specifies the organisation's mission, vision and objectives and develops policies and plans, often in terms of projects and programs, created to achieve the organisation's objectives and also allocate resources to implement them. For example, the vision of the University of Jos is to nurture a university of high international standard so that the quality of the institution is rated the best in Nigeria. This is to be achieved by encouraging the advancement of learning, promoting scholarship and community service; providing an environment in which staff can develop their potential, contributing optimally to the university so that students can acquire academic and professional competences, as well as character with discipline and dedication; allocating resources to achieve strategic objectives.

According to Flood (2000), organisational strategies are important since they affect an organisation's long-term prosperity, typically for like five years, and they have multifunctional or multidivisional consequences and require consideration of both external and internal factors facing the organisation. An organisation may have personnel, resources and energy, but if it doesn't have a clear and compelling vision of where it is headed, such an organisation is bound to face difficulties. This is why organisational strategy techniques are designed to avoid such situation and to keep organisations moving efficiently toward their goals. It is therefore imperative that universities, as the highest educational institutions define competitive strategies that are consistent with their visions.

A framework for decision-making and action is the organisational strategy framework as propounded by Lafayette (2013). The framework has four fundamental stages which are:

Stage 1: Strategic planning

Strategic planning involves contextual high-level analysis that may make use of management tools such as Porter's Five Forces, SWOT, PEST, Scenario, Gap, Scouting, Problem Inventory and other analyses. A fundamental difference from 'regular' business strategy is that electronic technology capabilities are often a key driver of the need or opportunity for strategy.

Stage 2: Systems design

Strategic objectives are translated into practical project designs and plans. Electronic technology capabilities are matched with the objectives. Costs, timeframes and resource requirements are determined, and the results assessed against the strategic requirements. Key criteria include involving stakeholders to generate buy-in, and payoff and risk analysis, before implementation can be authorized.

Stage 3: Implementation

The specific plan developed in stage 2 is executed. Key issues here are that there is a continuous involvement of stakeholders and to aim for early wins rather than a nothing-to-everything 'big bang' deployment of every bell and whistle simultaneously. It is also imperative to ensure that people involved in using the system have adequate training before it goes live.

Stage 4: Performance management

The project needs to be assessed against the original project plans for specification, time and budget compliance. Most importantly, the business performance of the strategic initiative in action must be measured.

2.2.6 E-business Strategy

Strategy according to Smith (2001) represents the action(s) to be taken to accomplish long-term objectives. Business strategies may include geographic expansion, product/service diversification, new investment acquisition, product development, market penetration, labor retrenchment, divestiture, liquidation, and joint venture. Strategies are potential actions that require top management decisions and large amounts of the organisation's resources. In addition, strategies affect an organisation's long-term prosperity, typically for at least five years, and thus are future-oriented. Strategies have multifunctional or multidivisional consequences and require consideration of both external and internal factors facing the firm. It is also seen as the roadmap to success because it answers the question - what type of business an organisation is into; it also determines how an organisation compete within the market it is in. Thompson and Strickland (2001) view the concept ‘strategy’ as consisting of the combination of competitive moves and business approaches that managers employ to please customers, compete successfully, and achieve organisational objectives.

E-business strategy is not just about new technology. Other factors, especially wider business networks can play a far more powerful role in strategy than the technology alone, for example integration is a key factor and the majority of e-business initiatives is deployed using newer technologies but will be connected to legacy back office systems. Business strategy obviously subsumes e-business strategy, they are strongly interlinked because technology can alter existing or create new operating models and therefore influence business strategy.

A state-of-the-art e-business strategy according to Economy Watch (2010) would generally include:

1. Supply chain management: effective management of the supply chain can be handled with the help of e-business strategies, which will ensure better coordination between the wholesalers and the retailers of various products. Better integration of the supply chain right from the source till the final delivery of the product can be effectively implemented using e-business strategy. This also brings us to the point of e- commerce where a parallel network of buying and selling can be observed using dissemination of information over the Internet. Everything

ranging from automobiles to electronic gizmos can be bought over the Internet in a hassle free manner under the aegis of sound supply chain management.

2. Customer service and customer relationship management: effective e-business strategies would involve better customer service and customer relationship management ensuring the highest level of consumer satisfaction. E-business is targeted at providing the customer-friendly services, which would include the timely delivery of goods right at the doorstep of the consumer.
3. Inventory and service management integration: e-business strategies can also help in better inventory and service management integration through formulating specific plans for inventory accumulation and purchasing machinery and equipment which will avoid unnecessary purchases which can lead to higher expenditures entailing different tax implications.
4. Tactical operations alignment: tactical operations directed towards short-term goals as opposed to strategic planning aimed at long term goals can be better coordinated implementing the e-business strategies.

Moreover, Porter (1985) developed a model called the 'Value Chain' to help understand the network of processes and services. This model on competitive strategy suggests that organisations should re-evaluate their value chain and concentrate on the operations that they can do best, while other processes should be out-sourced to specialists. Nigerian universities in the late 90's have offered only the manual system of registration, but recently, majority has embraced the online system of registration which has eased the registration process for students. Some of these universities now have people in-house who design their websites, student registration portals, staff portals, etc.

Porter (1985) further distinguished between primary activities and support activities in the value chain process. Primary activities according to him are directly concerned with the creation or delivery of a product or service. They can be grouped into five main areas: inbound logistics; operations; outbound logistics; marketing and sales; and service. Each of these primary activities is linked to support activities, which help to improve their effectiveness or efficiency. There are four main areas of support activities: procurement, technology development (including R and D), human resource management,

and infrastructure (systems for planning, finance, quality, information management etc.). The chain consists of a series of activities that create and build value. They culminate in the total value delivered by an organisation.

In strategy formulation, Porter provided three generic strategies which, if successfully implemented, can allow a firm to stake out a defended position in the marketplace. These strategies are: Overall Cost Leadership, Differentiation and Focus. Overall Cost Leadership includes efficient scale facilities, vigorous cost reductions, cost control, overhead control, avoid marginal accounts, minimize R and D, minimize service and minimize advertising. This strategy is evident in the enrollment statistics in Nigerian universities, federal universities which are the most affordable have a higher number of students compared to state and private universities. Differentiation involves creating something about a company's product that is perceived industry wide as being unique. Differentiation can provide insulation against competitors because of brand loyalty by customers and a resulting lower sensitivity to price. For example, the stable academic calendar of the University of Ilorin has made it the most sought university in Nigeria with over 50,000 applicants in the 2014 UTME examination (JAMB Statistics, 2014). The key idea of Focus is to focus on a particular buyer group, segment of the product line, or geographic market etc. This strategy is built around serving a particular target market very well. The premise is that a firm is able to serve its narrow strategic target more effectively or efficiently than competitors who are competing more broadly. For example, the University of Ibadan is now focusing on postgraduate studies than undergraduate studies; this makes its postgraduate programme more scholastic. So by effectively implementing such strategy, an organisation can achieve differentiation by better meeting the market needs or lower costs through specialization, or both.

2.2.7 Risk issues in e-business strategy

Bearing in mind what strategy is, there is no one single strategy that is appropriate for all organisations and there are undoubtedly many risks associated with e-business strategies. Andersen (2011) argues that when there is no e-business strategy in place, there will be missed opportunities for additional sales on the sell-side and more efficient purchasing on the buy-side, such an organisation will fall behind competitors in delivering

online services and lastly, there will be poor customer experience from poorly formulated e-business strategy. Lafayette (2013) discussed the following broad categories of risks with regards to the four-stage e-business strategy framework:

1. No strategy or wrong strategy: Any enterprise has risks associated with ignoring e-business opportunities and staying with old traditional methods of doing business. There are also risks in actually moving to a new or updated e-business platform. The strategy may be of course for various reasons. It may fail to take into account the latest competitive activities of others. Strategies must fill a real need or desire held by customers and other stakeholders, and it may be necessary to conduct market research to determine the potential level of support before making an investment.
2. Poor translation of strategy into design: There are significant risks in the translation of e-business strategy into system designs that can be implemented in practice. Larger projects with extended timelines can mean that an initial design becomes obsolete before it is deployed. Some designs must attempt to bridge the gap between archaic legacy systems and new leading edge systems, with the potential for a complex and unreliable fit. Others may appear technically neat and clever, but fail to deliver well on the value expected in the strategy statement.
3. Poor implementation: Many projects are implemented by personnel who have not undertaken such a project before. Partly by definition, e-business initiatives tend to be new. The more leading edge (i.e. unproven) the technology is, the greater the risk - and the potential rewards. Numerous studies acknowledge that strategies frequently fail not because of inadequate strategy formulation, but because of insufficient implementation,
4. Failing to measure performance: It is logical to do only things that can be measured. Any e-business initiative needs at least two major forms of measurement. Measuring the project itself according to the project triangle of time, budget and specifications and measuring the quantitative and qualitative business outcomes expected of the initiative.

2.2.8 E-business strategy in higher education

E-business in higher education is far more about strategy and business redesign than technology (Kvavi, 2002). The Internet and the browser are tools that make e-business possible, but new business strategies and models of service delivery are needed to make it successful and to capture the imagination and loyalty of students, faculty members, and staff members. Kvavi (2002) re-asserts that e-business has the potential to affect a wide variety of university services and how teaching is done. Nimmanphatcharin (2003) is of the opinion that the university management team needs to undertake a process, which will allow it to assess three key questions through the use of the tools shown in figure 2.1 below.

Planning techniques are required at each level of the management because it analyses the models and techniques that should be used to help facilitate decision-makers and analysts (university management teams or corporate level). For example, the TOWS matrix which builds on the analysis provided by SWOT is a technique to help management teams formulate strategy. Opportunity, strengths and weaknesses of the companies are identified in the TOWS matrix, where internal strengths are used to take advantage of opportunities and to overcome internal weaknesses. In addition, the management teams are able to generate strategies by using internal strengths to avoid threats, while minimizing weaknesses will also help them to deal with external threats.

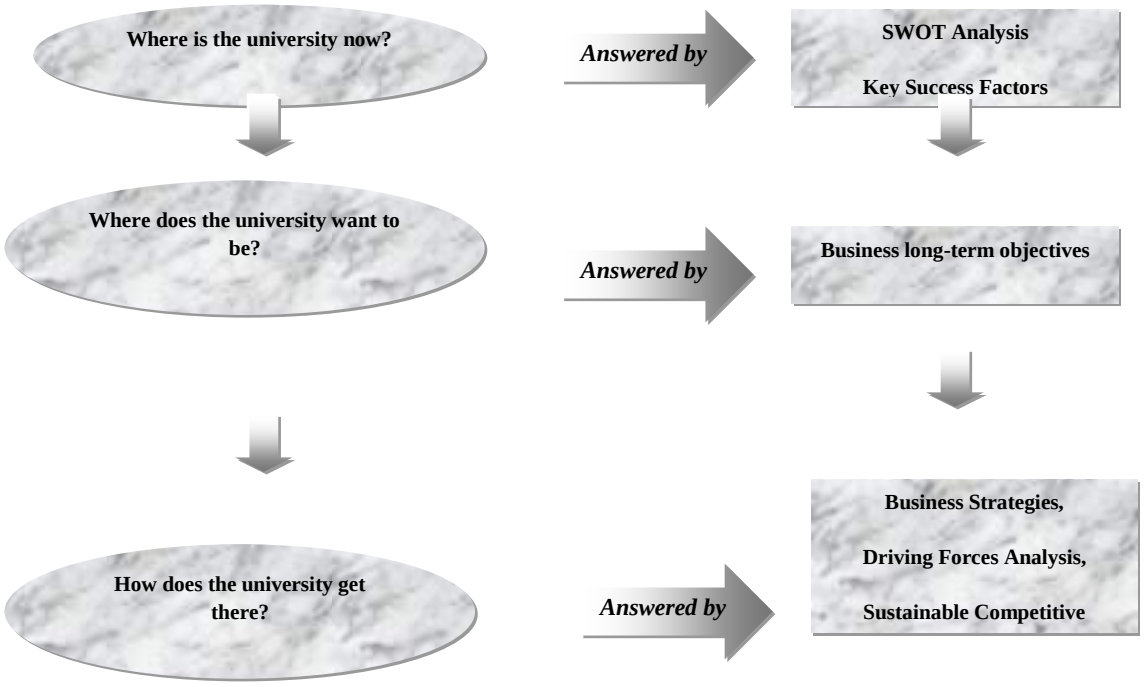

Fig. 2.1. Key Questions and Tools in a University Setting (Source: Nimmanphatcharin 2003)

Strategy implementation incorporates a number of aspects, some of which can be changed directly and some of which can only be changed indirectly. The major implementation themes is said to concern organisation structure, strategies, planning system, policies, control system, and environmental conditions. Nimmanphatcharin (2003) suggested that to be successful in strategy implementation, universities should meet the following criteria:

1. Clear responsibility for the successful outcome of planned strategic change should be allocated,
2. The number of strategies and availability being pursued at any time should be limited. The ability of the necessary resources to cope with the changes should be seen as a key determinant of strategy and should not be overlooked,
3. Necessary action to implement strategies should be identified and planned and again responsibility should be allocated, and
4. Strategy evaluation or performance measures should be established and appropriate monitoring and control mechanisms put in place.

Strategy evaluation, especially corporate strategy evaluation at the widest level involves seeking answer to the following questions (Nimmanphatcharin, 2003):

1. Are the current objectives of the organisation appropriate?
2. Are the strategies created previously and which are currently being implemented to achieve these objectives still appropriate?
3. Do current results confirm or refute previous assumptions about the feasibility of achieving the objectives and the ability of the chosen strategies to achieve the desired results?

Nimmanphatcharin (2003) also provided the following situation analysis model and techniques for universities:

1. SWOT analysis: Strategic management involves aligning an organisation's opportunities and threats with its strengths and weaknesses. Strengths and weaknesses are generated from internal factors such as, the university's people, products/services, operations and facilities, and so forth. For example, one identified strength of the University of Ilorin is its central location in Nigeria and

gateway between the North and South-West. On the other hand, opportunities and threats will be picked up from external factors like an organisation's markets, the environment, and competitors. Many researchers identify that an organisation needs to focus on internal differential strengths and weaknesses by comparing themselves with competitors and key external opportunities and threats. A major weakness of the University of Jos, as contained in their strategic plan is unstable school calendar.

2. Key success factors analysis: KSFs are business aspects that all universities in the industry must pay close attention to in order to achieve the specific outcomes crucial to market success and the competencies and competitive capabilities with the most direct bearing on university profitability. An example of a key success factor is high quality leadership with clear vision and direction.
3. Driving forces analysis: One tool that might help the university in establishing its business strategies is driving and restraining forces as shown in figure 2.1.
4. Sustainable competitive advantage analysis: SWOT, KSFs, Driving Forces, and Business strategy analysis will help the university identify its sustainable competitive advantages, which are particular capabilities that will enable the university to maintain a sustainable position against its key competitors. The university will use all these analyses and sustainable competitive advantages to establish its new business strategies to meet the organisation's visions, missions, and objectives. The related processes of business objectives formulation, SWOT analysis, KSFs analysis, driving force analysis, and environment variable analysis are shown in the figure below:

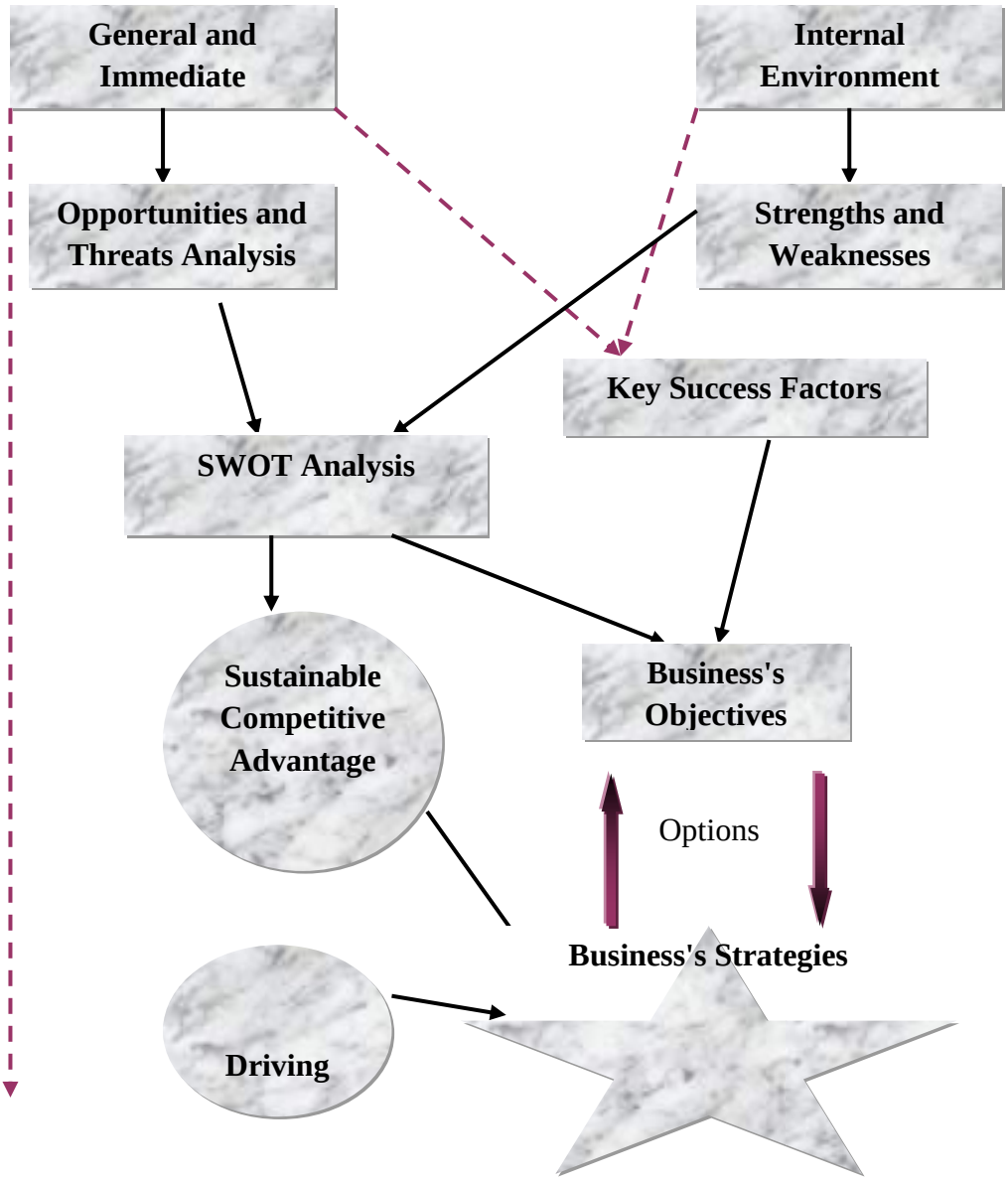

Fig. 2.2. Related processes of business objectives, SWOT analysis, KSFs, sustainable competitive advantage, and strategies (Source: Nimmanphatcharin, 2003).

2.2.9 Strategic objectives of Nigerian universities

A review of Nigerian universities websites, brochures and strategic plan documents revealed the following as some of the common strategic objectives most universities have outlined in order to achieve their visions and missions:

1. encourage the advancement of learning;
2. promote scholarship and conduct research in all fields of learning and human endeavor;
3. deploy appropriate and adequate ICT facilities;
4. promote probity equity and other shared values;
5. produce high quality graduates who are worthy both in character and learning;
6. foster linkages to attract added value, increase revenue generation;
7. promote effective and efficient human resource management;
8. promote an environment-friendly university;
9. enhance welfare services for staff and students;
10. ensure a safe and secure university environment;
11. promote global best practices in the activities of the university;
12. ensure stable academic calendars;
13. promote industrial and labour peace on campus;
14. internationalization of programmes and academic staff;
15. internationalization of student intake;
16. collaborative linkages with other Nigerian universities and internationally;
17. contribute to the transformation of society through creativity and innovation;
18. serve as a dynamic custodian of society's salutary values and thus sustain its integrity;
19. encourage the expression of viewpoints that contribute to improvements and intellectual pursuits within the university
20. encourage new perspectives and approaches to issues; among others.

In order to meet the above and other objectives, the universities had also mapped out some strategies that are contemporary best practices in most universities in Nigeria and even globally:

1. provision of uninterrupted power supply;
2. continuous update of the university ICT policy;
3. computerizing all major activities;
4. deploying ICT hardware and software to teaching and research;
5. enhancing staff and students' ICT capacity;
6. strengthening the ICT management unit;
7. ensuring enhancement and restructuring of academic programmes to respond to current and emerging global trends;
8. creating a conducive atmosphere for attracting external funds for research and project implementation;
9. pursue a comprehensive staff development and retention program;
10. improve facilities in all programs to attain and or maintain full accreditation status;
11. encourage interdisciplinary studies to produce more versatile graduates;
12. support the central library to improve its collections and use cutting-edge technology to provide quality access and services;
13. promote partnerships with industry and ensure relevance of programs to professional practice;
14. encourage partnerships with Nigerian higher education institutions and foreign universities for joint use of resources and exchange of staff and students;
15. provide increased support and facilities for postgraduate teaching and research in areas of strength and comparative advantage;
16. continue engagement in multidisciplinary research with national and multinational research partners;
17. foster a seminar culture and the hosting of national and international conferences;
18. encourage increased mentoring to boost joint research and publications;
19. support the regular publication of quality Faculty journals in text and on-line formats;
20. diversify opportunities for acquisition of ICT resources for staff and students;
21. maintain an updated, dynamic and interactive website with inputs from Faculties, Departments and units;

22. ensure maximum utilization of internal professional expertise to handle internal projects in order to cut down costs;
23. promote free flow of information to foster openness, accountability and transparency;
24. provide incentives and support to staff to attend conferences and workshops;
25. introduce distinguished service awards for committed staff of all categories; improve the aesthetic appearance of the campuses;
26. continue the policy of the automatic offer of training positions to all first class graduates of the University;
27. increase the University carrying capacity through Open and Distance Learning (ODL), e-learning, Sandwich and part-time programmes; establishing high admission standards;
28. signing Memoranda of Understanding with foreign universities; ensuring a conducive work environment.

2.2.10 E-business readiness

In 1999, the OECD proposed the following framework for classifying e-business indicators:

1) Readiness indicators which describe the technical, commercial and social infrastructures that are necessary to support e-business.
2) Intensity indicators which describe the usage, volume, value and nature of electronic transactions.
3) Impact indicators which describe the differences made by e-business in terms of efficiency and/or the creation of new value added.

The readiness indicators encompass many factors. These include technical infrastructures like hardware and software; human resources i.e. IT personnel; support services like consulting, website hosting and certification services; organisational culture like policies, structure, personnel attitudes and organisational goals. There are other yardsticks for measuring readiness, for example, the World Bank and Biu et al. (2003) instruments. However, the OECD classification was chosen because it does not only apply

to governments, but also to organisations, households and other sectors. In addition, the OECD framework has evolved into the current standard for classifying e-commerce indicators and is widely used.

2.2.11 E-business intensity

The second framework for classifying e-business indicators as proposed by OECD (1999) is the intensity indicators which describe the usage, volume, value and nature of electronic transactions. A company is high-intensity if the majority of its revenue is generated through Web-based or supply-chain applications (Cisco Systems Inc., 2002). Factors considered in assessing e-business intensity include the following: information systems staffing mix: sectors and organisations that have more than the average number of e-commerce application developers in their IT departments rank higher in e-business intensity; e-commerce software in place; plans to buy e-commerce; availability of web site, availability of internet connectivity; support for telecommuting capabilities with IT; web-based business-to-business transactions, web-based business-to-consumer transactions; electronic data interchange via Web site; EDI via direct-dial connections with suppliers; EDI via direct-dial connections with consumers; etc.

2.2.12 E-business impact

The third framework for classifying e-business indicators as proposed by OECD is the impact indicators which describe the differences made by e-business in terms of efficiency and/or the creation of new value added. Research attention has moved from technical e-business systems towards the consequences of having those systems and as a result two kinds of e-business impacts have been identified (Deiss, 2002) as follows:

a) An impact that focuses on the consequences of e-business and ICT on processes, organisational structures and communication lines.
b) An impact that focuses on business and strategy measures like effectiveness (sales), efficiency (costs) and customer satisfaction.

After measuring high experienced e-business impact level with respect to improved satisfaction of customers and clients and the quality of relationships within business partners, Fuchs et al. (2010) concluded that there was relatively low e-business impact

level with regard to cost savings (e.g., marketing costs, costs of internal processes, and costs of coordinating business partners). In terms of statistical methodology, the study used linear structural equation models which effectively supported the testing of the hypothesized relationships between the constructs measuring e-business readiness, intensity, and impact, respectively. Furthermore, the European Commission (2008) explains that the economic aspects of e-business can be seen by analyzing the contribution of information-communication technologies to the economic growth and higher productivity of companies, micro-level analyses indicate the strategic importance of e-business for companies while macro-economic analyses indicate that e-business has only moderate effects on industry productivity and growth levels.

2.3 Contextual review

2.3.1 E-business challenges in developing countries

In general, the main issues of concern that acts as barriers to the increased adoption of e-business, some of which are highlighted by the OECD are the following:

1. Lack of awareness and understanding of the value of e-business. Most SMEs in developing countries have not taken up e-business or use the Internet because they fail to see the value of e-business to their businesses. Many think e-business is suited only to big companies and that it is an additional cost that will not bring any major returns on investment.
2. Lack of ICT knowledge and skills. People play a vital role in the development of e-commerce. However, technology literacy is still very limited in most developing countries. There is a shortage of skilled workers among organisations, a key issue in moving forward with using information technology in business.
3. Financial costs. Cost is a crucial issue. The initial investment for the adoption of a new technology is proportionately heavier for small than for large firms. The high cost of computers and Internet access is a barrier to the uptake of e-commerce. Faced with budgetary constraints, some organisations consider the additional costs of ICT spending as too big an investment without immediate returns (Applegate, 2002).

4. Infrastructure. The national network/physical infrastructure of many developing countries is characterized by relatively low teledensity, a major barrier to e-commerce.
5. Lack of trust. Ensuring security of payments and privacy of online transactions is key to the widespread acceptance and adoption of e-commerce. While the appropriate policies are in place to facilitate e-commerce, lack of trust is still a barrier to using the Internet to make online transactions. Moreover, credit card usage in many developing countries is still relatively low (Lallana, et al., 2000).
6. Privacy and security issues. Transaction security pertains to three important components and related issues, namely: Transaction Privacy, which means that transactions must be held private and intact, with unauthorized users unable to understand the message content; Transaction Confidentiality, implying that traces of transactions must be dislodged from the public network and that absolutely no intermediary is permitted to hold copies of the transaction unless authorized to do so; and Transaction Integrity, which pertains to the importance of protecting transactions from unlawful interference i.e., transactions, must be kept unaltered and unmodified. These three components constitute a major challenge to e-business in developing countries. The technological solutions that address these challenges include authorization schemes, i.e., programs that make sure that only authorized users can gain access to information resources such as user accounts, files, and databases. Typical examples of authorization schemes are: password protection, encrypted smart cards, biometrics (e.g., fingerprinting, iris-scanning), and firewalls (Kalakota and Whinston, 1999). Other related issues include tax evasion, privacy and anonymity, fraud adjudication, and legal liability on credit cards.
7. Lack of motivation in e-learning especially in asynchronous modes; this is as a result of the fact that people are already used to the synchronous mode where they can see the teacher, ask questions and get feedback immediately.
8. Cultural rejection and isolation. There is still the belief among Nigerians that the conventional system of education supersedes any kind of new system. This attitude is in conformity with the theory of the diffusion of innovation which believes that

some people usually don't embrace new technological innovations until other people have done so.

9. Underdeveloped electronic payments. In developing countries, the underdeveloped electronic payments system is a serious impediment to the growth of e-commerce and e-business. In these countries, entrepreneurs are not able to accept credit card payments over the Internet due to legal and business concerns. The primary issue is transaction security (Briggs and Brooks, 2011).
10. Cross-country legal and regulatory differences. There are some evident cross-country regulatory differences especially in e-payment systems.

2.3.2 Nigerian ICT environment for e-business in education

The Federal Government of Nigeria over the years has adopted several ICT related policies and laws aimed at guiding the development of the ICT sector and harnessing its power for national development. But Nigeria, like other nations, has been faced with the inevitability of the fast technological and market convergence of the global ICT industry and has therefore continued to evolve new ICT policy frameworks to accommodate convergence and maximize the potential of ICT tools for national development.

Presently, there are about ten known ICT for education initiatives at various stages of development being carried out by the education coordinating agencies of the Nigerian government and the ministry of education. These initiatives include:

1) The Nigeria Universities Management Information System (NUMIS) 1989
2) The Nigerian Universities Network (NUNet) Project
3) The Polytechnics Network (PolyNet) Project
4) The School Net Project
5) The Nigerian Education, Academic and Research Network (NEARNet)
6) The Teachers Network (TeachNet) Project
7) National Open University 2002
8) National Virtual (Digital) Library (Ministry of Education/ NUC)
9) National Virtual Library (Ministry of Science and Technology/NITDA) 2001
10) National Information, communication and education programme of the Presidency

The 2012 draft National ICT policy of Nigeria states that its vision is to make Nigeria a knowledge-based and globally competitive society and its mission is to fully integrate information and communications technologies into the socio-economic development and transformation of Nigeria into a knowledge based economy (draft National ICT Policy, 2012). As contained in the policy, the objectives of the National ICT Policy are:

I. To reflect convergence by de-emphasizing the differences between the IT, broadcasting, telecommunication, and postal sectors;

II. To bring all ICT related activities under a single Ministry so as to give policy guidance to the converged industry;

III. To enact a new Information and Communication Technology (ICT) Act that ensures a competitive and converged industry as well as provide an appropriate legal framework;

IV. To promote universal access to high quality advanced Information and Communication technologies and services, in particular the Internet and related capabilities ;

V. To develop and enhance indigenous capacity in ICT technologies and software development;

VI. To ensure the country's effective participation in regional and international ICT fora in order to promote ICT development in Nigeria, meet the country's international obligations and derive maximum benefit from international cooperation in these areas;

VII. To establish an administrative and legal framework for the transition to digital broadcasting and ensure a smooth switch over in accordance with ITU guidelines;

VIII. To establish the framework for the implementation of community radio in Nigeria;

IX. To divest NIPOST of its regulatory function and transform it into a commercial provider of postal and integrated data communications services.

X. To eliminate multiple regulation and taxation in the ICT sector which serves as disincentives to investors;

XI. To encourage the development of Broadband services that will enable Nigerians enjoy the benefits of globalization and convergence; and

XII. To create the enabling environment for investment in ICT in Nigeria.

As contained in the draft National ICT Policy (2012), development in the ICT sector of Nigeria is far below expectation for a country of its size and resources prior to 1999. For example, total fixed telephone lines were less than 400,000 while regular internet users were less than 200,000. From a policy and regulatory standpoint, the Federal Government of Nigeria adopted the National Telecommunications Policy (NTP) in 2000 to guide the development of the telecommunications industry in Nigeria. In a similar vein, the National Information Technology Policy was approved in 2000 to guide the IT industry in Nigeria, and was followed by the enactment of the National Information Technology Development Agency Act 2007 which became the legal platform for the creation of Nigeria Information Technology Development Agency (NITDA). These policy and regulatory developments along with other government and private sector initiatives have resulted in significant improvement of the ICT sector. Statistics show that Nigeria has moved from approximately 400,000 available fixed telephone lines pre- 1999 to over 90.5 million available mobile telephone lines by the first quarter of 2011, thereby making Nigeria's telecommunications market the fastest growing in Africa. There is now modest ICT deployment in the functioning of government organisations, as well as in the private sector (draft National ICT Policy, 2012).

In addition, ICT now drives some activities in the financial and oil and gas sectors while various e-government initiatives are ongoing in various departments at the three tiers of government. Table 2.1 shows available statistics of ICT penetration for the year 2015 and 2016:

Table 2.1. Available statistics of ICT penetration

ICT Indicators	Percentage/Number
Mobile Penetration	107.67% (2016)
Fixed penetration	125,196 (2016)
Internet Penetration	38 (2016)
Internet Users (000)	83,000 (2015)
Broadband Penetration	14% (2016)
PC Penetration	11% (2016)
Computers Assembled in Nigeria	< 700,000
Number of registered ICT companies	600,000 (2016)
Licensed courier companies	290 (2016)

Source: Nigerian Communications Commission (2016)

There is increasing interest in how computers and the Internet can improve education at all levels, in both formal and non-formal settings. In order to fulfill the Vision 2020 of Nigeria, the educational system has to be transformed and driven by ICT. Thus ICT is an increasingly influential factor that could facilitate and speed up the transformation expected in the education sector (Adedoyin, et al., 2008).

2.3.3 Current Nigerian e-business initiatives

According to Ribadu (2011), a country determined to compete in a 21st century marked by globalization, fiercely competing markets, job opportunities, and rapid technological advances, must have commensurate infrastructure to drive its vision. Several developed nations of the world have plunged into e-commerce in order to improve their economic activities. In fact e-commerce is now seen as one of the areas developed nations are now gaining competitive advantage over developing nations like Nigeria. Any nation that refuses to join this global trend cannot be a significant player in the global economy that will be driven by high powered technology in the foreseeable future. The recent significant developments in Nigeria which include the re-delegation of .ng TLD (an Internet top-level domain generally used or reserved for a country, a sovereign state, or a dependent territory), the budding e-Payment services and the emerging international fiber cable from MainOne and Globacom are pointers that Nigeria is about taking its place in the committee of nations in using e-business strategies for attainment of her economic recovery (Akintola et al., 2011).

As reported by Akintola et al., (2011), one currently used e-payment system in Nigeria today is the eTranzact which was conceptualized, designed and developed in Nigeria. It is the first completely integrated and operational mobile phone, B2B (Business to Business) and Internet payment system in Nigeria. It enables customers shop securely, effect money transfers online, pay bills, make purchases and buy airtime via the mobile phone, POS devices, bank outlets and the Internet. This one Nigerian electronic payment initiative has revolutionized transaction processing in Nigeria since its introduction. eTranzact is currently the only functional electronic platform for genuine m-commerce and e-commerce in Nigeria today. It is a multi-channel electronic payment system that facilitates financial transactions using the Internet, mobile (SMS and WAP), VoiceXML and bank

outlets. While other payment solutions are restricted in their channels, eTranzact offers several choices and flexibility to prospective users. eTranzact is said to have been successfully deployed and is now fully operational in Zimbabwe while plans have been concluded to introduce eTranzact to other countries like South Africa, Botswana and Ghana, Kenya, Zambia, Namibia and Malawi (Fanawopo, 2004). eTransact is fully incorporated in UK, USA and Latin American countries.

In 2005, the Economist Intelligence Unit's sixth annual e-readiness rankings placed Nigeria on 58th position out of 65 countries ranked. This position is not showing enough potential considering that most investors today will be interested not only on the investment climate and infrastructure in a country, but also on e-readiness indices such as national connectivity, e-leadership, information security, human capital, and e-business climate.

2.3.4 E-business trends in Nigeria

In recent years, there has been a huge drive towards the use of Internet for business purposes in Nigeria. Many tertiary educational institutions in Nigeria now have websites through which they carry out activities like giving the searching public the opportunity to know about their institutions, advertising programs being offered by the institutions, processing of admission, serving as a means of communication to students and staff about academic calendar and other internal information (Oyekunle and Mejabi, 2012). They also offer services like online course registration for students, online payment of fees, downloadable courseware, checking results by students and/or by parents or guardians online. Some have also been known to have publications emanating from the institutions published on the website and they also offer mail service to staff and students. However, many of these websites are static, inactive or have not been updated since first deployed, not to talk of being connected with automated processes within the owner institutions. The reason for this is usually the inadequate appreciation of both the e-business uses of websites beyond merely providing the most basic institutional information such as contact or directory information, and the backend infrastructural and human resources and processes needed to support the websites.

The Nigeria Internet Group (2009), a group conceived as a non-Governmental organisation with the mission statement of promoting and facilitating full access to the Internet in Nigeria, argued that, the recent significant developments in Nigeria which include the re-delegation of .ng TLD (top-level domain) generally used or reserved for a country, a sovereign state, or a dependent territory), the budding e-Payment services and the emerging international fiber cable from SAT3, MainOne and Globacom are pointers that Nigeria is about taking her place in the committee of nations in using e-business strategies for attainment of economic recovery.

In the same vein, the Global Information Technology Report (GITR) 2009–2010, the ninth in the series, measured the extent to which 133 economies from both the developed and developing worlds leverage ICT advances for increased growth and development through the methodological framework of the Networked Readiness Index (NRI). The NRI identifies the most relevant factors facilitating ICT readiness, providing policymakers, business leaders, and all other relevant stakeholders with a unique tool in drawing national roadmaps toward increased networked readiness, one that they can use to benchmark their country's performance over time and vis-à-vis other economies. The GITR which was first initiated in 2001 has become a valuable and unique benchmarking tool to determine national Information and Communication Technology (ICT) strengths and weaknesses, as well as to evaluate progress, just as it also highlights the continuing importance of ICT application and development for economic growth. Nigeria was rated the 99th networked readiness nation (out of 133 nations) otherwise known as e-readiness in the 2009-2010 Global Information Technology Report (GITR) sponsored in 2010 by Cisco Systems as a series of joint project between the World Economic Forum and INSEAD.

Additionally, evidence of Nigeria attaining an e-ready society can be found in the outcome of the Internet World Stats (2012), where Nigeria ranked first in Africa in terms of Internet usage with an approximate population of 170 million of which 48 million actively use the internet (28.4%), followed by Egypt with 29.8 million users (17.8%) out of a population of 83 million, then Morocco with 16.4 million Web users (9.8%) and Kenya with 12.2 million users (7.2%).

As is evident in table 2.2, the Nigeria's Internet sector had been hindered by the country's underdeveloped and unreliable fixed-line infrastructure, but this is changing as competition intensifies and new technologies are able to deliver wireless broadband access. From the foregoing, there are numerous advantages of e-business adoption; but unfortunately, rapid growth in e-business especially in purchases and sales over the Internet is rather low in Nigeria. Research has revealed that the level of e-business in Nigeria is still very low as compared to developed countries. Ayo, Adewoye, and Oni (2011), reported that businesses in Nigeria have online access with opportunity for e-commercial activities, customers in the country however access business websites only to source for information but make purchases the traditional way. Also, Longe, Boateng, Longe and Olatubosun, (2010) found out that growth and development of ICT infrastructure and implementation in Nigeria are still faced with some challenges that has prevented the nation from maximizing the potentials offered by ICT and related technologies. Lack of trust, fear of being defrauded, lack of ICT skills, inadequate infrastructures, high cost of maintenance and repair of this equipment, high cost of information technology training to staff, lack of financial capability and inefficiency on the part of the handlers, underdeveloped electronic payment systems, poor delivery infrastructure, cybercrimes, poor policy and project implementation strategies, and inefficient e-business applications are some of the reasons for this trend (Tiamiyu 2000, Lal 2007, Longe, Boateng, Longe and Olatubosun 2010 and Akintola et al. 2011). Even so, educational institutions in Nigeria are still forging ahead to register their presence on the information superhighway.

Table 2.2. Internet usage and population growth in Nigeria

YEAR	Users	Population	% Penetration	Usage Source
2000	200,000	142,895,600	0.1 %	ITU
2006	5,000,000	159,404,137	3.1 %	ITU
2009	23,982,200	149,229,090	16.1 %	ITU
2011	45,039,711	155,215,573	26.5 %	ITU
2012	48,366,179	170,123,740	28.4 %	IWS
2013	65,670,276	172,816,517	38 %	IWS
2014	75,746,751	177,475,986	42.7 %	IWS
2015	82,094,998	182,201,962	45.1 %	IWS

Source: Internet World Statistics & International Telecommunication Union (2015)

2.4 Empirical literature review

Akinyele and Mbanefo (2011) carried out a study on the role of e-business in optimizing performance in Nigerian banks. The research used a case study methodology to report the extent to which the customers of Oceanic bank really accept that Information and Communication Technology (ICT) has had a profound impact on the banking industry and the wider financial sector using Pearson's correlation. Among the major findings of the study is that e-business improves the efficiency and effectiveness of bank workers, it has a positive impact on the growth of banks, optimizes the performance of banks and improves customer patronage and satisfaction with banking activities in Nigeria.

Achimugu, Oluwagbemi and Oluwaranti (2010), in their study on the evaluation of the impact of ICT diffusion in Nigeria's higher educational institutions, found out that impacts of ICT diffusion in Nigeria's tertiary education include access to remote learning resources, reduced the barrier of distance in knowledge acquisition, improved library services and enabled the efficient institution of distance learning.

Anim, Akpan, Okon, Sunday and Eyo (2012) examined the status of ICT deployment in four Nigerian universities and results revealed that (i) the private university places greater emphasis on and has deployed ICTs more comprehensively than the public universities, (ii) private universities are likely to invest more in ICTs than public universities, (iii) the public universities tend to pay more attention to administration than teaching and learning in their deployment of ICTs, (iv) only the private university demands laptop ownership - by staff and students - as a prerequisite for adequate ICTs deployment in teaching and learning, and (v) distance learning is not yet considered as a serious option.

Amassoma and Ayanda (2013) conducted a study to investigate the impact of e-readiness on educational development among undergraduate students of selected private universities in Nigeria using a comparative analysis. The study employed both descriptive and parametric statistical analysis through the use of cross tabulation, bivariate analysis and chi square to establish relationships. The results revealed that not all the undergraduate students had easy access to computer and internet facilities as a result of infrastructural deficiencies prevalence in the universities under consideration, this describes a negative impact on educational development among the undergraduates

surveyed and Nigerian higher institution students at large. The study recommended that stake holders like; government, proprietors, and non-governmental organisations (NGO) should invest more on the provision of infrastructural facilities and capacities in order to create opportunity for educational development and enhance the e-readiness of the private universities at large for sustainable development in Nigeria. Wu, Mahajan, and Balasubramanian (2003), stated in their study that firms have adopted e-business initiatives to better manage their internal business processes as well as their interfaces with the environment across industries. In the study, a unified framework that captures the antecedents of e-business adoption, adoption intensity, and performance outcomes was proposed and empirically tested using data collected from senior managers in four technology-intensive industries. Applying a framework that captures the intensity of e-business adoption across four business process domains, the authors found that the antecedents and performance outcomes of e-business adoption are best studied in a process-specific context. They found that while the communication and internal administration aspects of e-business positively affect performance outcomes, the more high-profile activities related to online order taking and e-procurement do not.

Grounded in the technology-organisation-environment (TOE) framework, Zhu et. al. (2003) developed a research model for assessing the value of e-business at the firm level. Based on this framework, six hypotheses were formulated and six factors identified (technology readiness, firm size, global scope, financial resources, competition intensity, and regulatory environment) that may affect value creation of e-business. Survey data from 612 firms across 10 countries in the financial services industry were collected and used to test the theoretical model. To examine how e-business value is influenced by economic environments, two subsamples were compared from developed and developing countries. Based on structural equation modeling, the empirical analysis demonstrated several key findings:

1) Within the TOE framework, technology readiness emerges as the strongest factor for e-business value, while financial resources, global scope, and regulatory environment also significantly contribute to e-business value.
2) Firm size is negatively related to e-business value, suggesting that structural inertia associated with large firms tends to retard e-business value.

3) Competitive pressure often drives firms to adopt e-business, but e-business value is associated more with internal organisational resources (e.g., technological readiness) than with external pressure to adopt.
4) While financial resources are an important factor in developing countries, technological capabilities become far more important in developed countries. This suggests that as firms move into deeper stages of e-business transformation, the key determinant of e-business value shifts from monetary spending to higher dimensions of organisational capabilities.
5) Government regulation plays a much more important role in developing countries than in developed countries. These findings indicate the usefulness of the proposed research model and theoretical framework for studying e-business value.

Also, Fuchs et al. (2010) proposed an empirical approach that showed how infrastructural, organisational, and environmental factors are typically responsible for successful e-business adoption and use, and determine both e-business adoption and the impact of information and communication technologies. The research framework was based on E. Rogers' Innovation Diffusion Theory and was tested with survey data gathered in the Austrian destination management organisation sector. The approach spelt out how the use of e-business applications may positively affect the performance of tourism organisations. Online survey data were analyzed through a linear structural equation modeling approach.

Another study by Zhu and Kraemer (2005) developed an integrative research model for assessing the diffusion and consequence of e-business at the firm level focusing on post adoption stages, that is, actual usage and value creation. The model tried to link technological, organisational, and environmental factors to e-business use and value, based on which a series of hypotheses were developed. Structural equation model on a dataset of 624 firms across 10 countries in the retail industry was used to test the theoretical model. To probe deeper into whether e-business use and value are influenced by economic environments, two subsamples from developed and developing countries were compared. Findings revealed that technology competence, firm size, financial commitment, competitive pressure, and regulatory support are important antecedents of e-

business use. In addition, while both front-end and back-end capabilities contribute to e-business value, back-end integration has a much stronger impact. While front-end functionalities are becoming commodities, e-businesses are more differentiated by back-end integration. The study also added an international dimension to the innovation diffusion literature, showing that careful attention must be paid to the economic and regulatory factors that may affect technology diffusion across different countries.

2.5 Theoretical background and conceptual framework

2.5.1 Theoretical background

This research work is based on the TOE framework developed by Thornatzky and Fleischer in 1990, which identifies the features of technology, the organisational readiness of the firm, and the environmental conditions as key drivers of technology adoption. Technological context describes both the internal and external technologies relevant to the firm. This includes current practices and equipment internal to the firm, as well as the set of available technologies external to the firm. Organisational context refers to descriptive measures about the organisation such as scope, size, and managerial structure, while the environmental context is the arena in which a firm conducts its business - its industry, competitors, and dealings with the government (Tornatzky and Fleischer 1990). Subsequent studies (Kuan and Chau, 2001; Zhu et al., 2003; Zhu et al., 2004; Zhu and Kraemer, 2005; Srivastava and Teo, 2006) have extended the TOE framework to study technological innovations at both organisational and national levels. Figure 2.3 is the TOE framework as initially presented, and later adapted in IT adoption studies, it provides a useful analytical framework that is used for studying the adoption and assimilation of different types of IT innovation.

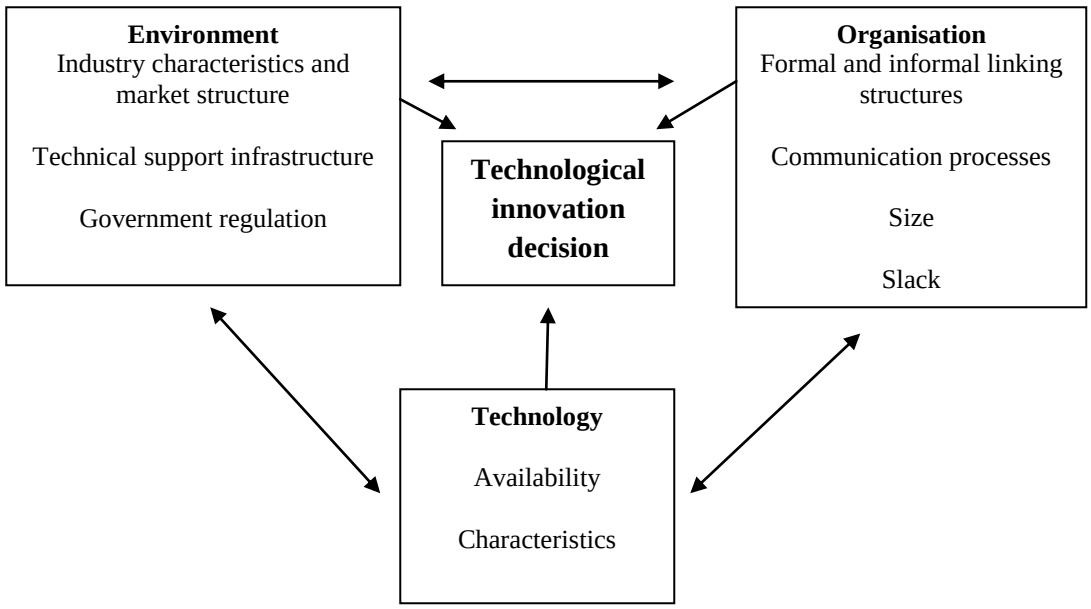

Fig. 2.3. Technology, Organisation and Environment framework (Tornatzky and Fleischer, 1990)

2.5.2 Conceptual framework

This study draws upon concept and relationships from the technology–organisation–environment (TOE) framework, for building its conceptual research model for assessing the relationships among organisational strategy and e-business strategy, readiness, intensity and impact in universities (Figure 2.4).

In the conceptual model, organisational strategy, which represents the vision, mission and goals/objectives of a university, is viewed as the aspect of a university's context that influences the process by which it adopts and implements technological innovations. E-business strategy i.e. the creation of enabling environment for and actual computerization of the internal and/or external activities of a university is viewed as the internal and external environmental determinants that can lead to e-business readiness, which describes the technology context of e-business adoption in the university. E-business intensity describes the effectiveness and efficiency with which the available technology context is actually harnessed and used to achieve e-business objectives and impact. Lastly, the value creation process induced by e-business applications (e-business impact), is defined as positive effects on both internal operations and external processes that can be measured based on the organisational strategic objectives that the universities aim to achieve. The conceptual framework guided the study’s methodology.

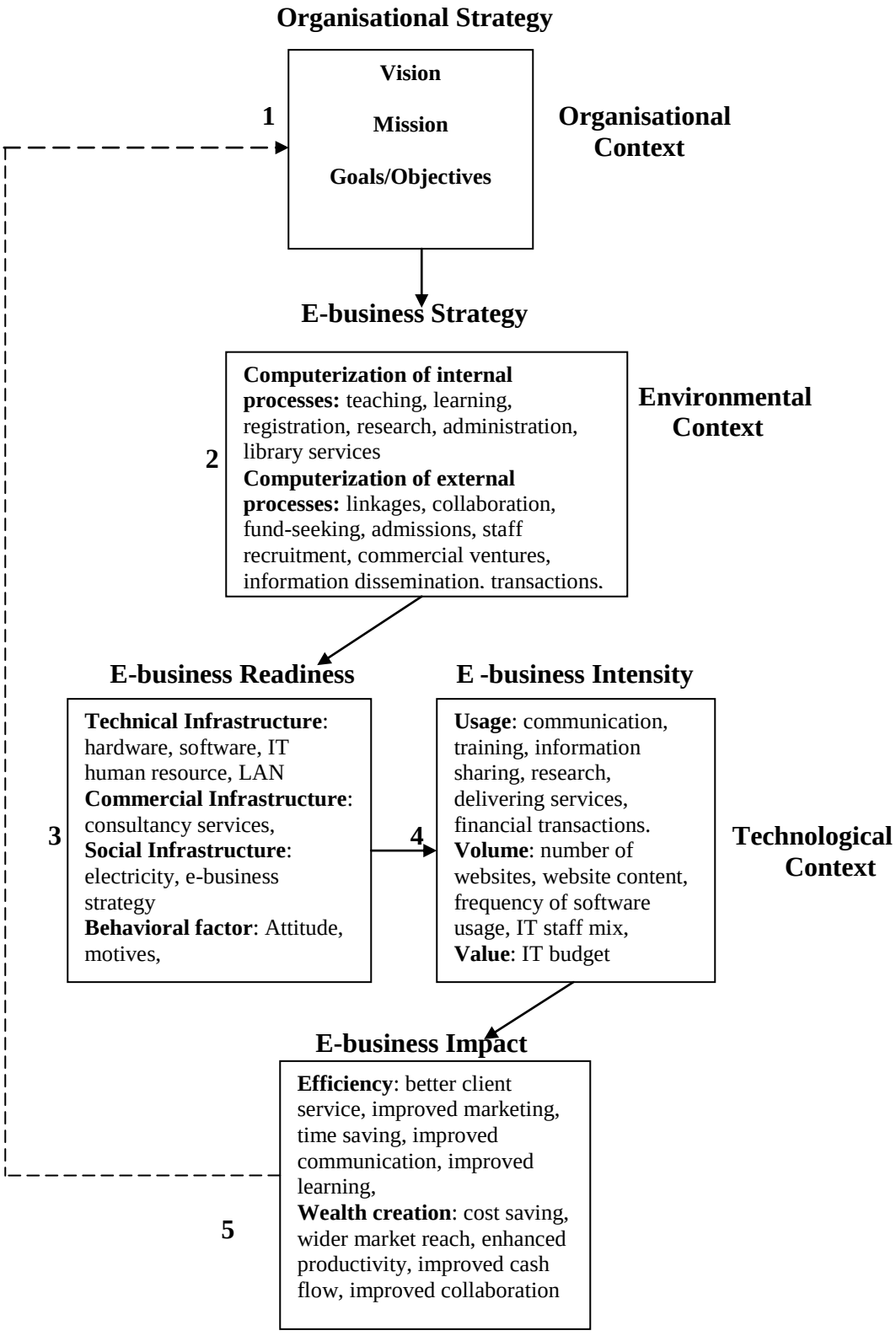

Fig. 2.4. Conceptual framework

Looking at Figure 2.4, box 1 (organisational strategy) is expected to influence box 2 (e-business strategy), then box 2 (e-business strategy) is expected to influence box 3 (e-business readiness), while box 4 (e-business intensity) is expected to influence box 5 (e-business impact) and lastly, box 5 (e-business impact) should be measured based on the organisational strategic objectives.

The organisational strategy has a direct relationship with e-business strategy since it is the e-business strategies that will be used to achieve some of the organisational strategic objectives.

Readiness indicators such as the technical and commercial infrastructures will depend on the availability of hardware, software and human resources which are e-business strategies. In the same vein, social infrastructure e.g. electricity will depend largely on e-business strategies like the provision of uninterrupted power supply. Furthermore, e-business strategies e.g. maintaining an updated, dynamic and interactive website with inputs from Faculties and increasing the University carrying capacity through Open and Distance Learning (ODL) or e-learning, can strengthen the e-business readiness and intensity of a university.

As well, e-business strategies like deploying appropriate and adequate ICT facilities, continuous update of the university ICT policy and enhancing staff and students' ICT capacity can determine the state of e-business readiness and can facilitate the actual usage and volume of e-business infrastructures which measures the intensity of e-business.

Lastly, relationships are anticipated between boxes 3, 4 and 5, and possibly between boxes 5 and 1. E-business readiness is expected to lead to e-business intensity and then to e-business impact, while e-business impact which can be measured in relation to the organisational strategic objectives set by universities. This is because the presence of technical, commercial and social infrastructures would result to the actual usage and increased volume of e-business technologies which, in turn, would, impact positively on efficiency, linkages, collaboration and student and staff satisfaction in a university.

2.6 Summary

This chapter carried out a review of research on e-business in Nigeria and globally to ascertain the current state of that research and indicate the gaps of knowledge yet to be

explored and addressed. Amidst the on-going discourse on e-business's potential, the diversity of research issues and theoretical frameworks employed give evidence of the efforts of Nigerian universities to circumvent the constraints in their context and exploit the potential of e-business. However, what tends to be lacking in research is, first, an empirical study to reveal the relationships or interdependencies among organisational strategy, e-business strategy, readiness, intensity and impact in Nigerian universities, and how they can more efficiently use their e-business resources to achieve greater return on investment on their e-business strategies, investment and resources. Literature on e-business potential and constraints in Nigerian universities has particularly focused on the use and impact of ICTs in general, as compared to the impact of actual e-business operations resulting from adoption and use.

The second gap focuses on the need to develop a theoretically grounded and practically-oriented understanding of how Nigerian universities can address or navigate around the institutional constraints and challenges in their contexts to achieve maximum e-business benefits.

The strengths of the literature reviewed is that it gives a holistic overview of how e-business impact can be realized when universities strategize for and invest adequately in appropriate e-business infrastructures, processes and human resources.

CHAPTER 3
METHODOLOGY

3.1 Introduction

This chapter discusses the details of the methodology that was used in the study. These are the research design, the study location and population, sampling technique and sample size, nature of the data collection instrument and their validation, the procedures for data collection and the statistical techniques used to analyze the data.

3.2 Research design

This study employed descriptive survey research design and adopted the triangulation method which requires the use of more than one approach to data collection, analysis and interpretation. Triangulation in the social sciences has come to mean applying more than one technique in carrying out a study and Aina (2002) is of the opinion that the idea of triangulation can be extended beyond its conventional association with research methods and designs, to the processes of data collection, number of investigators, the types of theories adopted, and also the methodology used in a particular study.

Triangulation with respect to this study involved the use of more than one research methods for the study of e-business readiness, intensity and impact in Nigerian universities. Data collected through the different methods served to validate one another. This was expected to enhance more confidence in the research findings. The methods used were: survey of University management; survey of ICT staff; survey of users of the e-business services; i.e. staff and students; and lastly evaluation of websites.

3.3 Location and study population

The population of the study comprised all the one hundred and twenty-eight (128) universities in Nigeria as at 2014. There are three categories of universities in Nigeria i.e. federal, state and private universities. Data was collected:

1. At the institutional level, from Principal Officers, Directors, Deans and Heads of department,
2. From staff of the institutions (both academic and non-academic),
3. From students of the institutions (both undergraduate and postgraduate) and
4. From the websites of the institutions.

3.3.1 Institutions

According to the National Universities Commission (NUC, 2014), there are a total of one hundred and twenty eight (128) universities in Nigeria, forty of which are federal universities, thirty-eight state universities and fifty private universities. These institutions are spread among the six geo-political zones in the country. Table 3.1 shows the distribution of universities under the six geo-political zones in Nigeria:

Table 3.1. Distribution of universities under the six geo-political zones

S/N	Geo-political Zones	Federal Universities	State Universities	Private Universities
1	North-East	7	5	2
2	North-West	8	6	1
3	North-Central	7	6	9
4	South-South	6	7	9
5	South-East	5	5	8
6	South-West	7	9	21
	TOTAL	**40**	**38**	**50**

Summarized from NUC website on 20/2/2014

3.3.2 Staff and students of Institutions

Both staff and students of higher institutions in Nigeria are users of the e-business services provided by their institutions and will be in a position to say the e-business infrastructures that are available, the actual usage of such infrastructures and what impact it has had on them as individuals. The academic staff, non-academic staff, undergraduate students and postgraduate students are the different categories of users of the e-business services offered by Nigerian universities.

3.3.3 Websites of institutions

All the higher institutions in Nigeria are expected to have a website, as having a website is a key factor in e-business. Two existing checklist were modified and used to evaluate the websites of the sampled universities on some aspects of e-business readiness and intensity.

3.4 Sampling technique and sample size

In this study, the sampling technique used was the stratified random sampling. Stratification was necessary to ensure that all the sub-populations were represented in the sample and to reduce bias as much as possible (Kothari, 2004). The type of university that is whether federal, state or private and the geo-political zones specifically north-east, north-west, north-central, south-south, south-east and south-west served as the strata. One each of federal, state and private universities was sampled from all the six geo-political zones of the county using. This translates to six federal universities, six state universities, and six private universities, making a total of eighteen institutions that were sampled as shown in table 3.2.

Stratified random sampling refers to a situation where populations are divided into subgroups based on particular characteristics. It is a basic method of survey research and its aim is to give respondents from different subgroups an equal chance of representation and an equal chance of being included in the sample. Each university was assigned a number from 1 to 40 for federal universities, 1 to 38 for state universities and 1 to 50 for private universities. The first two digits of the numbers listed on the chart (Rand corporation random number tables) were used since the population of each stratum is two

digits; a randomly picked point was used as the starting point. Because more than one type of university cannot be picked from a geo-political zone, when a number is picked and the political zone is already represented, then the next number was picked until all political zones were represented.

Table 3.2. Sample selection

S/No	Geo-political Zones	Sampled Federal University	Sampled State University	Sampled Private University
1	North-East	Abubakar Tafawa Balewa University, Bauchi	Bauchi State University	Kwararafa University, Wukari
2	North-West	Ahmadu Bello University, Zaria	Kaduna State University	Al-qalam University, Katsina
3	North-Central	University of Abuja	Kwara State University, Malete	African University of Science and Tech.
4	South-South	University of Benin	Delta State University	Benson Idahosa University
5	South-East	University of Nigeria	Abia State University	Paul University, Awka
6	South-West	University of Ibadan	Ladoke Akintola University of Technology	Fountain University Osogbo

The population of staff and students of the selected institutions was collected from the individual universities concerned. Table 3.3 reveals the total population of staff (both teaching and non-teaching) and students (both undergraduate and postgraduate) of the sampled universities.

Table 3.3. Population of sampled universities

S/No	Name of University	Teaching Staff	Non-Teaching Staff	Undergraduate Students	Postgraduate Students
1	Abubakar Tafawa Balewa University, Bauchi	781	1023	7,714	942
2	Ahmadu Bello University, Zaria	1,400	1,985	30,347	6,472
3	University of Abuja	714	2123	15,929	3,371
4	University of Benin	1418	4326	21,545	1,226
5	University of Nigeria	1089	4586	25,560	4,049
6	University of Ibadan	1,167	3,173	12,935	6111
7	Bauchi State University	241	98	663	N/A
8	Kaduna State University	469	804	4661	N/A
9	Kwara State University, Malete	308	408	4,022	N/A
10	Delta State University	813	2550	11,699	685
11	Abia State University	620	2150	10,608	
12	Ladoke Akintola University of Technology	830	1322	26,810	5000
13	Kwararafa University Wukari	75	90	1060	N/A
14	Al-qalam University, Katsina	80	62	1,329	N/A
15	African University of Science and Technology	45	85	N/A	100
16	Benson Idahosa University	175	200	1,823	N/A
17	Paul University, Awka	43	45	276	N/A
18	Fountain University Osogbo	47	30	758	N/A

Source: Records Unit of each University for 2013/2014 and 2014/2015 Session

For all sampled universities with large population, a total of 2% of the student population was used as the sample size; while 5% of the staff population was used since Alreck and Settle (1995) have disputed the logic that sample size is necessarily dependant on population size. Meanwhile, according to Gay and Diehl (1992), generally the number of respondents acceptable for a study depends on the type of research involved. For descriptive research, Gay and Diehl (1992) suggested that the sample should be 10% of population. But if the population is small then 20% may be required. Hence, for universities with low staff and student population (less than 500), 10% of the student population and 25% of the staff population were used as sample. This gives a total of 2241 staff and 4476 students as shown in table 3.4.

Table 3.4. Sample size

S/No	Name of University	Teaching Staff	Non-Teaching Staff	Undergraduate Students	Postgraduate Students
1	Abubakar Tafawa Balewa University, Bauchi	39	51	154	19
2	Ahmadu Bello University, Zaria	70	99	607	129
3	University of Abuja	36	106	319	67
4	University of Benin	71	216	431	25
5	University of Nigeria	54	229	511	81
6	University of Ibadan	58	159	259	122
7	Bauchi State University	60	25	66	0
8	Kaduna State University	47	80	93	0
9	Kwara State University, Molete	77	102	108	0
10	Delta State University	41	128	234	14
11	Abia State University	31	108	212	
12	Ladoke Akintola University of Technology	42	66	536	100
13	Kwararafa University, Wukari	19	23	106	0
14	Al-qalam University, Katsina	20	16	133	0
15	African University of Science and Technology	11	21	0	10
16	Benson Idahosa University	44	50	36	0
17	Paul University, Awka	11	11	28	0
18	Fountain University Osogbo	12	8	76	0

3.5 Data collection methods

The data collection methods used in this study were the questionnaire and website content analysis. A checklist was designed to gather data from the sampled Universities websites on some aspects of e-business readiness and intensity, while the questionnaire was used to gather data on all major variables i.e. strategy, readiness, intensity and impact.

3.5.1 Questionnaire

Five different questionnaires were designed, one for the management of the institutions, one for the IT staff, one for the teaching staff, another for the non-teaching staff and the last one for the postgraduate and undergraduate students of the universities.

(a) **Management questionnaire:** is divided into two parts. Part I contain questions on the demographic attributes of the institution. Part B is divided into four sections; section A focuses on organisational strategy (i.e. vision, mission and objectives/goals); section B is on the e-business strategies used to achieve the organisational strategy, section C focuses on the impact of e-business in terms of efficiency and effectiveness; while section D is on the major challenges faced by the sampled institutions in terms of e-business adoption.

(b) **IT Staff questionnaire:** is divided into two parts. Part I contain questions on the demographic attributes of the institution. Part B is divided into five sections; section A focuses on the e-business strategies used to achieve the organisational strategy of the university, section B focuses on the readiness for e-business in terms of technical infrastructures, commercial infrastructures, social infrastructures and behavioral factors; section C focuses on the intensity of e-business in relation to usage, volume and value; section D focuses on the impact of e-business in terms of efficiency and effectiveness; while section E is on the major challenges faced by the sampled institutions in terms of e-business adoption.

(c) **Teaching Staff questionnaire**: is also divided into two parts. Part I contain questions on the demographic attributes of the staff. Part B is divided into three sections: section A focuses on collecting data in respect of e-business services and infrastructure that are available to the staff of each institution; section B focuses on the impact of using e-business services provided by the institutions to the staff; while section C focuses on the

major challenges faced by the staff in the use the of e-business services offered by their institution.

(d) **Non-Teaching Staff questionnaire**: is also divided into two parts. Part I contain questions on the demographic attributes of the staff. Part B is divided into three sections: section A focuses on collecting data in respect of e-business services and infrastructure that are available to the staff of each institution; section B focuses on the impact of using e-business services provided by the institutions to the staff; while section C focuses on the major challenges faced by the staff in the use the of e-business services offered by their institution.

(e) **Student questionnaire:** is as well divided into two parts. Part I contain questions on the demographic attributes of the students. Part B is divided into three sections; section A focuses on collecting data concerning the e-business services and infrastructure that are available to the students of the concerned institution; section B focuses on the impact of using e-business services provided by the institutions to the students; while section C focuses on the major challenges faced by the student in the use the of e-business services offered by their institution.

Table 3.5 is a summary of the variables for this study, the instrument where they can be found and the type of data to be collected on them.

Table 3.5. Variables, instrument where found and type of data to be collected

Sub Variables		Instrument to be used to collect data	Type of data to be collected
	Vision	Questionnaire	Quantitative
Organisational	Mission	Questionnaire	Quantitative
Strategy	Objectives/goals	Questionnaire	Quantitative
E-business	Computerization of internal processes	Questionnaire and checklist	Quantitative
Strategy	Computerization of external processes	Questionnaire and checklist	
	Technical Infrastructure	Questionnaire	Quantitative
E-business	Commercial Infrastructure	Questionnaire	Quantitative
Readiness	Social Infrastructure	Questionnaire	Quantitative
	Behavioral factor	Questionnaire	Quantitative
	Usage	Questionnaire and Checklist	Quantitative
E-business	Volume	Questionnaire and Checklist	Quantitative
Intensity	Value	Questionnaire and Checklist	Quantitative
E-business	Efficiency	Questionnaire	Quantitative
Impact	Wealth creation	Questionnaire	Quantitative

3.5.2 Checklist

The checklist is a set of questions that was used for gathering data from the websites of the sampled institutions. The questions contained in the checklist focused on questions that addressed some of the readiness and intensity aspects of e-business (see appendix 6). Two existing checklists were used to generate the checklist for this research work, the "E-business Benchmarking Questionnaire Summary" by eBusiness Research Center (2002) and the checklist by Mustafa and Al-Zoua'bi (2008). Five assessors including the researcher evaluated the websites of the sampled institutions, and their ratings of features of each website were averaged.

3.6 Validation of the of research instruments

Reliability concerns the extent to which an experiment, test, or any measuring procedure yields the same results on repeated trials (Carmines and Zeller, 1979). In general, there are two ways to analyze reliability: replication or a retest method, and internal consistency (Carmines and Zeller, 1979; De Heus, Van der Leeden and Gazendam, 1995). In this study, data was collected at one point in time, thus ruling out the possibility of replication. However, when the different items of a scale intend to measure the same phenomenon, they can be regarded as repeated measurements. Although repeated measurements of the same phenomenon never precisely duplicate each other, they tend to be consistent from measurement to measurement (Carmines and Zeller, 1979). In that case, the popular Cronbach's alpha (a) can be used to measure internal consistency and estimate reliability (Carmines and Zeller, 1979). Internal consistency or a high degree of interrelatedness between scale items is a necessary but not sufficient condition for homogeneity. In other words, even if a scale has a high alpha, and hence free of error associated with the use of different items, it does not mean it has a straightforward or unambiguous interpretation (Cortina, 1993). In essence, alpha can be used as a confirmatory measure of uni-dimensionality or as a measure of the strength of a dimension once the existence of a single factor has been determined (Cortina, 1993). The value of Cronbach's alpha is usually judged by using a rule of thumb, as a rule, recommended critical values are 0.70 for Cronbach's alpha (Cortina, 1993). Others consider Cronbach's

alpha very good when greater than 0.80, acceptable when alpha is between 0.60 and 0.80 and unacceptable when below 0.60 (De Heus et al., 1995).

Validity on the other-hand concerns the crucial relationship between concept and indicator. Validity can be defined as the extent to which any measuring instrument measures what it is intended to measure (Carmines and Zeller, 1979). In other words, do the concept-as-measured represent the concept-as-intended? There are several types of validity that are considered relevant in the social sciences like external validity, content validity, construct validity, and internal validity (Yin, 1994). External validity refers to the generalisability of the research findings or the extent to which the conclusions are valid beyond the study in question. Content validity depends on the extent to which an empirical measurement reflects a specific domain of content (Carmines and Zeller, 1979). Construct validity is concerned with the extent to which a particular measure (concept-as-measured) relates to the theoretical construct i.e. concept-as-intended (Yin, 1994). And internal validity concerns the quality of the conclusion from the entire research design. Yin (1994) defines internal validity as 'establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationship'.

In addition, Suskie (1996) reports that validity is enhanced when the researcher takes certain precautionary steps: have people with diverse backgrounds and viewpoints review the survey before it is administered. This is to find out if:

1. each item is clear and easily understood
2. they interpret each item in the intended way
3. the items have an intuitive relationship to the study's topic and goals, and
4. the intent behind each item is clear to colleagues knowledgeable about the subject.

Also, Hutjes and Van Buuren (1996) proposed two tactics to enhance content validity (face value) and construct validity: peer debriefing and member check. Peer debriefing means asking fellow researchers and experts to check interpretations and tailor the questionnaire to the educational domain and e-business content.

In view of the above, the following were used to validate the instruments:

1. The questionnaire and the checklist were reviewed by the Supervisor of this research project to comment and make suggestions to further improve the quality of all instruments,

2. Some doctoral students in information science were asked to review the instrument and necessary modifications were made according to the comments collected,
3. A pretest of the questionnaire instruments and checklist was executed, and
4. Cronbach's Alpha statistics was used to measure the reliability of the instruments and the reliability statistics is presented in tables 3.6 to 3.8.

Table 3.6. Reliability results of the management questionnaire

Construct	No. of Items	Cronbach's Alpha
Organisational strategy	10	0.817
E-business Strategy	15	0.810
E-business Readiness	15	0.789
E-business Intensity	8	0.892
E-business Impact	13	0.679

Table 3.7. Reliability results of staff questionnaire

Construct	No. of Items	Cronbach's Alpha
E-business Activities	3	0.825
E-business Impact	8	0.767
E-business Challenges	8	0.812

Table 3.8. Reliability results of student questionnaire

Construct	No. of Items	Cronbach's Alpha
E-business Activities	3	0.836
E-business Impact	7	0.676
E-business Challenges	8	0.812

3.7 Administration of the research instrument

The researcher administered the questionnaires by visiting the sampled institutions along with at least one research assistant for private universities and five research assistants for federal and state universities. The checklist was used to gather specific data from the institutions' websites. Research assistants were engaged and trained for ease and consistency of the instrument administration processes. Data collection spanned through a period of thirteen months, beginning from June 2014 to June 2015. A lot of constraints surfaced during the data collection, particularly with respect to the attitude of some respondents. Some respondents were not receptive; some misplaced the instrument and had to be given another one, while a few wanted to be remunerated before filling the questionnaire. Another major constraint was the tediousness in the administration of the management questionnaire, the researcher and her assistants had to visit some members of the management quite a number of times before retrieving the questionnaire.

3.7.1 Management Questionnaire

The management questionnaire was administered to the principal officers, directors and deans of faculties of the sampled universities; an equal number of averaged responses from each university were used to represent the data collected for the different universities.

3.7.2 IT Staff Questionnaire

The questionnaire for the IT Staff was filled by the IT personnel of the sampled institutions. These included the Director of the ICT unit, web designers, programmers, system analyst, network administrators, database administrators, computer operators, etc.

3.7.3 Teaching Staff Questionnaire

This questionnaire is for teaching staff from the graduate assistant cadre to the professorial cadre.

3.7.4 Non-Teaching Staff Questionnaire

The questionnaire for the non-teaching staff is for both junior and senior staff of the sampled universities.

3.7.5 Student Questionnaire

The student questionnaire was administered to both undergraduate and postgraduate students of the sampled universities.

3.8 Method of Data Analysis

Data generated from this study was analyzed descriptively using simple frequency count and percentages to describe the general distribution and trends in the data. Other descriptive statistics methods were used as applicable such as mean. Test statistics like p-value or chi-square was used to decide whether or not to accept or reject the stated hypotheses and correlation was used to measure the relationship between variables. Finally, SmartPLS 3 software was used for the partial least square structural equation model.

Table 3.9. Summary of research questions, hypotheses, dependent and independent variables and statistical analysis to be used

		Dependent Variable(s)	Independent Variable(s)	Statistical Analysis
Research Questions	1. What are the organisational strategic objectives Nigerian universities are focusing upon?	Nil	Nil	Frequency counts
	2. What are the e-business strategies that Nigerian universities have been pursuing towards achieving their and strategic objectives?	Nil	Nil	Frequency counts
	3. Is the current level of e-business readiness in Nigerian universities adequate?	Nil	Nil	Frequency counts
	4. What is the e-business intensity level in the universities in terms of diversity, variety and scope of actual e-business operations?	Nil	Nil	Frequency counts
	5. What are the impacts of e-business activities in Nigerian universities in terms of measurable organisational strategy variables?	E-business Impact	E-business Readiness/Intensity	Frequency counts
	6. Are there any major differences in the behavior of the variables across type of universities and geo-political zone?			
	7. What are the challenges faced by Nigerian universities in the adoption of e-business?	Nil	Nil	Frequency counts
Hypotheses	1. There is no significant relationship between organisational strategy and e-business strategy.	E-business Strategy	Organisational Strategy	Pearson moment correlation/PLS-SEM
	2. There is no significant relationship between e-business strategy and e-business readiness.	E-business Readiness	E-business Strategy	Pearson moment correlation/PLS-SEM
	3. There is no significant relationship between e-business readiness and e-business intensity.	E-business Intensity	E-business Readiness	Pearson moment correlation/PLS-SEM
	4. There is no significant relationship between e-business Intensity and e-business Impact.	E-business Impact	E-business Intensity	Pearson moment correlation/PLS-SEM
	5. There is no significant relationship between e-business impact and organisational strategy/goals.	organisational strategy/goals	E-business Impact	Pearson moment correlation/PLS-SEM
	6. There is no significant structural equation model that predicts simultaneously the path relationships of organisational strategy with e-business strategy, e-business strategy with e-business readiness, e-business readiness with e-business intensity and e-business intensity with e-business impact.			

CHAPTER 4

RESULTS

4.1 Introduction

This chapter presents the results of the analyses of the data collected during the study. The chapter is organized into five main sections: The actual sample sizes achieved during the data collection are presented in the first section. Thereafter, section two presents the descriptive analyses of some key dependent and independent variables collected through the five questionnaires for university management, university teaching staff, university non-teaching staff, university students, and university IT staff. Section three presents the tests of hypothesis, while section four presents the estimated structural equation model to explain the interrelationships among the dependent, intervening and independent variables of the study.

The total number of copies of the student questionnaire administered was 3,909 on undergraduates and 567 on postgraduates, making a total of 4,476. A total of 743 copies of the questionnaire for teaching staff and 1,498 for the non-teaching staff were also administered. The fourth questionnaire designed for Management Staff in the universities (comprising Principal Officers, Deans and Heads of Department and Units was administered on 160 of them. Finally, five copies of the fifth questionnaire designed for IT staff was administered in each university, for a target total of 90. Table 4.1 reveals the percentage returns for the different instruments:

Table 4.1. Percentage Return

Questionnaire	Number Distributed	Number Returned	Percentage returned
Student Questionnaire (Administered on Undergraduates)	3909	2597	76%
Student Questionnaire (Administered on Postgraduates)	567	479	84%
Teaching Staff Questionnaire	743	638	86%
Non-teaching Staff Questionnaire	1498	1003	67%
Management Questionnaire	160	108	68%
IT Staff Questionnaire	90	82	91%

4.2 Characteristics of the respondents

The total number of student participants was 3,076 from eighteen universities sampled purposively across the country. These include undergraduate students and postgraduate students. Lecturers totaling 743 from different faculties constituted the actual sample size for teaching staff, while 1498 non-teaching staff from various units in all the sampled universities participated in the study. For the IT staff category, although at least five copies of the questionnaire were administered in each university for an expected total of 90, only 82 copies were returned and found usable for data analysis. Lastly, analysis of the data collected with the students' questionnaire revealed that more males participated in the study than females across all categories and there are more undergraduate students than postgraduate students in all the sampled universities. As expected, majority of the students are between the ages of 16 to 25, while more staff fell in the range of 30 to 40 as revealed in tables 4.2, 4.3 and 4.4 respectively. A few respondents did not indicate their sex and age.

Table 4.2. Demographic data of Students

Variable	Classification	Frequency	Percentage
Category	Undergraduate	2597	84.4
	Postgraduate	479	15.6
Gender	Male	1791	58.2
	Female	1271	41.3
	Missing	14	0.5
Age	16-25	2007	65.2
	26-35	943	30.7
	36-45	88	2.9
	46 and above	26	0.8
	Missing	12	0.4

Table 4.3. Demographic data of teaching staff

Variable	Classification	Frequency	Percentage
Gender	Male	423	66.3
	Female	197	30.9
	Missing	18	2.8
Age	21-30	100	15.7
	31-40	272	42.6
	41-50	185	29.0
	51 and above	68	10.7
	Missing	13	2.0

Table 4.4. Demographic data of non-teaching staff

Variable	Classification	Frequency	Percentage
Gender	Male	650	64.8
	Female	334	33.3
	Missing	19	1.9
Age	16-25	199	19.8
	26-35	453	45.2
	36-45	214	21.3
	46 and above	119	11.9
	Missing	18	1.8

Figures 4.1 to 4.3 are pie charts illustrating the percentages by category (undergraduate/postgraduate), gender and age of the students.

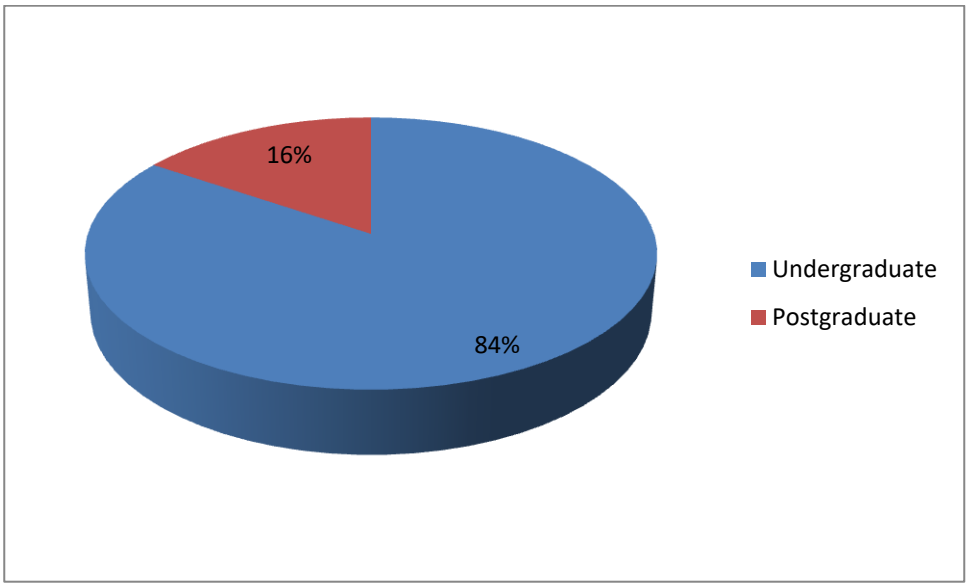

Figure 4.1. Students category

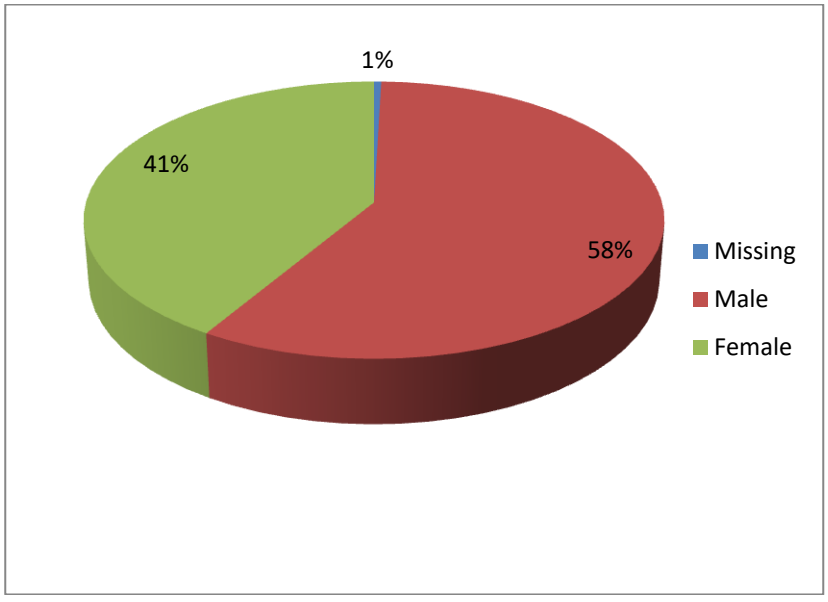

Figure 4.2. Gender distribution of students

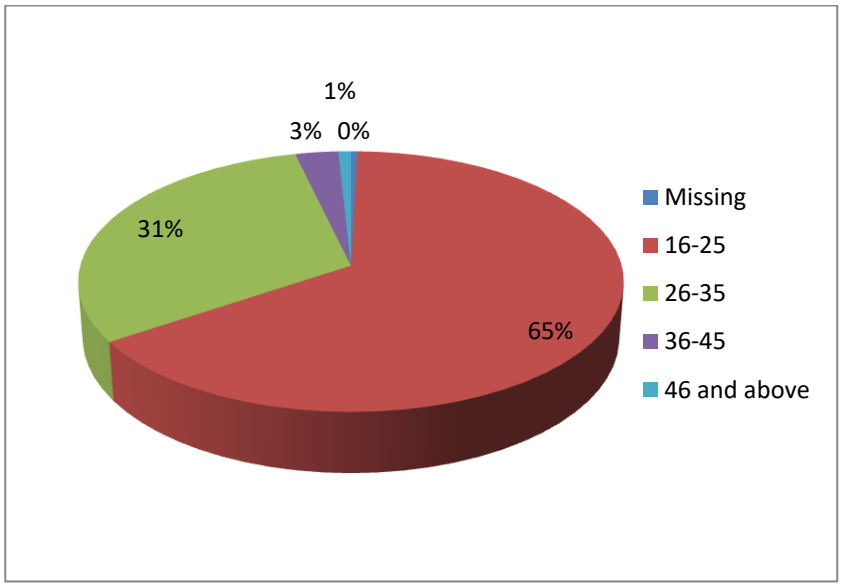

Figure 4.3. Age distribution of students

Figures 4.4 and 4.5 provide pie charts illustrating the percentages by gender and age of the teaching staff.

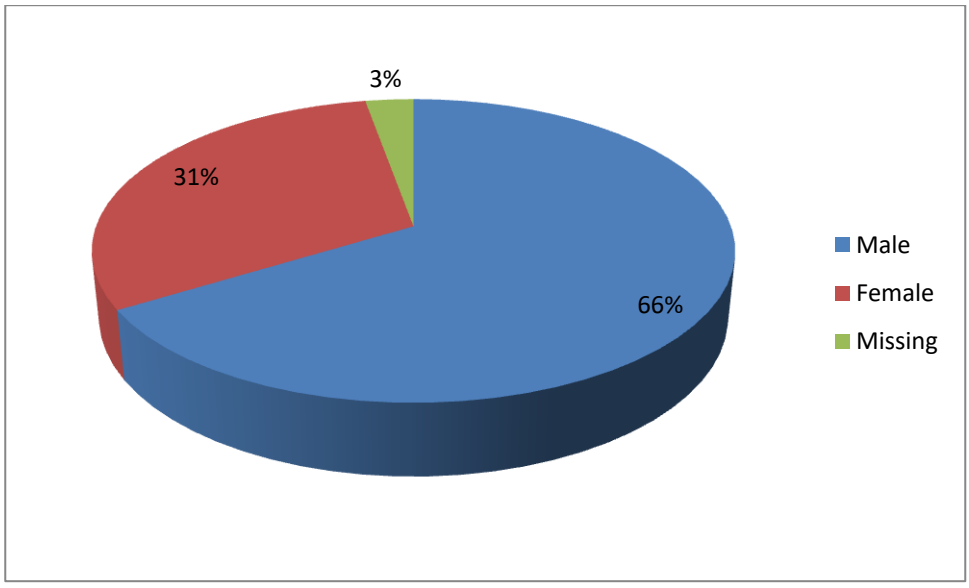

Figure 4.4. Gender distribution of teaching staff

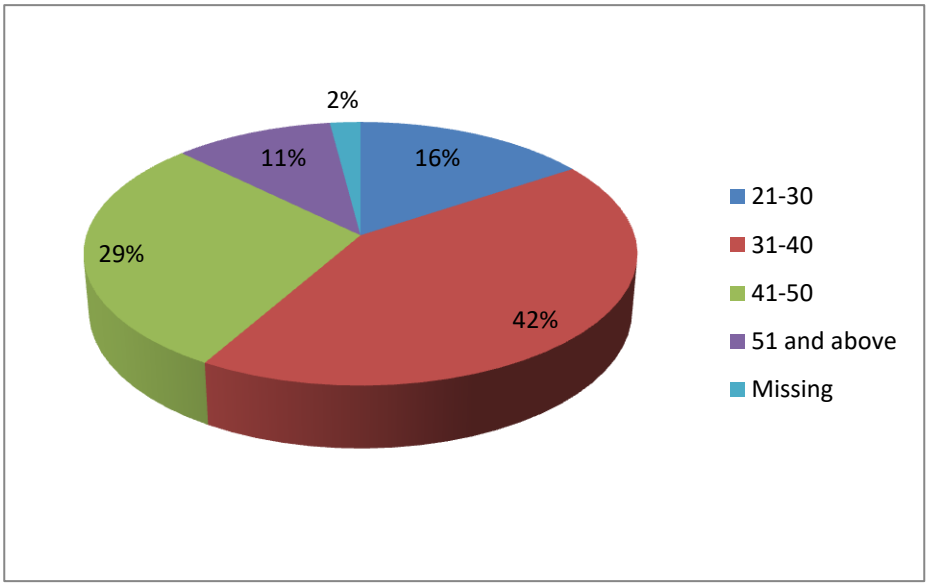

Figure 4.5. Age distribution of teaching staff

Figures 4.6 and 4.7 provide pie charts illustrating the percentages by gender and age of the non-teaching staff.

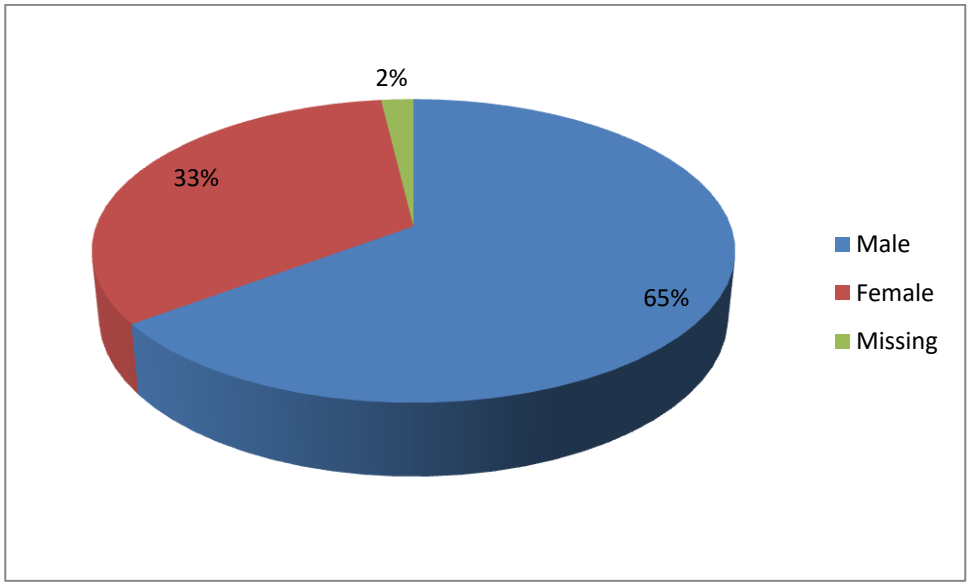

Figure 4.6. Gender distribution of non-teaching staff

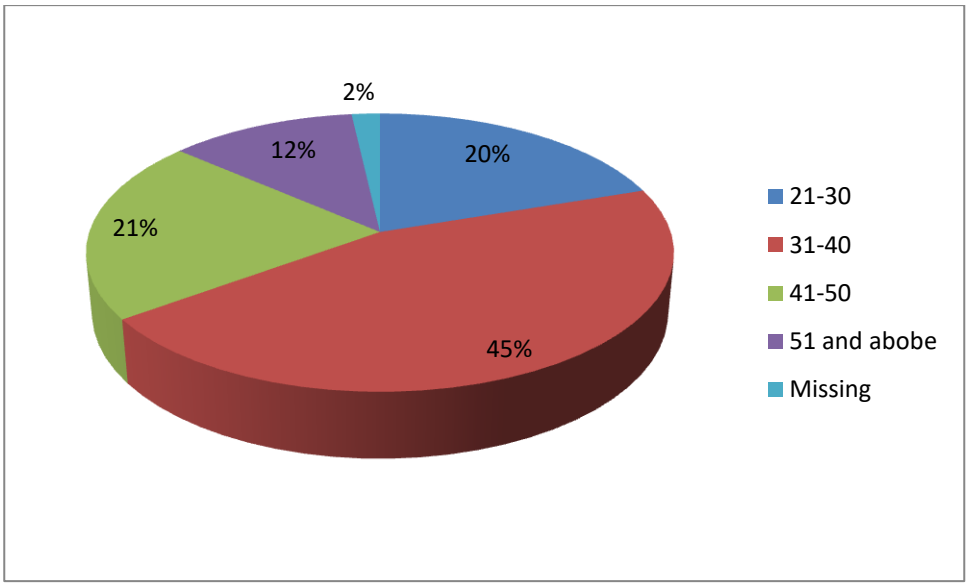

Figure 4.7. Age distribution of non-teaching staff

4.3 Research questions

4.3.1 Research question 1: What are the organisational strategic objectives that Nigerian universities are focusing upon?

The table 4.5 reveals the relative emphasis to which the sampled Nigerian universities are aiming to achieve the listed strategic objectives in the next five years. 44.4% place deploying ICT facilities to support activities and promoting scholarship and research very high and high. Other highly aimed strategic objectives that recorded one-third percent and more are promoting teaching and learning, increasing revenue generation, fostering linkages with local universities and firms to create value, promoting global best practices in its activities, internationalization of student intake, internationalization of academic staff and promoting service to the community. While fostering linkages with international universities and organisations to create value (27.8%) and promoting service to the community (27.8%) is given a low priority.

The last column of the table 4.5 shows the calculated means for each item from the 5-point Likert scale responses. The means show that goal A is emphasized most by the majority of the sampled universities (Mean = 4.11), followed by goals B (Mean = 4.00), C (Mean = 3.94) and D (Mean = 3.94), in that order. On the other hand, goals J (Mean = 3.50), K (Mean = 3.33) and L (Mean = 3.28) are the least emphasized by the sampled universities.

Table 4.5. Organisational strategy

	Organisational Strategy	Very Low Freq.(%)	Low Freq.(%)	Moderate Freq.(%)	High Freq.(%)	Very high Freq.(%)	Mean
A	Promote teaching and learning	-	1(5.6)	3(16.7)	7(38.9)	7(38.9)	4.11
B	Deploy ICT facilities to support activities	-	3(16.7)	2(11.1)	5(27.8)	8(44.4)	4.00
C	Increase revenue generation	-	2(11.1)	3(16.7)	7(38.9)	6(33.3)	3.94
D	Promote global best practices in its activities	-	2(11.1)	4(22.2)	5(27.8)	7(38.9)	3.94
E	Promote scholarship and research	-	2(11.1)	3(16.7)	8(44.4)	5(27.8)	3.89
F	Ensure stable academic calendar	-	1(5.6)	6(33.3)	5(27.8)	5(27.8)	3.78
G	Foster linkages with international universities and organisations to create value	-	5(27.8)	2(11.1)	6(33.3)	5(27.8)	3.61
H	Internationalize its programmes	-	1(5.6)	6(33.3)	10(55.6)	1(5.6)	3.61
I	Foster linkages with local universities and firms to create value	1(5.6)	1(5.6)	6(33.3)	7(38.9)	3(16.7)	3.56
J	Promote service to the community	-	5(27.8)	3(16.7)	6(33.3)	4(22.2)	3.50
K	Internationalize its academic staff	-	4(22.2)	5(27.8)	7(38.9)	2(11.1)	3.33
L	Internationalize its student intake	1(5.6)	1(5.6)	9(50.0)	6(33.3)	1(5.6)	3.28

N= 18 universities

Source: Authors' field data collection 2014-2015

4.3.2 Research question 2: What are the e-business strategies that Nigerian universities have been pursuing towards achieving their strategic objectives?

Table 4.6 clearly indicates the e-business strategies Nigerian universities are employing to achieve their organisational strategic objectives. Half (50%) of the sampled universities don't enhance students ICT skills though special workshops and 33.3% are not employing improvement of power supply towards 24/7 availability and improvement of bandwidth for Internet-based communication as their e-business strategy. All other e-business strategies in the table are utilized by more than half of the universities to achieve their organisational strategic objectives.

Table 4.6. E-business strategy

S/No.	Strategy Area	Specific Strategy Variable	Yes	No
1	External Linkage	Increase the University carrying capacity through Open and Distance Learning (ODL)/e-learning	8(44.4)	10(55.6)
2	Skill Development	Enhance students ICT skills though special workshops	9(50.0)	9(50.0)
3	External Linkage	Maintain an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units	12(66.7)	6(33.3)
4	General	Improvement of power supply towards 24/7 availability	12(66.7)	6(33.3)
5	General	Improvement of bandwidth for Internet-based communication	12(66.7)	6(33.3)
6	Skill Development	Enhance staff ICT skills through special workshops	13(72.2)	5(27.8)
7	External Linkage	Signing Memoranda of Understanding with foreign universities on ICT-related activities	13(72.2)	5(27.8)
8	ICT deployment	Deploying hardware/software for library services	14(77.8)	4(22.2)
9	Skill Development	Strengthen the ICT management unit through staff training	14(77.8)	4(22.2)
10	Policy	Restructuring of academic programmes to integrate ICT teaching and learning tools	14(77.8)	4(22.2)
11	External Linkage	Signing Memoranda of Understanding with local firms on ICT-related activities	14(77.8)	4(22.2)
12	ICT deployment	Deploying ICT hardware/software for teaching	15(83.3)	1(5.1)
13	ICT deployment	Deploying ICT hardware/software for learning	15(83.3)	3(16.7)
14	Policy	Regular update of the university ICT policy	15(83.3)	3(16.7)
15	ICT deployment	Deploying hardware/software for administration	16(88.9)	2(11.1)
16	ICT deployment	Deploying hardware/software for accounts/finance	16(88.9)	2(11.1)
17	Policy	Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by staff	16(88.9)	2(11.1)
18	Skill Development	Strengthen the ICT management unit through staff recruitment	17(94.4)	1(5.1)
19	ICT deployment	Deploying specialized software to support research in various disciplines	16(88.9)	1(5.1)
20	Skill Development	Strengthening the ICT management unit through provision of hardware/software tools	15(83.3)	3(16.7)
21	Policy	Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by students	15(83.3)	3(16.7)

N= 18 universities

Source: Authors' field data collection 2014-2015

4.3.3 Research Question 3: Is the current level of e-business readiness in Nigerian universities adequate?

Table 4.7 shows the e-business readiness of the sampled universities. Results indicates that even though the management of Nigerian universities are highly favorably disposed to e-business operations, engages in adequate capacity building to improve the skills of its IT personnel and are already using one or more electronic payment systems, they don't commit adequate financial resources to e-business development.

Furthermore, the mean value reveals that the top most e-business readiness variable is the availability of IT consultancy service unit (Mean= 4.0), while the least e-business readiness variables are availability of documented IT policy that can supports e-business effectively and the search for new e-business strategies in order to lead competition with a mean of 3.00 each.

Table 4.7. E-business Readiness

S/No.	E-business Readiness	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean
		Freq.(%)	Freq.(%)	Freq.(%)	Freq.(%)	Freq.(%)	
A	This university has an IT consultancy service unit	-	3(16.7)		9(50.0)	6(33.3)	4.00
B	The management of this University is highly favorably disposed to e-business operations	-	2(11.1)	4(22.2)	7(38.9)	5(27.8)	3.83
C	This University is already using one or more electronic payment systems	2(11.1)	2(11.1)	1(5.6)	8(44.4)	5(27.8)	3.67
D	This university engages in adequate capacity building to improve the skills of its IT personnel?		5(27.8)	1(5.6)	10(55.6)	2(11.1)	3.50
E	There are adequate human resources with appropriate IT skills to drive e-business in this university	1(5.6)	2(11.1)	3(16.7)	12(66.7)	-	3.44
F	The type of management culture in this university promotes e-business adoption	2(11.1)	2(11.1)	4(22.2)	7(38.9)	3(16.7)	3.39
G	There is adequate hardware to support e-business in this university	2(11.1)	3(16.7)	2(11.1)	9(50.0)	2(11.1)	3.33
H	The management of this University commits adequate financial resources to e-business development	1(5.6)	6(33.3)	3(16.7)	5(27.8)	3(16.7)	3.17
I	This university is already operating an e-commerce system for some of its services	2(11.1)	7(38.9)	1(5.6)	4(22.2)	4(22.2)	3.06
J	There is adequate software to support e-business in this university	2(11.1)	5(27.8)	1(5.6)	8(44.4)	1(5.6)	3.06
K	This University has a documented IT policy that can supports e-business effectively	1(5.6)	5(27.8)	5(27.8)	7(38.9)	-	3.00
L	This university continually searches for	2(11.1)	4(22.2)	5(27.8)	6(33.3)	1(5.6)	3.00

	new e-business strategies in order to lead the competition						
M	This university tries to implement its e-business strategies only when competitors do so	2(11.1)	10(55.6)	2(11.1)	4(22.2)	-	2.44

N= 18 universities
Source: Authors' field data collection 2014-2015

Table 4.8 reveals that all the sampled universities have a student database (100.0%) and other e-business infrastructures in place that topped the list are Internet connectivity (94.4%), Management Information System (88.9%), staff database (88.9%), LAN/Intranet (83.3%) and Groupware tools (83.3%). The e-business infrastructures not in place that recorded a high percentage are Customer Relationship Management System (61.1%) and Enterprise Resource Planning (ERP) system (50.0%).

Table 4.8. Available e-business infrastructures

E-business Infrastructures	Yes		No		Don't know	
	Freq.	%	Freq.	%	Freq.	%
Internet connectivity	17	94.4	1	5.6		
LAN/Intranets	15	83.3	3	16.7		
Extranets	6	33.3	8	44.4	4	22.2
Campus fiber optics backbone	11	61.1	6	33.3	1	5.6
E-commerce software e.g. etranzact	8	44.4	7	38.9	3	16.7
Enterprise Resource Planning (ERP) system	3	16.7	9	50.0	6	33.3
Electronic Accounting System	7	38.9	7	38.9	4	22.2
Content management system (CMS)	8	44.4	6	33.3	4	22.2
Customer Relationship Management System (CRM)	2	11.1	11	61.1	5	27.8
Management Information System	16	88.9	1	5.6	1	5.6
Decision Support System	7	38.9	8	44.4	3	16.7
Video Conferencing System	12	66.7	6	33.3		
Groupware tools	15	83.3	3	16.7		
Student database	18	100.0				
Staff Database	16	88.9	2	11.1		
Asset database	10	55.6	7	38.9	1	5.6
Finance database	11	61.1	3	16.7	4	22.2
Alumni database	11	61.1	7	38.9		

N= 18 universities

Source: Authors' field data collection 2014-2015

Table 4.9 reveals the type of content management system used by the sampled Nigerian universities and the result shows that Joomla is the most popular content management system in use.

Table 4.9. List of content management system

S/No.	Name of CMS	Frequency
1	Drupal	1
2	Joomla	4
3	Wordpress	3

N: 18 universities
Source: Authors' field data collection

Table 4.10 clearly indicates that Nigerian universities recognize the strategic importance of websites and that is why 94.4% of the websites evaluated were fully functional with only 5.6% website not functional. Exactly two third (66.7%) of the website loads quickly with a standard dial-up modem and more than half (61.1%) of the universities have webmail. The table further reveals that only one (5.6%) university has a courseware link on its website, meaning that Nigerian universities have not realized the value of courseware for teaching and learning or don't deem it fit to upload on their websites. Other important items that are yet to gain popularity on the websites of Nigerian universities are online ordering of transcripts, availability of site map, the support of secure credit card transactions and subscription of any kind with respect to the university. While other items that recorded a high percentage include: contact us information, availability of search engine, detailed information on courses/programmes offered by the university and links to other sites from the university's website.

Table 4.10. Website checklist

	Yes		No	
	Freq.	%	Freq.	%
Is the university website fully functional?	17	94.4	1	5.6
Does the site load quickly and completely with a standard dial-up modem?	12	66.7	6	33.3
Does the university have a webmail?	11	61.1	7	38.9
Is there a courseware link on the university's website?	1	5.6	17	94.4
Can students apply for their transcripts online?	2	11.1	16	88.9
Does the university have a student portal?	10	55.6	8	44.4
Is there a way of contacting the university from the website?	15	83.3	3	16.7
Does the web site contain a search engine?	13	72.2	5	27.8
Is online application and registration available on the university's website?	11	61.1	7	38.9
Is there a site map on the website?	4	22.2	14	72.8
Is there detailed information on courses/programmes offered by the university on the university's website?	13	72.2	5	27.8
Are there links to other sites from the university's website?	14	77.8	4	22.2
Can subscription of any kind with respect to the university be made through the web site?	2	11.1	16	88.8
Does the site support secure credit card transactions?	3	16.7	15	83.3
Is there access to the university's publication on their website?	10	55.6	8	44.4

N= 18 universities

Source: Authors' field data collection 2014-2015

According to Webometrics (2015), “in the second decade of the 21st century, the Web is key for the future of all the university missions, as it is already the most important scholarly communication tool, the future channel for the off-campus distance learning, the open forum for the community engagement and the universal showcase for attracting talent, funding and resources.” The original aim of ranking bodies is to promote academic web presence, supporting the open access initiatives for increasing significantly the transfer of scientific and cultural knowledge generated by the universities to the whole Society. Although there are several ranking bodies of universities which include: Academic Ranking of World Universities, THE World University Rankings, QS World University Rankings, Ranking Web of Universities and 4ICU University Web Ranking, Ranking Web of Universities (Webometrics) was used in this study because it is the largest global ranking since 2004, it publish only a unique ranking of universities in every edition and the ranking is built from publicly available web data, combining the variables into a composite indicator, and with a true global coverage. Table 4.11 is the web ranking figure of sampled universities for the year 2015.

Information on the web ranking figure of the sampled universities for the year 2015 revealed that none of the sampled universities ranked among the top 100 among African universities in any of the categories. In the world ranking of over 20,000 universities, only Ahmadu Bello University ranked in the first 3000 and two universities ranked in the first 4000, University of Nigeria and University of Benin. Under the Presence Rank category, only university of Ibadan and Ahmadu Bello University ranked in the first 3000 and 4000 respectively. No university in the sample ranked among the first 6000 in the Impact Rank category. Under the Openness Rank category, two universities i.e. University of Ibadan and University of Benin ranked among the first 6000. In the last category tagged Excellence Rank, only University of Ibadan and University of Nigeria ranked among the first 2000 and 3000 respectively.

Table 4.11. Webometrics ranking of sampled universities

S/No	Name of University	World Rank	Africa			
			Presence Rank	Impact Rank	Openness Rank	Excellence Rank
1	Abubakar Tafawa Balewa University, Bauchi	16293	23187	13828	19804	4898
2	Ahmadu Bello University, Zaria	2999	3555	19467	14083	5490
3	University of Abuja	16418	11745	16479	21671	4898
4	University of Benin	3674	5343	7367	5942	3140
5	University of Nigeria	3367	8281	6853	6713	2692
6	University of Ibadan	15120	2714	9999	5226	1706
7	Bauchi State University	16305	10725	16917	16169	5490
8	Kaduna State University	15241	15463	13710	18364	5490
9	Kwara State University, Malete	12709	12269	12423	12282	5490
10	Delta State University	14590	19565	14964	21671	4120
11	Abia State University	16131	22796	17518	21671	3656
12	Ladoke Akintola University of Technology	6337	10454	11022	14369	3252
13	Kwararafa University Wukari	22507	20848	22211	21671	5490
14	Al-qalam University, Katsina	22638	21880	22666	16376	5490
15	African University of Science and Technology	10920	6414	15380	13123	4318
16	Benson Idahosa University	17721	18761	16958	17779	5490
17	Paul University, Awka	13293	17194	8792	21671	5490
18	Fountain University Osogbo	15973	14899	16432	13312	5490

N: 18 universities

Source: Webometrics 2015

The e-services provided to academic staff that ranked high among other are online staff information system or portal (80.3%), email address, box and webmail services (75.7%), online uploading of result (72.3%) and e-library services (68.9%) as revealed in table 4.12. While those that recorded a high percentage among services not available include online training/tutorial of staff (84.5%), facilities for online collaboration with other researchers outside the country (67.1%), online chat with other staff (65.2%), facilities for online collaboration with other researchers in the country (60.3%).

Table 4.12. E-services provided to teaching staff

E-services	Yes		No		Don't know	
	Freq.	%	Freq.	%	Freq.	%
Online staff information system or portal	512	80.3	125	19.6	1	0.2
Online uploading of result	438	68.7	197	30.9	2	0.3
Email address, box and webmail services	483	75.7	154	24.1	1	0.2
Online training/tutorial of staff	98	15.4	539	84.5	1	0.2
E-library services	461	72.3	176	27.6	1	0.2
Links to social network from university website e.g. Face book	366	57.4	270	42.3	2	0.2
Online chat with other staff	218	34.2	416	65.2	4	0.6
Online access to university's publications	331	51.9	304	47.6	3	0.5
Online access to databases or subscription journals	372	58.3	263	41.2	3	0.5
Online repository for research and publications of academic staff	288	45.1	347	54.4	3	0.5
Regular online communication of new research grant opportunities to academic staff	308	48.3	327	51.3	3	0.5
Facilities for online collaboration with other researchers in the country	250	39.2	385	60.3	3	0.5
Facilities for online collaboration with other researchers outside the country	207	32.4	428	67.1	3	0.5
Online distribution of the university bulletin/newsletter	365	57.2	272	42.6	1	0.2

N: 638 Teaching staff
Source: Authors' field data collection 2014-2015

Email services and online staff information system topped the list in the e-services provided by the sampled Nigerian universities to their non-teaching staff with 75.4% and 76.8% respectively as shown in table 4.13. While the least provided e-services is online training of staff with 24.4%.

Table 4.13. E-services provided to non-teaching staff

E-services	Yes		No		Don't know	
	Freq.	%	Freq.	%	Freq.	%
Online staff information system or portal	770	76.8	233	23.2	-	-
Email services	756	75.4	247	24.6	-	-
Online training of staff	245	24.4	758	75.6	-	-
E-library services	669	66.7	333	33.2	1	0.1
Links to social network from university website e.g. Face book	584	58.2	419	41.8	-	-
Online chat with other staff	350	34.9	653	65.1	-	-
Online access to university's publication	551	54.9	452	45.1	-	-
Online version of university bulletin/newsletter	644	64.2	359	35.8	-	-

N: 1003 Non-teaching staff
Source: Authors' field data collection 2014-2015

In table 4.14, the e-services that recorded a very high percentage for students are online student information portal and online registration. Other e-services that had a percentage of between 50 and 69 include student email box, online result checking, online payment, e-library services, links to social network and university's page on social media. Those e-services that recorded below 50% are online ordering of transcripts, online access to university's publication, online booking of accommodation, e-learning e.g. courseware and online chat with officers of the university.

Table 4.14. E-services provided to students

E-services	Yes		No		Don't know	
	Freq.	%	Freq.	%	Freq.	%
Student email box and webmail	1583	51.5	1484	48.2	9	0.3
Online student information portal	2599	84.5	471	15.3	6	0.2
Online registration	2757	89.6	314	10.2	5	0.2
Online result checking	1666	54.2	1401	45.5	9	0.3
Online payment of fees, levies, charges etc.	2123	69.0	948	30.8	5	0.2
Online ordering of transcripts	891	29.0	2176	70.7	9	0.3
Online access to university's publication	1529	49.7	1535	49.9	12	0.4
Online booking of accommodation	1236	40.2	1832	59.6	8	0.3
E-learning e.g. courseware,	1310	42.6	1754	57.1	9	0.3
E-library services/OPAC	1634	53.1	1434	46.6	8	0.3
Links to social network from university website e.g. Face book	1787	58.1	1275	41.4	14	0.5
University's page on Face book/YouTube/Twitter	1846	60.0	1219	39.6	11	0.4
Online chat with Officers of the university	589	19.1	2458	79.9	29	0.9

N: 2597 students
Source: Authors' field data collection 2014-2015

With regards to how teaching staff are allowed to access the Internet provided by their university, table 4.15 shows that wireless connection in the faculty/dept/library topped the list with 70.2%, followed by the use of laptop/notebook/Smartphone to connect with a password.

Table 4.15. Teaching staff access to the Internet

Ways staff are allowed to access the Internet facility provided by the University	Yes		No		Don't know	
	Freq.	%	Freq.	%	Freq.	%
Computers in the laboratory	140	21.9	498	78.1	-	-
Computers in the laboratory in my faculty/department	188	29.5	450	70.5	-	-
Using my laptop/notebook/Smartphone to connect with a password	402	63.0	234	36.7	2	0.3
Physical connection in the lab in faculty/dept/library	231	36.2	407	63.8	-	-
Wireless connection in faculty/dept/library	448	70.2	190	29.8	-	-

N: 638 Teaching staff
Source: Authors' field data collection 2014-2015

Like the teaching staff, table 4.16 shows that the non teaching staff also majorly access the Internet through using their laptop/notebook/Smartphone to connect with a password (69.9%) and through wireless connection in faculty/dept/library (59.9%).

Table 4.16. Non-teaching staff access to the Internet

Ways staff are allowed to access the Internet facility provided by the University	Yes		No	
	Freq.	%	Freq.	%
Computers in the laboratory	251	25.0	752	75.0
Computers in the laboratory in my faculty/department	236	23.5	767	76.5
Using my laptop/notebook/Smartphone to connect with a password	701	69.9	302	30.1
Physical connection in the lab in faculty/dept/library	190	18.9	813	81.1
Wireless connection in faculty/dept/library	601	59.9	402	40.1

N: 1003 Non-teaching staff

Source: Authors' field data collection 2014-2015

Table 4.17 reveals that the most common way students are allowed Internet access provided by their university is using personal laptops/notebook/Smartphone to connect with a password (64.8%). This was followed by the use of wireless connection in the faculty, department or library (53.2%).

Table 4.17. Students Access to Internet

Ways students are allowed to access the Internet facility provided by their University	Yes		No		Don't know	
	Freq.	%	Freq.	%	Freq.	%
Computers in the laboratory	820	26.7	2230	72.5	26	0.8
Computers in the laboratory in my faculty/department	652	21.2	2390	78.0	26	0.8
Using my laptop/notebook/Smartphone to connect with a password	1993	64.8	1057	34.4	26	0.8
Physical connection in the lab in faculty/dept/library	583	19.0	2467	80.2	26	0.8
Wireless connection in faculty/dept/library	1636	53.2	1413	45.9	27	0.8

N: 2597 students
Source: Authors' field data collection 2014-2015

4.3.4 Research question 4: What is the e-business intensity level in the universities in terms of diversity, variety and scope of actual e-business operations?

In table 4.18, all the sampled universities provide information and disseminate it online and also provide information about their university (100.0%). The next e-business activities that topped the list are advertising of programmes, services and products (94.4%) and email communication within the university (77.8%). On the other hand, 83.3% don't engage in e-commerce i.e. trading of goods and services, 72.2% are not into web-based business-to-business (B2B) transactions, and 77.8% don't use online collaboration tools (groups, wikis, social networks, etc) with industrial firms for R and D purposes.

Table 4.18. E-business activities

E-business Activities	Yes		No	
	Freq.	%	Freq.	%
Information provision or dissemination	18	100.0		
Advertising of programmes, services and products	17	94.4	1	5.6
Public and Customer Relations	9	50.0	9	50.0
Information about the university	18	100.0		
Administrative services	12	66.7	6	33.3
Web-based business-to-business (B2B) transactions	5	27.8	13	72.2
Web-based business-to-consumer (B2C) transactions	10	55.6	8	44.4
Institutional repository for research and publications by Academics	8	44.4	10	55.6
Trading of goods or services	2	11.1	15	83.3
Email communication between departments	10	55.6	8	44.4
Email communication within the university	14	77.8	4	22.2
Education and training (eLearning/online course delivery	7	38.9	11	61.1
Electronic/Virtual library services	11	61.1	7	38.9
Use of online collaboration tools (groups, wikis, social networks, etc) among staff	8	44.4	10	55.6
Use of online collaboration tools (groups, wikis, social networks, etc) with Industrial firms for R and D purposes	4	22.2	14	77.8

N: 18 universities
Source: Authors' field data collection 2014-2015

Furthermore, data collected under e-business intensity revealed that the total number of computers in the sampled universities ranged from 200 to 3000, the total bandwidth (UP) ranged from 4 to 300 and DOWN was 4 to 230. The estimated weekly band width usage (UP) was 3 to 200 and DOWN was 3 to 170. The least average number of daily connections to the web server was 20 and the highest was 7000. The university that had the least webmail interface/clients had 2 and the highest was 10. The least average number of daily log-ins to the e-mail server was 5 and the highest was 7500. The least average number of daily log-ins to the database server was 20 and the highest was 20,000. The total number of monthly transactions using electronic payment system ranged from 0 to 6500 and the percentage of all offices connected to the Internet ranged from 40% to 100%. The usage of video conferencing facilities by the sampled universities in the last one year was 0 to 10 times.

Other ways by which the frequency and usage of ICT facilities is determined include: using the network monitoring tools in Microtik router, system logs and specialized tools for data centre monitoring. The strength of IT personnel in the sampled universities is as follows:

Web Designers/Administrators: 0 to 7

System Administrator/Analyst: 0 to 40

Computer Technician/Engineer: 0 to 20

Database Administrator: 0 to 8

Software Engineer/Programmers: 0 to 8

In table 4.19, it is evident that email is not the major mode of communication between management and staff in Nigerian universities.

Table 4.19. Use of email for communication

Is email the major mode of communication between management and staff?		
	Frequency	Percent
Yes	8	44.4
No	10	55.6
Total	18	100.0

N: 18 universities

Source: Authors' field data collection, 2014-2015

From table 4.20, subscription to online databases or journals is quite high with a total of 14 (77.8%) having subscribed to online databases.

Table 4.20. Subscription to online databases

Has your university subscribed to online databases or journals?		
	Frequency	Percent
Yes	14	77.8
No	4	22.2
Total	18	100.0

N: 18 universities
Source: Authors' field data collection, 2014-2015

Table 4.21 shows that Ebscohost, HINARI and AGORA are relatively popular databases among the sampled Nigerian universities.

Table 4.21. Subscription to databases

S/No.	Name of Database	Frequency
1	Ebscohost	4
2	AGORA	2
3	HINARI	3
4	E-GRANARY	1
5	TEEAL	1
6	OARE	1
7	AJOL	1
8	NUC Virtual Library	1
9	JSTOR	1
10	Proquest	1

N: 18 universities
Source: Authors' field data collection, 2014-2015

The conduct of computer based tests/examination is averagely implemented in Nigerian universities as shown in table 4.22.

Table 4.22. Conduct of CBT

Does your university conduct computer based tests/examination?		
	Frequency	Percent
Yes	9	50.0
No	9	50.0
Total	18	100.0

N: 18 universities
Source: Authors' field data collection, 2014-2015

Table 4.23 reveals that on the experience while using the university website, more than half of the teaching staff sampled agreed that their university's website's appearance is beautiful and pleasing (59.2%), that the website is always available when needed (58.0%), that using their university's website/portal is usually a satisfying experience (52.7%) and that information about upcoming events is available on the website/portal (51.4%). Meanwhile, 38.2% of the teaching staff disagreed to the fact that they can easily contact students because the website provides information about student and e-mail addresses.

Table 4.23. Teaching staff experience with university's website/portal

Experience with university's website/portal	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
The website is always available when needed	144(22.6)	370(58.0)	21(3.3)	29(4.5)	74(11.6)
Privacy and security is guaranteed while using the site	177(27.7)	311(48.7)	37(5.8)	32(5.0)	81(12.7)
The feedback mechanism on the website is adequate	61(9.6)	265(41.5)	53(8.3)	114(17.9)	145(22.7)
Information about upcoming events is available on the website/portal	132(20.7)	328(51.4)	44(6.9)	45(7.1)	89(13.9)
I can easily access the publications on my university's website	113(17.7)	254(39.8)	41(6.4)	63(9.9)	167(26.2)
I can easily contact my students because the website provides information about student and e-mail addresses	53(8.3)	122(19.1)	69(10.8)	150(23.5)	244(38.2)
The website is regularly updated with new information	130(20.4)	279(43.7)	56(8.8)	61(9.6)	112(18.6)
This website's appearance is beautiful and pleasing	118(18.5)	378(59.2)	60(9.4)	41(6.4)	41(6.4)
I can easily move from one place to the other on the website	119(18.7)	310(48.6)	57(8.9)	60(9.4)	92(14.4)
Using my university's website/portal is usually a satisfying experience	97(15.2)	336(52.7)	57(8.9)	48(7.5)	100(15.7)

N = 638 teaching staff; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

In table 4.24, more than 50% of the non-teaching staff agreed that the website of their university is always available when needed, privacy and security is guaranteed while using the site, the feedback mechanism on the website is adequate, the website's appearance is beautiful and pleasing, they can easily move from one place to the other on the website and using their university's website/portal is usually a satisfying experience. On the other hand, the most strongly disagreed to statement is the fact that they can easily contact students because the website provides information about student and e-mail addresses with 24.4%. Meanwhile, the mean scores of the experience with university's website reveals that contacting students because the website provides information about student and e-mail addresses (Mean = 2.78), the feedback mechanism on the website is adequate (Mean = 2.54) and using my university's website/portal is usually a satisfying experience (Mean = 2.34) are the best experience in that order.

Table 4.24. Non-teaching staff experience with university's website/portal

S/N	Experience with university's website/portal	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree	Mean
A	I can easily contact my students because the website provides information about student and e-mail addresses	90 (9.0)	316 (31.5)	59 (5.9)	245 (24.4)	293 (29.2)	2.78
B	The feedback mechanism on the website is adequate	96 (9.6)	510 (50.8)	40 (4.0)	98 (9.8)	259 (25.8)	2.54
C	Using my university's website/portal is usually a satisfying experience	154 (15.4)	510 (50.8)	54 (5.4)	96 (9.6)	189 (18.8)	2.34
D	The website is always available when needed	188 (18.7)	542 (54.0)	10 (1.0)	87 (8.7)	176 (17.5)	2.25
E	The website is regularly updated with new information	199 (19.8)	492 (49.1)	47 (4.7)	92 (9.2)	173 (17.2)	2.25
F	I can easily access the publications on my university's website	234 (23.3)	418 (41.7)	76 (7.6)	97 (9.7)	178 (17.7)	2.24
G	I can easily move from one place to the other on the website	172 (17.1)	536 (53.4)	37 (3.7)	113 (11.3)	145 (14.5)	2.24
H	Information about upcoming events is available on the website/portal	265 (26.4)	417 (41.6)	21 (2.1)	113 (11.3)	187 (18.6)	2.23
I	This website's appearance is beautiful and pleasing	209 (20.6)	506 (50.4)	46 (4.6)	68 (6.8)	176 (17.5)	2.22
J	Privacy and security is guaranteed while using the site	215 (21.4)	542 (54.0)	21 (2.1)	88 (8.8)	137 (13.7)	2.15

N = 1003 Non-teaching staff; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

With respect to student's experience while using their university's website/portal, table 4.25 shows more than half agreed that they can easily access the registration page to register for courses, easily move from one place to the other through adequate hyperlinks on the website, and the website's appearance is beautiful and pleasing. Although, quite number of the students disagreed (32.3%) and strongly disagreed (31.4%) to the statement that they can easily find the information they need on their university's website.

Table 4.25. Students experience with university's website/portal

Experience with university's website/portal	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
The website is always available when needed	1093(35.5)	1382(44.9)	175(5.7)	210(6.8)	216(7.0)
Privacy and security of my information is guaranteed	247(8.0)	845(27.5)	597(19.4)	488(15.9)	899(29.2)
The contact us messages are quickly replied	1116(36.3)	1290(41.9)	221(7.2)	214(7.0)	235(7.6)
I can easily access the registration page to register for academic sessions	1156(37.6)	1223(39.8)	293(9.6)	192(6.2)	212(6.9)
I can easily access the registration page to register for courses	669(21.7)	1627(52.9)	228(7.4)	189(6.1)	363(11.8)
I can easily find the information I need on the website	185(6.0)	474(15.4)	457(14.9)	966(31.4)	994(32.3)
I can use the website to contact my instructors to obtain information,, seek permission or book appointment	357(11.6)	1272(41.4)	383(12.4)	415(13.5)	649(21.1)
I can easily move from one place to the other through adequate hyperlinks on the website	687(22.3)	1662(54.0)	104(3.4)	177(5.8)	446(14.5)
The website is regularly updated with new information on courses	496(16.1)	1368(44.5)	279(9.1)	443(14.4)	490(15.9)
This website's appearance is beautiful and pleasing	740(24.1)	1617(52.6)	260(8.4)	205(6.7)	254(8.3)
Using my university's website/portal is usually a satisfying experience	722(23.5)	1461(47.5)	252(8.2)	251(8.2)	390(12.7)

N = 2597 Students; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

4.3.5 Research question 5: What are the impacts of e-business activities in Nigerian universities in terms of measurable organisational goal and strategy variables?

From the management questionnaire, the highest impact of e-business on Nigerian universities according to table 4.26 are improved services to staff, (72.2%), improved services to students (61.1%), improved research activities (55.6%), enhanced productivity of teaching staff (55.6%), and enabled faster production of educational materials (55.6%). While improved applications for admission from abroad (38.9%) and ability to participate in international market for staff/students (38.9%) recorded a low impact. The last column of the table 4.26 shows the calculated means for each item from the 5-point Likert scale responses. The means show that areas that have the greatest impact are productivity (Mean = 3.72 and 3.61), research and collaboration (Mean = 3.61) and cost (Mean = 3.56), in that order. On the other hand, admissions and marketing are areas where there was no much impact.

Table 4.26. E-business impact (management)

S/No	**Impact Area**	**Specific Impact variable**	Low Extent	Moderate Extent	High Extent	Very high Extent	Mean
1	Productivity	Enhanced the productivity of our Teaching staff	1(5.6)	5(27.8)	10(55.6)	2(11.1)	3.72
2	Productivity	Enabled faster production of educational materials	1(5.6)	4(22.2)	10(55.6)	2(11.1)	3.72
3	Productivity	Improved services to our staff	1(5.6)	4(22.2)	13(72.2)	-	3.67
4	Research and Collaboration	Improved research activities in the university	3(16.7)	3(16.7)	10(55.6)	2(11.1)	3.61
5	Productivity	Improved services to our students	3(16.7)	3(16.7)	11(61.1)	1(5.6)	3.56
6	Cost	Reduced the cost of course materials for students	3(16.7)	5(27.8)	5(27.8)	4(22.2)	3.56
7	Productivity	Enhanced the productivity of our Students	1(5.6)	8(44.4)	8(44.4)	1(5.6)	3.50
8	Marketing	Enabled us to innovate new marketing strategies for our education programmes	3(16.7)	5(27.8)	9(50.0)	1(5.6)	3.44
9	Research and Collaboration	Increased our researchers' collaborations with other universities in Nigeria	1(5.6)	9(50.0)	7(38.9)	1(5.6)	3.44
10	Research and Collaboration	Improved collaborations between Departments and Faculties with Industry	2(11.1)	7(38.9)	8(44.4)	1(5.6)	3.44
11	Productivity	Improved services to our suppliers and contractors	1(5.6)	8(44.4)	8(44.4)	-	3.39
12	Cost	Reduced our costs of operation	3(16.7)	7(38.9)	7(38.9)	1(5.6)	3.33
13	Research and Collaboration	Increased our researchers' collaborations with researchers abroad	4(22.2)	5(27.8)	8(44.4)	1(5.6)	3.33
14	Productivity	Enhanced the productivity of our Non-teaching staff	4(22.2)	7(38.9)	6(33.3)	1(5.6)	3.22
15	Admission	Improved applications for admission from outside the university catchment area	3(16.7)	7(38.9)	5(27.8)	2(11.1)	3.22
16	Marketing	Enabled us to participate in international market for staff/students	7(38.9)	3(16.7)	8(44.4)	-	3.06
17	Admission	Improved applications for admission from abroad	7(38.9)	6(33.3)	3(16.7)	1(5.6)	2.78
18	Marketing	Improved marketing of our education programmes	2(11.1)	11(61.1)	5(27.8)	-	3.17

N = 18 Universities; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

Table 4.27 reveals the result of e-business impact from the IT staff questionnaire. Improved services to students recorded the maximum impact to a high extent (55.6%), this is followed by improved services to staff (44.4%). Under the very high extent option, reduced the cost of course materials students (22.2%) topped the list, followed by improved research activities in the university, enhanced the productivity of teaching staff, enabled faster production of educational materials and reduced costs of operation, all with 16.7%. Ability to participate in international market for staff/students had the highest percentage in the low extent option; this is followed by improved applications for admission from abroad with 27.8%.

The Mean scores revealed that impact is higher in the area of productivity and also in the area of research and collaboration. Meanwhile, there is low impact in the areas of admissions and marketing.

Table 4.27. E-business impact (IT staff)

S/No	Impact Area	Specific Impact variable	Low Extent	Moderate Extent	High Extent	Very high Extent	Mean
1	Productivity	Enhanced the productivity of our Teaching staff	2(11.1)	4(22.2)	7(38.9)	3(16.7)	3.39
2	Productivity	Improved services to our students	3(16.7)	3(16.7)	10(55.6)	1(5.6)	3.39
3	Productivity	Improved services to our staff	1(5.6)	5(27.8)	8(44.4)	2(11.1)	3.39
4	Research and Collaboration	Increased our researchers' collaborations with other universities in Nigeria	2(11.1)	6(33.3)	7(38.9)	2(11.1)	3.39
5	Research and Collaboration	Improved research activities in the university	4(22.2)	3(16.7)	7(38.9)	3(16.7)	3.39
6	Cost	Reduced the cost of course materials for students	2(11.1)	2(11.1)	6(33.3)	4(22.2)	3.35
7	Research and Collaboration	Increased our researchers' collaborations with researchers abroad	3(16.7)	2(11.1)	9(50.0)	2(11.1)	3.33
8	Productivity	Enhanced the productivity of our Students	1(5.6)	6(33.3)	7(38.9)	2(11.1)	3.33
9	Research and Collaboration	Improved collaborations between Departments and Faculties with Industry	2(11.1)	6(33.3)	7(38.9)	1(5.6)	3.29
10	Productivity	Enabled faster production of educational materials	3(16.7)	4(22.2)	6(33.3)	3(16.7)	3.28
11	Cost	Reduced our costs of operation	2(11.1)	4(22.2)	6(33.3)	3(16.7)	3.22
12	Productivity	Enhanced the productivity of our Non-teaching staff	3(16.7)	5(27.8)	7(38.9)	1(5.6)	3.11
13	Admission	Improved applications for admission from outside the university catchment area	3(16.7)	5(27.8)	5(27.8)	2(11.1)	3.00
14	Productivity	Improved services	2(11.1)	8(44.4)	5(27.8)	-	2.94

		to our suppliers and contractors					
15	Marketing	Enabled us to innovate new marketing strategies for our education programmes	4(22.2)	7(38.9)	5(27.8)	-	2.83
16	Marketing	Improved marketing of our education programmes	3(16.7)	12(66.7)	1(5.6)	-	2.76
17	Marketing	Enabled us to participate in international market for staff/students	6(33.3)	6(33.3)	4(22.2)	-	2.67
18	Admission	Improved applications for admission from abroad	5(27.8)	6(33.3)	3(16.7)	1(5.6)	2.67

N = 18 Universities; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

Table 4.28 reveals that the e-business impact on teaching staff that recorded more than 50% agreement are better relationship between teaching staff and the university, teaching has become easier with the use of technology and access to information about the university any day any time. The most disagreed to impact is access to electronic grant and development initiatives with 29.3%.

Table 4.28. E-business impact on teaching staff

E-business Impact	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
I can now use ICTs better	231(36.2)	300(47.0)	31(4.9)	33(5.2)	43(6.7)
My work has been made easier as a result of reduced paper work	209(32.8)	235(36.8)	43(6.7)	64(10.0)	87(13.6)
I have easier access to online scholarly materials	179(28.1)	310(48.6)	22(3.4)	55(8.6)	72(11.3)
There is a better relationship between me and my university	93(14.6)	370(58.0)	34(5.3)	99(15.5)	42(6.6)
Teaching has become easier with the use of technologies	125(19.6)	329(51.6)	50(7.8)	51(8.0)	83(13.0)
I have access to information about my university any day anytime	155(24.3)	323(50.6)	36(5.6)	59(9.2)	65(10.2)
I can easily find the information I need on the website	141(22.1)	305(47.8)	45(7.1)	65(10.2)	82(12.9)
I have access to electronic grant and development initiatives	80(12.5)	222(34.8)	53(8.3)	96(15.0)	187(29.3)
I enjoy collaboration with colleagues within and outside the country	102(16.0)	254(39.8)	49(7.7)	96(15.0)	137(21.5)

N = 638 Teaching staff; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-15.

In table 4.29, the only impact on non-teaching staff that recorded more than 50% agreement is the fact that work has been made easier as a result of reduced paper work. Meanwhile, as high as 37% disagreed that e-business has brought about access to electronic grant and development initiatives.

Table 4.29. E-business impact on non-teaching staff

S/No	E-business Impact	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree	Mean
A	I have access to electronic grant and development initiatives	88 (8.8)	341 (34.0)	70 (7.0)	133 (13.3)	371 (37.0)	2.84
B	I enjoy collaboration with colleagues within and outside the country	72 (7.2)	429 (42.8)	82 (8.2)	102 (10.2)	318 (31.7)	2.72
C	I have easier access to online scholarly materials	160 (16.0)	383 (38.2)	51 (5.1)	159 (15.9)	250 (24.9)	2.52
D	There is a better relationship between me and my university	160 (16.0)	455 (45.4)	48 (4.8)	203 (20.2)	137 (13.7)	2.33
E	I can easily find the information I need on the website	216 (21.5)	482 (48.1)	51 (5.1)	96 (9.6)	158 (15.8)	2.21
F	My work has been made easier as a result of reduced paper work	178 (17.7)	564 (56.2)	38 (3.8)	80 (8.0)	143 (14.3)	2.19
G	I have access to information about my university any day anytime	267 (26.6)	479 (47.8)	59 (5.9)	57 (5.7)	141 (14.1)	2.08
H	I can now use ICTs better	295 (29.4)	500 (49.9)	23 (2.3)	59 (5.9)	126 (12.6)	2.02
I	My job has become easier with the use of technologies	310 (30.9)	484 (48.3)	69 (6.9)	46 (4.6)	94 (9.4)	1.92

N = 1003 Non-teaching staff; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

Table 4.30 highlights the various ways e-business activities of sampled Nigerian universities have impacted on students. More than half of the student agreed that their ICT skills have improved (52.9%) and learning have become more interesting (52.0%). The e-business impact that was strongly agreed to by majority of the students are time saving (29.2%) and 24/7 access to information (28.7%). While the e-business impact that was disagreed and strongly disagreed to by majority of the students is easier communication with instructors (32.3% and 25.9%) respectively.

Table 4.30. E-business impact

E-business Impact	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
My ICT skills have been improved	679(22.1)	1628(52.9)	164(5.3)	259(8.4)	346(11.2)
My learning has become more interesting	637(20.7)	1599(52.0)	211(6.9)	285(9.3)	344(11.2)
I have easier access to online library materials	409(13.3)	1156(37.6)	379(12.3)	481(15.6)	651(21.2)
I have easier access to online journal articles	349(11.3)	1137(37.0)	399(13.0)	493(16.0)	698(22.7)
I can check my result anytime and anywhere	569(18.5)	817(26.6)	410(13.4)	558(18.1)	722(23.5)
I have access to information about my university anytime any day	882(28.7)	1483(48.2)	212(6.9)	245(8.0)	254(8.3)
I have access to information about my courses anytime any day	643(20.9)	1367(44.4)	234(7.6)	347(11.3)	485(15.8)
My time is saved as I don't queue for registration any longer	897(29.2)	1029(33.5)	238(7.8)	474(15.4)	438(14.2)
My academic performance has improved as a result	612(19.9)	1259(40.9)	283(9.2)	419(13.6)	503(16.4)
I can communicate with my instructor more easily	204(6.6)	671(21.8)	411(13.4)	796(25.9)	994(32.3)
I can now more easily obtain most of the information I need for my activities at the university from the website	516(16.8)	1175(38.2)	399(13.0)	401(13.0)	585(19.0)

N = 2597 Students; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

4.3.6 Research question 6: Are there any major differences in the behavior of the variables across type of universities and geo-political zone?

The chart in figure 4.9 and figure 4.10 shows that the behavior of the variables organisational strategy (OS), e-business strategy (ES), e-business readiness (ER), e-business intensity (EI) and e-business impact (EM) is virtually the same in the private, state and federal universities. Similarly, the behavior of the variables is almost the same in the six geo-political zones which are North-West, North-East, North-Central, South-East, South-West and South-South. This implies that irrespective of the type or location of the university, the organisational strategic objectives focused on, the e-business strategies being pursue towards achieving the strategic objectives, the e-business readiness level, the e-business intensity levels in terms of diversity, variety and scope of actual e-business operations and the impact of e-business activities is about the same.

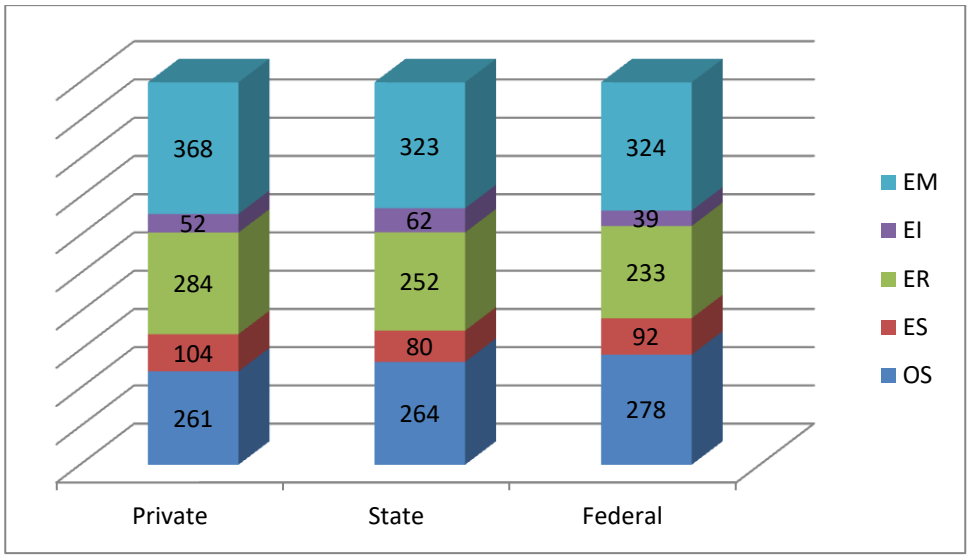

Fig 4.8. Comparison of the variables OS, ES, EI, ER and EM across type of universities

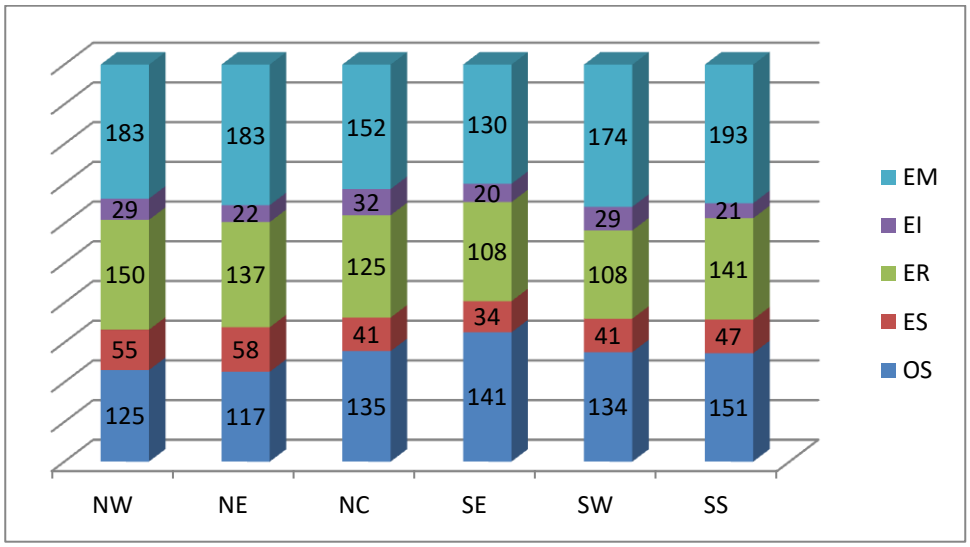

Fig. 4.9. Comparison of the variables OS, ES, EI, ER and EM across Geo-political Zones

4.3.7 Research question 7: What are the challenges faced by Nigerian universities in the adoption of e-business?

For the university management, table 4.31 reveals that the main challenges are inadequate security for online transactions in the country, high cost of maintenance of IT infrastructure and inadequate policies of Government in the IT sector of the country. Whereas, low use of Internet connectivity infrastructure by students of the university, lack of commitment from management of the university and ineffective approach to e-business in the university were not major challenges. Different ways universities have tried to overcome e-business challenges include: increase in the number of IT staff, provision of e-resources to library staff, appointing computer literate staff, linking with foreign universities with high and advanced IT skills and infrastructure, pursuing policies that encourage the use of e-facilities, e-operations in every spectrum of activities i.e. teaching, learning and administrative duties, implementing all possible global best practices, increasing ICT budget, encouraging staff to attend conferences, improving policy implementation mechanisms in the university, increase in the bandwidth of Internet facility to ensure smooth online operations, through extensive collaboration with stakeholders in the ICT sector, sourcing for local and international grants, all year round maintenance of equipment, training of staff and students on IT capacity utilization, signing of MoU with Glo, Etisalat etc., increasing internally generated revenue, sourcing for funding alternatives to facilitate efficient service delivery and capacity building, provision of laptops to staff of the university.

Table 4.31. E-business challenges (management)

	E-business challenges	No Extent	Low Extent	Moderate Extent	High Extent	Very high Extent	Mean
A	Inadequate security for online transactions in the country	-	1(5.6)	4(22.2)	6(33.3)	7(38.9)	4.06
B	High cost of maintenance of IT infrastructure	-	2(11.1)	4(22.2)	4(22.2)	8(44.4)	4.00
C	Inadequate policies of Government in the IT sector of the country	-	2(11.1)	6(33.3)	5(27.8)	5(27.8)	3.72
D	Underdeveloped electronic payment systems in the country	-	3(16.7)	4(22.2)	9(50.0)	2(11.1)	3.56
E	Low use of infrastructure by non-teaching staff of this university	1(5.6)	2(11.1)	5(27.8)	6(33.3)	4(22.2)	3.56
F	Low Internet capacity/bandwidth in this university	-	4(22.2)	5(27.8)	6(33.3)	3(16.7)	3.44
G	Low use of library e-resources by students of this university	-	3(16.7)	7(38.9)	3(16.7)	4(22.2)	3.44
H	Low use of infrastructure by students of this university	-	5(27.8)	6(33.3)	3(16.7)	4(22.2)	3.33
I	Low use of infrastructure by teaching staff of this university	1(5.6)	2(11.1)	9(50.0)	2(11.1)	4(22.2)	3.33
J	Inadequate IT personnel in this university	-	1(5.6)	12(66.7)	4(22.2)	1(5.6)	3.28
K	Low use of e-resources by students of this university	2(11.1)	3(16.7)	5(27.8)	5(27.8)	3(16.7)	3.22
L	Low use of e-resources by staff of this university	-	4(22.2)	8(44.4)	4(22.2)	2(11.1)	3.22
M	Low use of Internet connectivity infrastructure by Academic staff of this university	-	5(27.8)	7(38.9)	3(16.7)	3(16.7)	3.22
N	High cost of training of staff for IT applications	1(5.6)	1(5.6)	11(61.1)	3(16.7)	2(11.1)	3.22
O	Low use of library e-resources by academic staff of this university	-	4(22.2)	8(44.4)	3(16.7)	2(11.1)	3.17
P	Inappropriate e-business strategy in this university	2(11.1)	3(16.7)	8(44.4)	2(11.1)	3(16.7)	3.06
Q	Ineffective implementation of e-business strategy in this university	3(16.7)	1(5.6)	8(44.4)	5(27.8)	1(5.6)	3.00
R	Low use of Internet connectivity infrastructure by students of this university	-	7(38.9)	7(38.9)	2(11.1)	2(11.1)	2.94
S	Lack of commitment from Management of this university	3(16.7)	3(16.7)	8(44.4)	1(5.6)	3(16.7)	2.89
T	Ineffective approach to e-business in the university	2(11.1)	3(16.7)	11(61.1)	1(5.6)	1(5.6)	2.78

N = 18 Universities; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

Table 4.32 reveals the responses on e-business challenges of IT staff. The mean score shows that factors that topped the list in constituting e-business challenge to a low extent are underdeveloped electronic payment systems in the country (Mean= 3.67), high cost of maintenance of IT infrastructure (Mean= 3.67), inadequate policies of Government in the IT sector of the country (Mean= 3.56), inadequate security for online transactions in the country (Mean= 3.39) and lack of commitment from Management of the university (Mean= 3.39). Factors that constituted the least challenge are low use of library e-resources by students of this university (Mean= 2.78), low use of library e-resources by academic staff of this university (Mean= 2.71), low use of Internet connectivity infrastructure by students of this university (Mean= 2.67) and low use of Internet connectivity infrastructure by academic staff of this university (Mean= 2.61).

Table 4.32. E-business challenge (IT staff)

	E-business challenges	No Extent	Low Extent	Moderate Extent	High Extent	Very high Extent	Mean
A	Underdeveloped electronic payment systems in the country	-	4(22.2)	2(11.1)	8(44.4)	4(22.2)	3.67
B	High cost of maintenance of IT infrastructure	-	4(22.2)	4(22.2)	4(22.2)	6(33.3)	3.67
C	Inadequate policies of Government in the IT sector of the country	-	5(27.8)	2(11.1)	7(38.9)	4(22.2)	3.56
D	Inadequate security for online transactions in the country	-	6(33.3)	3(16.7)	5(27.8)	4(22.2)	3.39
E	Lack of commitment from Management of this university	1(5.6)	3(16.7)	7(38.9)	2(11.1)	5(27.8)	3.39
F	High cost of training of staff for IT applications	2(11.1)	3(16.7)	5(27.8)	4(22.2)	4(22.2)	3.28
G	Low Internet capacity/bandwidth in this university	2(11.1)	5(27.8)	2(11.1)	6(33.3)	3(16.7)	3.17
H	Inappropriate e-business strategy in this university	1(5.6)	5(27.8)	5(27.8)	4(22.2)	3(16.7)	3.17
I	Ineffective implementation of e-business strategy in this university	2(11.1)	3(16.7)	6(33.3)	5(27.8)	2(11.1)	3.11
J	Ineffective approach to e-business in the university	2(11.1)	3(16.7)	7(38.9)	4(22.2)	2(11.1)	3.06
K	Inadequate IT personnel in this university	2(11.1)	4(22.2)	7(38.9)	3(16.7)	2(11.1)	2.94
L	Low use of infrastructure by students of this university	2(11.1)	7(38.9)	5(27.8)	-	4(22.2)	2.83
M	Low use of infrastructure by teaching staff of this university	2(11.1)	7(38.9)	5(27.8)	-	4(22.2)	2.83
N	Low use of infrastructure by non-teaching staff of this university	3(16.7)	6(33.3)	4(22.2)	1(5.6)	4(22.2)	2.83
O	Low use of e-resources by students of this university	2(11.1)	8(44.4)	3(16.7)	1(5.6)	4(22.2)	2.83
P	Low use of e-resources by staff of this university	1(5.6)	8(44.4)	4(22.2)	3(16.7)	2(11.1)	2.83
Q	Low use of library e-resources by students of this university	4(22.2)	5(27.8)	4(22.2)	1(5.6)	4(22.2)	2.78
R	Low use of library e-resources by academic staff of this university	4(22.2)	4(22.2)	4(22.2)	3(16.7)	2(11.1)	2.71
S	Low use of Internet connectivity infrastructure by students of this university	4(22.2)	3(16.7)	7(38.9)	3(16.7)	1(5.6)	2.67
T	Low use of Internet connectivity infrastructure by Academic staff of this university	4(22.2)	5(27.8)	5(27.8)	2(11.1)	2(11.1)	2.61

N = 18 Universities; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

In table 4.33, the major e-business challenge faced by teaching staff of Nigerian universities is unavailability of some online services provided by their universities; this is followed by some available but not useful services with 48.1%. Whereas, the least challenge faced is non-reply of contact us mails.

Table 4.33. E-business challenges faced by teaching staff

E-business Challenges	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
Some of the online services provided by my university are not available when I need them	76(11.9)	327(51.3)	28(4.4)	58(9.1)	149(23.4)
Some of them are available but not useful to me	46(7.2)	307(48.1)	31(4.9)	103(16.1)	151(23.7)
I have problem accessing Internet through my university's network	49(7.7)	186(29.2)	34(5.3)	87(13.6)	282(44.2)
I do not believe that my personal information is secured on the university network	41(6.4)	189(29.6)	37(5.8)	114(17.9)	257(40.3)
The website suffers problems during registration process for students	78(12.2)	248(38.9)	53(8.3)	106(16.6)	153(24.0)
I do not believe that the payment platform the university is using is safe and secured from fraud	26(4.1)	173(27.1)	60(9.4)	121(19.0)	258(40.4)
I usually wait too long when downloading a file through my university's network	80(12.5)	248(38.9)	56(8.8)	83(13.0)	171(26.8)
I usually wait too long when opening a webpage through my university's network	46(7.2)	171(26.8)	54(8.5)	130(20.4)	237(37.1)
The information on my university website are not updated regularly	30(4.7)	208(32.6)	61(9.6)	126(19.7)	213(33.4)
Contact us mails are not replied to promptly	64(10.0)	254(39.8)	65(10.2)	81(12.7)	174(27.3)
Contact us mails are not replied to at all	40(6.3)	104(16.3)	64(10.0)	13020.4)	300(47.0)

N = 638 Teaching staff; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

Similar to the teaching staff, table 4.34 reveals that the major e-business challenge faced by non-teaching staff of Nigerian universities is unavailability of some online services provided by their universities (46.4%); this is followed by some available but not useful services with 42.4%.

Table 4.34. E-business challenge faced by non-teaching staff

S/No	E-business Challenges	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree	Mean
A	Contact us mails are not replied to at all	64 (6.4)	166 (16.6)	119 (11.9)	189 (18.8)	465 (46.4)	3.19
B	The information on my university website are not updated regularly	65 (6.5)	292 (29.1)	75 (7.5)	153 (15.3)	418 (41.7)	3.00
C	I usually wait too long when opening a webpage through my university's network	80 (8.0)	286 (28.5)	79 (7.9)	137 (13.7)	421 (42.0)	2.97
D	I have problem accessing Internet through my university's network	57 (5.7)	301 (30.0)	78 (7.8)	189 (18.8)	378 (37.7)	2.96
E	I do not believe that the payment platform the university is using is safe and secured from fraud	79 (7.9)	227 (22.6)	85 (8.5)	322 (32.1)	290 (28.9)	2.90
F	I do not believe that my personal information is secured on the university network	62 (6.2)	355 (35.4)	76 (7.6)	155 (15.5)	355 (35.4)	2.87
G	I usually wait too long when downloading a file through my university's network	126 (12.6)	335 (33.4)	80 (8.0)	137 (13.7)	325 (32.4)	2.72
H	Some of the online services provided by my university are not available when I need them	93 (9.3)	425 (42.4)	68 (6.8)	126 (12.6)	291 (29.0)	2.66
I	The website suffers problems during registration process for students	104 (10.4)	388 (38.7)	95 (9.5)	171 (17.0)	245 (24.4)	2.61
J	Contact us mails are not replied to promptly	109 (10.9)	383 (38.2)	96 (9.6)	178 (17.7)	237 (23.6)	2.60
K	Some of them are available but not useful to me	85 (8.5)	465 (46.4)	79 (7.9)	115 (11.5)	259(25.8)	2.59

N = 1003 Non-teaching staff; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

In table 4.35, the factors that constituted challenges to e-business that was agreed to by more than one-third of the students are unavailability of some online services provided by the university when needed (44.2%), availability of some services that are not useful to students (47.4%), the website suffering from problems during registration process for students (32.7%) and contact us mails not being replied to promptly (37.5%).

Table 4.35. E-business challenge

	E-business Challenges	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
A	Some of the online services provided by my university are not available when I need them	483 (15.7)	1360 (44.2)	302 (9.8)	324 (10.5)	607 (19.7)
B	Some of them are available but not useful to me	310 (10.1)	1459 (47.4)	413 (13.4	326 (10.6)	568 (18.5)
C	I have problem accessing Internet through my university's network	336 (10.9)	937 (30.5)	312 (10.1)	480 (15.6)	1011 (32.9)
D	I do not believe that my personal information is secured on the university network	249 (8.1)	630 (20.5)	312 (10.1)	781 (25.4)	1104 (35.9)
E	The website suffers problems during registration process for students	536 (17.4)	1005 (32.7)	308 (10.0)	604 (19.6)	623 (20.3)
F	I do not believe that the payment platform the university is using is safe and secured from fraud	278 (9.0)	635 (20.6)	333 (10.8)	887 (28.8)	943 (30.7)
G	I usually wait too long when downloading a file through my university's network	470 (15.3)	837 (27.2)	411 (13.4)	489 (15.9)	869 (28.3)
H	I usually wait too long when opening a webpage through my university's network	388 (12.6)	791 (25.7)	403 (13.1)	503 (16.4)	991 (32.2)
I	The information on my university website are not updated regularly	399 (13.0)	917 (29.8)	382 (12.4)	562 (18.3)	816 (26.5)
J	Contact us mails are not replied to promptly	532 (17.3)	1153 (37.5)	426 (13.9)	439 (14.3)	526 (17.1)
K	Contact us mails are not replied to at all	367 (11.9)	522 (17.0)	639 (20.8)	602 (19.6)	946 (30.8)

N = 2597 Students; values (in parentheses) are frequencies (percentages).
Source: Authors' field data collection, 2014-2015.

4.4 Test of hypotheses

4.4.1 Research hypothesis one: There is no relationship between organisational strategy and e-business strategy.

Hypothesis one pertains to whether there is a relationship between organisational strategy and e-business strategy, the Pearson correlation test at 95% confidence level showed that there is a moderate and significant positive relationship between organisational strategy and e-business strategy ($r = 0.514$, $p = 0.029$). . The null hypothesis is therefore rejected. This result suggests a moderate level of alignment of organisational strategies of the sampled universities and their corresponding e-business strategies, and indicates need for improved alignment.

Table 4.36. Pearson correlation between organisational strategy and e-business strategy

	E-business Strategy
Organisational Strategy	.514*
	.029
	18

4.4.2 Research hypothesis two: There is no relationship between e-business strategy and e-business readiness.

Table 4.37 reveals that there is a strong positive linear relationship between e-business strategy and e-business readiness (r = 0.826, p - 0.000). The null hypothesis is therefore rejected. This result depicts that when universities have an e-business strategy in place, they tend to be also adequately ready for e-business.

Table 4.37. Pearson Correlation between e-business strategy and e-business readiness

	E-business Readiness
E-business Strategy	.826**
	.000
	18

4.4.3 Research hypothesis three: There is no relationship between e-business readiness and e-business intensity.

Hypothesis three pertains to whether there is a relationship between e-business readiness and e-business intensity. Results in Table 4.38 shows that there is a moderate positive linear relationship between e-business readiness and e-business intensity (r = 0.488, p - 0.040). The hypothesis is therefore rejected. This result means that when Nigerian universities preparedness for e-business is achieved in terms of hardware, software and humanware, e-business intensity becomes inevitable.

Table 4.38. Pearson correlation between e-business readiness and e-business intensity

	E-business Intensity
E-business Readiness	.488*
	.040
	18

4.4.4 Research hypothesis four: There is no relationship between e-business intensity and e-business impact.

Hypothesis four concerns whether there is a relationship between e-business intensity and e-business impact. Table 4.39 reveals that there is no significant relationship between e-business intensity and e-business impact ($r = 0.455$, $p = 0.058$). The null hypothesis is therefore accepted. The result shows that the intensity of use of deployed e-business related infrastructure (captured by e-business intensity) does not translate effectively into e-business impact in the sampled universities.

Table 4.39. Pearson correlation between e-business intensity and e-business impact

	E-business Impact
E-business Intensity	.455
	.058
	18

4.4.5 Research hypothesis five: There is no relationship between e-business impact and organisational strategic objectives.

This hypothesis concerns whether there is a significant relationship between e-business impact and organisational strategies. The result of the test of this hypothesis, as shown in table 4.40, reveals that there is no significant relationship between the two variables ($r = 0.412$, $p = 0.090$). The null hypothesis is therefore accepted. This result implies that, at least among the sampled universities, the impact of the intensity of use of the deployed e-business resources does not connect effectively to the organisational strategies that are expected to drive the chain of positive causal relationships from organisational strategy to e-business strategy to e-business readiness to e-business intensity to e-business impact, and then back to organisational strategy.

Table 4.40. Pearson correlation between e-business impact and organisational strategy

	Organisational Strategy
E-business Impact	.412
	.090
	18

4.4.6 Hypothesis six: There is no significant structural equation model that predicts simultaneously the path relationships of organisational strategy with e-business strategy, e-business strategy with e-business readiness, e-business readiness with e-business intensity and e-business intensity with e-business impact.

Structural equation modeling methods were used to test this hypothesis, as explained in the next section.

4.5 Structural equation model

A structural equation modeling was performed with the collected data using SmartPLS 3 software to estimate and validate the conceptual model proposed and described at the end of chapter two. The software was developed by Ringle, Wende and Will (2015) and the PLS algorithm procedure was initiated to do all the calculations. The estimated model is shown in figure 4.10.

From the structural model diagram in figure 4.10, the coefficient of determination, R^2, is 0.230 for the e-business strategy variable. This means that the organisational strategy variable explains 23.0% of the variance in e-business strategy. Furthermore, e-business strategy explains 74.3% of the variance in e-business readiness, e-business readiness explains 36.0% of the variance in e-business intensity, while e-business intensity explains 42.7% of the variance in e-business impact.

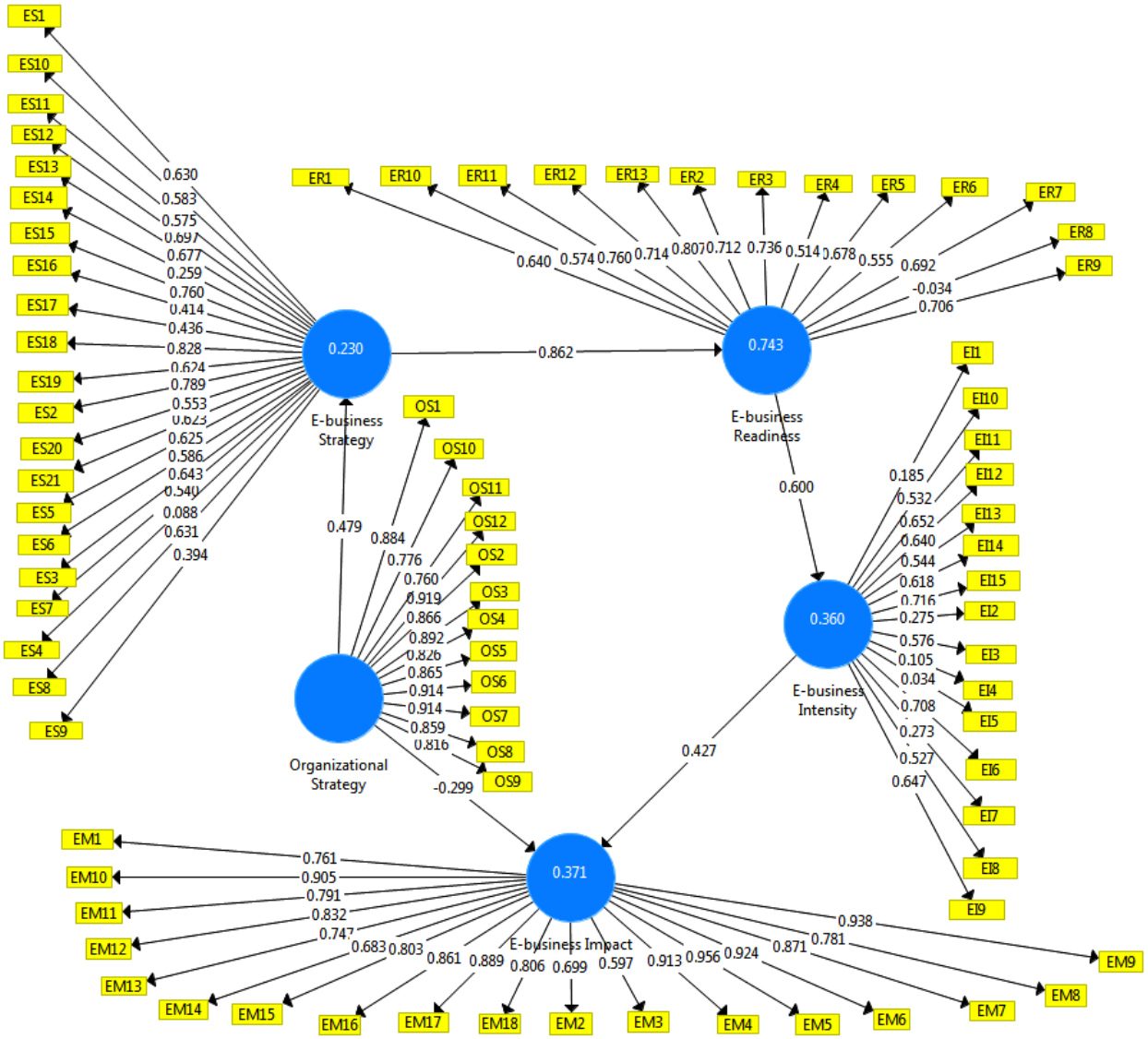

Fig. 4.10. PLS-SEM results

4.5.1 Outer model loadings and significance

In table 4.41, the indicator reliability values, except for a few, are larger than the minimum acceptable level of 0.4 (Hulland, 1999), and the values of the composite reliability (which is replacement for Cronbach's alpha) are larger than the acceptable 0.7 level (Wong, 2013). Therefore, there is high level of internal consistency reliability among all five reflective latent variables. Furthermore, to check the convergent validity, each latent variable's Average Variance Extracted (AVE) was evaluated. The threshold for this, according to Bagozzi and Yi (1988), is acceptable from 0.5 upwards for exploratory research. Again from the table 5.42, all of the AVE values except for one are greater than 0.5, confirming that there is convergent validity.

Furthermore, manifest variables with outer loading 0.7 or higher are considered highly satisfactory (Henseler, Ringle and Sinkovics, 2009). While loading value of 0.5 is regarded as acceptable, the manifest variables with loading value of less than 0.5 should be dropped (Hair, William, Barry and Anderson, 2010). Meanwhile, Hulland (1999) argued that 0.4 should be the acceptable loading value while Henseler et. al. (2009) suggested that manifest variable with loading values between 0.4 and 0.7 should be reviewed before elimination. The outer loadings as shown in table 4.42 reveals that organisational strategy and e-business impact have no indicator with less than 0.4. While e-business strategy, e-business readiness and e-business intensity have 3, 1 and 5 indicators respectively that are below 0.4.

Table 4.41. Result summary for outer model

Latent Variable	Indicators	Loadings (x)	Indicator Reliability (x^2)	Composite Reliability	AVE
Organisational	OS1	0.884	0.781	0.971	0.738
Strategy	OS2	0.866	0.749		
	OS3	0.892	0.796		
	OS4	0.826	0.682		
	OS5	0.865	0.748		
	OS6	0.914	0.835		
	OS7	0.914	0.835		
	OS8	0.859	0.738		
	OS9	0.816	0.666		
	OS10	0.776	0.602		
	OS11	0.760	0.577		
	OS12	0.919	0.845		
E-business	ES1	0.630	0.397	0.911	0.533
Strategy	ES2	0.789	0.623		
	ES20	0.553	0.306		
	ES21	0.623	0.388		
	ES3	0.643	0.413		
	ES4	-0.088	0.008		
	ES5	0.625	0.391		
	ES6	0.586	0.343		
	ES7	0.540	0.292		
	ES8	0.631	0.398		
	ES9	0.394	0.155		
	ES10	0.583	0.340		
	ES11	0.575	0.331		
	ES12	0.697	0.486		
	ES13	0.677	0.458		
	ES14	0.259	0.067		
	ES15	0.760	0.578		
	ES16	0.414	0.171		
	ES17	0.436	0.190		
	ES18	0.828	0.686		
	ES19	0.624	0.389		
E-business	ER1	0.640	0.409	0.897	0.426
Readiness	ER2	0.712	0.507		
	ER3	0.736	0.542		
	ER4	0.514	0.264		
	ER5	0.678	0.459		
	ER6	0.555	0.308		
	ER7	0.692	0.479		
	ER8	-0.034	0.001		
	ER9	0.706	0.498		
	ER10	0.574	0.329		
	ER11	0.760	0.578		
	ER12	0.714	0.509		
	ER13	0.807	0.651		
E-business	EI1	0.185	0.034	0.819	0.569

Intensity	EI2	0.275	0.076		
	EI3	0.576	0.332		
	EI4	0.105	0.011		
	EI5	0.034	0.001		
	EI6	0.708	0.501		
	EI7	0.273	0.075		
	EI8	0.527	0.278		
	EI9	0.647	0.419		
	EI10	0.532	0.283		
	EI11	0.652	0.425		
	EI12	0.640	0.409		
	EI13	0.544	0.296		
	EI14	0.618	0.382		
	EI15	0.716	0.513		
E-business	EM1	0.761	0.579	0.974	0.681
Impact	EM2	0.699	0.489		
	EM3	0.597	0.356		
	EM4	0.913	0.834		
	EM5	0.956	0.914		
	EM6	0.924	0.854		
	EM7	0.871	0.759		
	EM8	0.781	0.609		
	EM9	0.938	0.879		
	EM10	0.905	0.819		
	EM11	0.791	0.626		
	EM12	0.832	0.692		
	EM13	0.747	0.558		
	EM14	0.683	0.466		
	EM15	0.803	0.645		
	EM16	0.861	0.741		
	EM17	0.889	0.790		
	EM18	0.806	0.649		

4.5.2 Significance and relevance of the structural model relationships

The inner model suggests that the hypothesized path relationships between organisational strategy and e-business strategy (0.479), between e-business strategy and e-business readiness (0.862), between e-business readiness and e-business intensity (0.600), and between e-business intensity and e-business impact (0.427) are all statistically significant. Thus, in terms of statistical strength, e-business strategy is a strong predictor of e-business readiness, followed by e-business readiness and e-business intensity. However, the hypothesized path relationship between e-business impact and organisational strategy is not statistically significant. This is because it's standardized path coefficient (-0.299) is lower than 0.1. Thus, it can be concluded that Nigerian universities might not be effectively re-strategizing their business and e-business objectives based on the impact realized from previous and ongoing e-business operations in their universities.

Table 4.42. Path coefficients

	Organisational Strategy	**E-business Strategy**	**E-business Readiness**	**E-business Intensity**	**E-business impact**
Organisational Strategy		0.479 (0.452)			
E-business Strategy			0.862 (0.724)		
E-business Readiness				0.600 (0.000)	
E-business Intensity					0.427 (0.000)
E-business impact	-0.299				

Note: Values in parenthesis are the significance level of the coefficients

The coefficient of determination (R^2) which according to Hair et. al. (2014) is a measure of the model predictive accuracy and the adjusted R^2 are shown in table 4.43. Cohen.J, Cohen.P, West and Aiken (2003) explained that for a good model, the value of R2 of endogenous latent variable should be more than 0.26. Since R2 value for the developed model is 0.458 which is higher than the suggested value, the model is considered to have substantial degree of explained variance of organisational strategy by e-business strategy, e-business strategy by e-business readiness, e-business readiness by e-business intensity and e-business intensity by e-business impact.

Table 4.43. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.677[a]	.458	.450	.74273

a. Predictors: (Constant), EM, ES, ER, EI

4.5.3 Structural path significance in bootstrapping

Table 4.44 shows the significance of the path coefficients. A T-Statistic > 1.96 is significant with a two-tailed test, and > 0.98 is significant for a one-tailed test (Wong, 2013). As presented in table 4.44, all of the T-statistics are greater than 1.96, thus it can be concluded that the outer model loadings are significant.

Table 4.44. T-Statistics of path coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	p Values
Organisational Strategy E-business Strategy	0.479	0.485	0.038	12.558	0.000
E-business Strategy E-business Readiness	0.862	0.863	0.022	39.966	0.000
E-business Readiness E-business Intensity	0.600	0.610	0.048	12.575	0.000
E-business Intensity E-business Impact	0.427	0.433	0.057	7.434	0.000
Organisational Strategy E-business Impact	-0.299	-0.300	0.052	5.779	0.000

4.5.4 Discriminant validity

The Fornell-Larcker criterion analysis for showing Discriminant validity revealed that the square root of the AVE for each latent variable is greater than the correlations among the latent variables. The result indicates that discriminant validity is well established.

Table 4.45. Fornell-Larcker criterion

	E-business Impact	E-business Intensity	E-business Readiness	E-business Strategy	Organisational Strategy
E-business Impact	0.825				
E-business Intensity	0.542	0.519			
E-business Readiness	0.571	0.600	0.653		
E-business Strategy	0.597	0.429	0.862	0.594	
Organisational Strategy	-0.464	-0.385	-0.429	-0.479	0.859

4.6 Component variable analyses

In the tests of hypotheses using the Pearson correlation method, as presented in Section 4.4 above, insignificant statistical relationships were obtained (i) between e-business intensity and e-business impact, and (ii) between e-business impact and organisational strategy. Furthermore, in the path analysis using PLS-SEM method, as presented in Section 4.5 above, insignificant path relationship was revealed between e-business impact and organisational strategy. These findings suggest poor synchronization in the universities between these pairs of variables.

Nevertheless, it is very possible that, despite these insignificant relationships at the aggregate construct level, there might be highly, moderately or lowly positive or negative correlation between individual component variables of the organisational strategy construct and individual variables of the e-business strategy construct (and similarly for the e-business impact and organisational strategy constructs). Consequently, various Pearson correlation tests were therefore performed at the level of the component variables of these constructs.. This was in order to find out if there were significant positive or negative relationships between the component variables of the constructs that are hidden under the construct level analyses. The results are provided in the following subsections.

4.6.1 Organisational Strategy and E-Business strategy

At the level of the component variables of the constructs in the SEM model, results revealed that there are highly, moderately and lowly positive and negative correlation between individual component variables of the organisational strategy (OS) construct and individual variables of the e-business strategy (ES) construct. Among the OS indicator variables, to promote teaching and learning, to promote global best practices in activities, to ensure stable academic calendar, and to internationalize programmes, are highly correlated with the ES indicator variables, strengthening the ICT management unit through provision of hardware/software tools, maintaining an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units, signing memoranda of understanding with foreign universities on ICT-related activities.

Also, OS indicators variables, to promote scholarship and research, to increase revenue generation, to foster linkages with local universities and firms to create value

highly correlate with the following EB indicator variables - strengthening the ICT management unit through provision of hardware/software tools and maintaining an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units.

Out of the twenty-one e-business strategy indicators, the third and the sixth organisational strategy which are to deploy ICT facilities to support activities and to foster linkages with international universities and organisations to create value, positively correlates with nine and eleven of the e-business strategy indicators respectively. Also, there is significant correlation between the OS indicator (to internationalize student intake) and the following EB indicators - deploying hardware/software for accounts/finance, strengthening the ICT management unit through provision of hardware/software tools, maintaining an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units, improvement of power supply towards 24/7 availability and improvement of bandwidth for Internet-based communication.

In addition, the OS indicator - to internationalize academic staff - has a significant positive relationship with the following EB indicator variable, - strengthening the ICT management unit through provision of hardware/software tools.

Lastly, the OS indicator - to promote service to the community - is highly correlated with eleven out of the twenty-one EB indicators.

Table 4.46a. Pearson correlation tests of relationships between indicator variables of organisational strategy (OS) and e-business strategy (EB).

	ES1	ES2	ES3	ES4	ES5	ES6	ES7	ES8	ES9	ES10	ES11
OS1	.398	.398	-.157	.247	.373	.045	.221	.127	.031	.373	.568*
	.102	.102	.533	.323	.127	.860	.379	.616	.903	.127	.014
OS2	.265	.265	.147	.336	.222	-.042	.191	.119	-.029	.222	.584*
	.287	.287	.561	.173	.376	.869	.447	.639	.910	.376	.011
OS3	.674**	.674**	0.000	0.000	.483*	.160	.337	.201	-.219	.483*	.539*
	.002	.002	1.000	1.000	.042	.526	.172	.424	.382	.042	.021
OS4	.282	.282	-.020	.162	.107	-.020	-.036	-.057	-.264	.107	.589*
	.257	.257	.936	.521	.672	.936	.889	.821	.290	.672	.010
OS5	.245	.245	.019	.369	.161	.194	.095	.110	-.106	.161	.687**
	.326	.326	.939	.132	.522	.440	.707	.665	.674	.522	.002
OS6	.620**	.620**	.186	.186	.511*	.338	.326	.239	-.081	.511*	.620**
	.006	.006	.460	.460	.030	.170	.186	.339	.749	.030	.006
OS7	.412	.412	-.019	.325	.362	.325	.208	.271	-.013	.362	.702**
	.090	.090	.940	.188	.140	.188	.407	.277	.959	.140	.001
OS8	.380	.380	.300	.300	.454	.300	.391	.243	.206	.454	.542*
	.120	.120	.226	.226	.059	.226	.109	.332	.412	.059	.020
OS9	.403	.403	.319	.058	.285	.058	.193	.082	-.139	.285	.623**
	.097	.097	.198	.819	.252	.819	.443	.747	.582	.252	.006
OS10	.143	.143	.113	.520*	.171	.113	.055	.192	.077	.171	.657**
	.572	.572	.655	.027	.498	.655	.827	.446	.760	.498	.003
OS11	.183	.183	.145	.145	.078	.330	-.138	.058	-.156	.078	.496*
	.468	.468	.567	.567	.758	.180	.586	.818	.537	.758	.036
OS12	.600**	.600**	.158	.316	.598**	.316	.499*	.348	.108	.598**	.600**
	.008	.008	.531	.201	.009	.201	.035	.157	.668	.009	.008

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.46b. Pearson correlation tests of relationships between indicator variables of organisational strategy (OS) and e-business strategy (EB). (Continued)

	ES12	ES13	ES14	ES15	ES16	ES17	ES18	ES19	ES20	ES21
OS1	.398	.068	.449	-.114	.763**	-.114	.646**	.068	.359	.359
	.102	.789	.062	.654	.000	.654	.004	.789	.143	.143
OS2	.265	.222	.336	-.053	.671**	-.013	.456	-.063	.294	.294
	.287	.376	.173	.834	.002	.958	.057	.803	.237	.237
OS3	.674**	.121	.640**	-.135	.746**	-.202	.673**	-.121	.426	.426
	.002	.633	.004	.594	.000	.421	.002	.633	.078	.078
OS4	.282	.107	.344	-.333	.567*	-.064	.348	-.031	.202	.202
	.257	.672	.162	.177	.014	.801	.157	.904	.420	.420
OS5	.245	.425	.194	-.049	.621**	-.049	.340	.029	.272	.272
	.326	.078	.440	.847	.006	.847	.167	.908	.276	.276
OS6	.620**	.281	.490*	-.021	.778**	.011	.647**	.166	.474*	.474*
	.006	.258	.039	.933	.000	.966	.004	.510	.047	.047
OS7	.412	.362	.325	-.024	.766**	-.061	.571*	.101	.421	.421
	.090	.140	.188	.924	.000	.811	.013	.689	.082	.082
OS8	.380	.308	.300	.217	.729**	.095	.662**	.162	.343	.343
	.120	.214	.226	.387	.001	.708	.003	.521	.163	.163
OS9	.403	.088	.319	-.037	.637**	-.147	.559*	-.307	.290	.290
	.097	.730	.198	.885	.004	.562	.016	.216	.244	.244
OS10	.143	.324	.113	-.029	.632**	-.157	.341	-.137	.497*	.497*
	.572	.189	.655	.910	.005	.533	.166	.589	.036	.036
OS11	.183	.219	.145	-.287	.413	-.248	.254	-.062	.165	.165
	.468	.384	.567	.248	.088	.321	.310	.806	.512	.512
OS12	.600**	.359	.474*	.200	.843**	.000	.721**	.239	.527*	.527*
	.008	.144	.047	.426	.000	1.000	.001	.339	.025	.025

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.46c: Pearson correlation tests of relationships between indicator variables of organisational strategy (OS) and e-business strategy (EB). (Continued)

Legend
OS1 - Promote teaching and learning
OS2 - Promote scholarship and research
OS3 - Deploy ICT facilities to support activities
OS4 - Increase revenue generation
OS5 - Foster linkages with local universities and firms to create value
OS6 - Foster linkages with international universities and organisations to create value
OS7 - Promote global best practices in its activities
OS8 - Ensure stable academic calendar
OS9 - Internationalize its programmes
OS10 - Internationalize its student intake
OS11 - Internationalize its academic staff
OS12 - Promote service to the community
ES1 - Deploying ICT hardware/software for teaching
ES2 - Deploying ICT hardware/software for learning
ES3 - Deploying hardware/software for administration
ES4 - Deploying hardware/software for accounts/finance
ES5 - Deploying hardware/software for library services
ES6 - Deploying specialized software to support research in various disciplines
ES7 - Enhance staff ICT skills through special workshops
ES8 - Enhance students ICT skills though special workshops
ES9 - Strengthen the ICT management unit through staff recruitment
ES10 - Strengthen the ICT management unit through staff training
ES11 - Strengthening the ICT management unit through provision of hardware/software tools
ES12 - Regular update of the university ICT policy
ES13 - Restructuring of academic programmes to integrate ICT teaching and learning tools
ES14 - Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by staff
ES15 - Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by students
ES16 - Maintain an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units
ES17 - Increase the University carrying capacity through Open and Distance Learning (ODL)/e-learning
E18 - Signing Memoranda of Understanding with foreign universities on ICT-related activities
ES19 - Signing Memoranda of Understanding with local firms on ICT-related activities
ES20 - Improvement of power supply towards 24/7 availability
ES21 - Improvement of bandwidth for Internet-based communication

4.6.2 E-business strategy and e-business readiness

Significant positive correlations were obtained between individual component indicators of the e-business strategy (ES) construct and individual indicators of the e-business readiness (ER) construct. ES1 (deployment of ICT hardware/software for teaching) and ES3 (deployment of hardware/software for administration) correlates highly with ER12 (adequate human resources with appropriate IT skills to drive e-business) and moderately with ER5, 6, 10 and 13, which are the use of one or more electronic payment systems, availability of an IT consultancy service unit, adequate hardware to support e-business and a management culture that promotes e-business adoption. Also, there is high correlation between ES2 (deploying ICT hardware/software for learning) and ER2 as well as 5 (commitment of adequate financial resources to e-business development and use of one or more electronic payment systems), while there exists a moderate correlation between ES2 and ER4, 11 and13 which are the operation of an e-commerce system for some of its services, adequate software to support e-business and a management culture that promotes e-business adoption. ES5 (deployment of hardware/software for library services) was found to correlate highly with ER1 (high disposition to e-business operations) and moderately with ER2 and 10 which are commitment of adequate financial resources to e-business development and adequate hardware to support e-business. ES6 (deployment of specialized software to support research in various disciplines) correlates highly with ER12 and 13 and moderately with ER3 which are adequate human resources with appropriate IT skills to drive e-business, a management culture that promotes e-business adoption and availability of a documented IT policy that can supports e-business respectively.

However, four of the e-business strategy indicators ES8 (enhancement of students ICT skills though special workshops), ES9 (strengthening the ICT management unit through staff recruitment), ES17 (increasing the University carrying capacity through Open and Distance Learning (ODL)/e-learning) and ES21 (improvement of bandwidth for Internet-based communication), was found to correlate moderately with only one e-business readiness indicator ER11 (adequate software to support e-business), ER3 (availability of documented IT policy that can supports e-business effectively), ER4

(operating an e-commerce system for some of its services) and ER5 (use of one or more electronic payment systems) respectively.

Furthermore, ES15 (Diversification of opportunities for ICT acquisition by students) and ES18 (signing Memoranda of Understanding with foreign universities on ICT-related activities) recorded the highest number of correlations with ER indicators 2, 3, 5, 9, 10, 11, 13 and 1, 2, 3, 5, 9, 11, 13 respectively. This was followed by ES12 having a moderate correlation with six ER indicators 2, 3, 9, 10, 11 and 13 as well as ES13 and ES11 correlating with five ER indicators 3, 9, 11, 12, 13 and 1, 3, 7, 9, 13 respectively. Lastly, significant correlations were detected between ES10 and ER 1, 2, 5 and 13 as well as between ES19 and ER 3, 6, 12 and 13.

On the other hand, deploying hardware/software for accounts/finance, enhancing staff ICT skills through special workshops, diversification of opportunities for ICT acquisition by staff, maintaining an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units and improvement of power supply towards 24/7 availability which are the fourth, seventh, fourteenth, sixteenth and twentieth e-business strategy indicators did not correlate with any of the e-business readiness indicators.

Table 4.47a. Pearson correlation tests at the level of the component variables of e-business strategy (ES) and e-business readiness (ER).

	ER1	ER2	ER3	ER4	ER5	ER6	ER7	ER8	ER9	ER10	ER11	ER12	ER13
ES1	.464	.433	.257	.358	.501*	.485*	.359	.113	.219	.471*	.425	.662**	.480*
	.052	.073	.303	.145	.034	.041	.144	.656	.382	.049	.089	.003	.044
ES2	.465	.624**	.425	.501*	.690**	.267	.264	-.031	.363	.371	.485*	.414	.504*
	.052	.006	.079	.034	.002	.284	.291	.903	.139	.130	.049	.087	.033
ES3	.464	.433	.257	.358	.501*	.485*	.359	.113	.219	.471*	.425	.662**	.480*
	.052	.073	.303	.145	.034	.041	.144	.656	.382	.049	.089	.003	.044
ES4	.464	.233	-.257	.184	-.063	0.000	-.120	-.395	-.219	-.135	-.194	-.150	-.123
	.052	.352	.303	.465	.805	1.000	.636	.105	.382	.595	.455	.551	.628
ES5	.605**	.514*	.425	.213	.380	.134	.132	.109	.363	.482*	.405	.265	.283
	.008	.029	.079	.396	.120	.597	.602	.668	.139	.043	.107	.288	.256
ES6	.151	.392	.526*	.203	.224	.124	.184	.029	.449	.378	.458	.723**	.610**
	.549	.108	.025	.420	.371	.624	.466	.910	.062	.122	.065	.001	.007
ES7	.218	.203	.121	.359	.412	0.000	.281	.252	.309	.126	.337	.141	.445
	.384	.418	.633	.143	.089	1.000	.259	.314	.212	.617	.186	.576	.064
ES8	.195	.399	.237	.276	.375	.112	.110	-.052	.303	.341	.532*	.194	.380
	.439	.101	.343	.267	.125	.659	.663	.838	.221	.166	.028	.440	.119
ES9	.389	.184	.474*	-.089	-.115	-.149	.221	.052	.405	.248	.470	-.111	.267
	.110	.464	.047	.725	.648	.555	.379	.838	.096	.321	.057	.661	.284
ES10	.669**	.596**	.263	.381	.608**	.248	.428	-.101	.337	-.034	.245	.169	.508*
	.002	.009	.291	.119	.007	.321	.076	.690	.172	.892	.344	.502	.032
ES11	.545*	.307	.474*	.018	.231	.149	.515*	.208	.539*	.248	.470	.222	.514*
	.019	.215	.047	.944	.357	.555	.029	.408	.021	.321	.057	.376	.029
ES12	.272	.522*	.593**	-.036	.144	-.112	.221	.286	.607**	.496*	.635**	.305	.637**
	.274	.026	.010	.888	.568	.659	.379	.250	.008	.036	.006	.218	.004
ES13	.246	.389	.625**	.113	.183	.118	.349	.082	.533*	.294	.544*	.614**	.715**
	.325	.111	.006	.656	.468	.641	.156	.746	.023	.236	.024	.007	.001
ES14	.308	.194	.188	-.113	.183	-.177	0.000	.164	.320	-.049	-.194	-.219	-.033
	.214	.440	.456	.656	.468	.483	1.000	.514	.196	.847	.455	.382	.898
ES15	.465	.514*	.567*	.405	.483*	.134	.395	-.031	.604**	.482*	.659**	.414	.614**

	.052	.029	.014	.096	.042	.597	.104	.903	.008	.043	.004	.087	.007
ES16	.326	.184	.283	-.075	.276	0.000	.000	.388	.121	.037	-.105	.116	.283
	.187	.466	.254	.769	.268	1.000	1.000	.111	.633	.884	.689	.647	.256
ES17	.195	.399	.237	.517*	.462	.447	.331	-.286	.303	.434	.435	.444	.195
	.439	.101	.343	.028	.054	.063	.180	.250	.221	.072	.081	.065	.437
ES18	.575*	.485*	.604**	.359	.500*	.114	.393	.132	.618**	.411	.646**	.141	.634**
	.012	.041	.008	.143	.035	.653	.106	.600	.006	.090	.005	.576	.005
ES19	.369	.291	.750**	.282	.456	.471*	.349	.082	.426	.196	.442	.482*	.715**
	.132	.241	.000	.257	.057	.048	.156	.746	.078	.435	.075	.043	.001
ES20	.428	.123	.237	.437	.462	0.000	.331	.065	.405	.062	.238	-.055	.380
	.076	.627	.343	.070	.054	1.000	.180	.798	.096	.807	.358	.827	.119
ES21	.410	.392	.263	.381	.608**	.124	.306	-.101	.449	.069	.141	.169	.302
	.091	.108	.291	.119	.007	.624	.217	.690	.062	.786	.588	.502	.223

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.47b. Pearson correlation tests at the level of the component variables of e-business strategy (ES) and e-business readiness (ER). (Continued)

Legend
ES1 - Deploying ICT hardware/software for teaching
ES2 - Deploying ICT hardware/software for learning
ES3 - Deploying hardware/software for administration
ES4 - Deploying hardware/software for accounts/finance
ES5 - Deploying hardware/software for library services
ES6 - Deploying specialized software to support research in various disciplines
ES7 - Enhance staff ICT skills through special workshops
ES8 - Enhance students ICT skills though special workshops
ES9 - Strengthen the ICT management unit through staff recruitment
ES10 - Strengthen the ICT management unit through staff training
ES11 - Strengthening the ICT management unit through provision of hardware/software tools
ES12 - Regular update of the university ICT policy
ES13 - Restructuring of academic programmes to integrate ICT teaching and learning tools
ES14 - Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by staff
ES15 - Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by students
ES16 - Maintain an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units
ES17 - Increase the University carrying capacity through Open and Distance Learning (ODL)/e-learning
E18 - Signing Memoranda of Understanding with foreign universities on ICT-related activities
ES19 - Signing Memoranda of Understanding with local firms on ICT-related activities
ES20 - Improvement of power supply towards 24/7 availability
ES21 - Improvement of bandwidth for Internet-based communication
ER1 - The management of this University is highly favorably disposed to e-business operations
ER2 - The management of this University commits adequate financial resources to e-business development
ER3 - This University has a documented IT policy that can supports e-business effectively
ER4 - This university is already operating an e-commerce system for some of its services
ER5 - This University is already using one or more electronic payment systems
ER6 - This university has an IT consultancy service unit
ER7 - This university engages in adequate capacity building to improve the skills of its IT personnel?
ER8 - This university tries to implement its e-business strategies only when competitors do so
ER9 - This university continually searches for new e-business strategies in order to lead the competition
ER10 - There is adequate hardware to support e-business in this university
ER11 - There is adequate software to support e-business in this university
ER12 - There are adequate human resources with appropriate IT skills to drive e-business in this university
ER13 - The type of management culture in this university promotes e-business adoption

4.6.3 E-business readiness and e-business intensity

A significant and positive correlation was observed between ER3 (availability of documented IT policy that can supports e-business effectively) and the eleventh e-business indicator which is email communication within the university. ER7 (adequate capacity building to improve the skills of its IT personnel) was found to positively correlate with online availability of Public and Customer Relations, institutional repository for research and publications by Academics and use of online collaboration tools (groups, wikis, social networks, etc) with industrial firms for RandD purposes (EI3, EI8 and EI15). Also, email communication within the university (EI11) and use of online collaboration tools with industrial firms for RandD purposes (EI15) are two significant factors associated with ER9 which is continually searching for new e-business strategies in order to lead competition. There is also evidence of a link between adequate hardware to support e-business (ER10) and availability of electronic/virtual library services (EI13). Lastly, management culture that promotes e-business adoption (ER13) correlates positively with Web-based business-to-consumer (B2C) transactions, email communication between departments and email communication within the university which are EI7, EI10 and EI11.

Table 4.48a. Pearson correlation tests at the level of the component variables of e-business readiness (ER) and e-business intensity (EI)

	EI1	EI2	EI3	EI4	EI5	EI6	EI7	EI8	EI9	EI10	EI11	EI12	EI13	EI14	EI15
ER1	.[c]	.211	.290	.[c]	0.000	.238	.195	.039	.062	-.156	.326	-.099	.218	.039	-.047
		.400	.243		1.000	.343	.439	.878	.808	.537	.187	.695	.384	.878	.855
ER2	.[c]	.033	-.046	.[c]	-.194	.221	.215	.246	-.049	.123	.294	.172	.391	.430	.037
		.896	.857		.440	.377	.392	.326	.848	.627	.237	.494	.108	.075	.885
ER3	.[c]	.257	.354	.[c]	0.000	.395	.356	.237	.000	.356	.709**	.121	.121	.356	.142
		.303	.150		1.000	.105	.147	.343	1.000	.147	.001	.633	.633	.147	.575
ER4	.[c]	-.164	-.040	.[c]	-.395	-.114	-.045	-.116	-.014	-.205	.117	-.032	.195	.125	.075
		.514	.875		.105	.653	.861	.647	.956	.414	.643	.900	.437	.622	.769
ER5	.[c]	-.063	.258	.[c]	-.456	.256	.029	.404	.091	.115	.380	.294	.412	.404	.242
		.805	.301		.057	.305	.909	.096	.719	.648	.120	.236	.089	.096	.334
ER6	.[c]	-.243	.333	.[c]	-.354	.248	0.000	.224	.000	0.000	.134	.114	.456	.447	.134
		.332	.176		.150	.321	1.000	.372	1.000	1.000	.597	.653	.057	.063	.597
ER7	.[c]	.120	.493*	.[c]	-.232	.428	.110	.551*	.349	.000	.395	.393	.169	.331	.527*
		.636	.038		.353	.076	.663	.018	.156	1.000	.104	.106	.504	.180	.025
ER8	.[c]	.113	.349	.[c]	.205	.360	.182	.403	.390	.416	.109	.344	.132	.169	.311
		.656	.156		.413	.142	.470	.097	.109	.086	.668	.162	.600	.503	.210
ER9	.[c]	.439	.402	.[c]	-.320	.337	.101	.303	.160	.202	.725**	.412	.103	.303	.483*
		.069	.098		.196	.172	.690	.221	.526	.421	.001	.089	.684	.221	.042
ER10	.[c]	.067	-.092	.[c]	-.294	-.069	.062	-.062	-.245	.062	.148	.063	.506*	.310	.074
		.791	.715		.236	.786	.807	.807	.327	.807	.557	.803	.032	.210	.770
ER11	.[c]	.[c]	-.052	.[c]	-.269	.075	.240	.149	-.168	.041	.277	.058	.341	.453	.202
		0.000	.844		.296	.774	.353	.569	.518	.877	.281	.825	.181	.068	.437
ER12	.[c]	-.150	.248	.[c]	-.175	.108	.194	.055	.022	.319	.564*	.368	.141	.430	.182
		.551	.321		.486	.671	.440	.827	.931	.197	.015	.134	.576	.075	.469
ER13	.[c]	.078	.138	.[c]	.130	.416	.658**	.267	.179	.473*	.725**	.121	.068	.452	.160
		.758	.585		.607	.086	.003	.284	.478	.047	.001	.634	.788	.059	.527

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

c. Cannot be computed because at least one of the variables is constant.

Table 4.48b. Pearson correlation tests at the level of the component variables of e-business readiness (ER) and e-business intensity (EI). (Continued)

Legend
ER1 - The management of this University is highly favorably disposed to e-business operations
ER2 - The management of this University commits adequate financial resources to e-business development
ER3 - This University has a documented IT policy that can supports e-business effectively
ER4 - This university is already operating an e-commerce system for some of its services
ER5 - This University is already using one or more electronic payment systems
ER6 - This university has an IT consultancy service unit
ER7 - This university engages in adequate capacity building to improve the skills of its IT personnel?
ER8 - This university tries to implement its e-business strategies only when competitors do so
ER9 - This university continually searches for new e-business strategies in order to lead the competition
ER10 - There is adequate hardware to support e-business in this university
ER11 - There is adequate software to support e-business in this university
ER12 - There are adequate human resources with appropriate IT skills to drive e-business in this university
ER13 - The type of management culture in this university promotes e-business adoption
EI1 – Online information provision or dissemination
EI2 - Online advertising of programmes, services and products
EI3 - Online public and Customer Relations
EI4 - Online information about the university
EI5 - Online administrative services
EI6 - Web-based business-to-business (B2B) transactions
EI7 - Web-based business-to-consumer (B2C) transactions
EI8 - Online institutional repository for research and publications by Academics
EI9 - Online trading of goods or services
EI10 - Email communication between departments
EI11 - Email communication within the university
EI12 - Education and training (eLearning/online course delivery)
EI13 - Electronic/Virtual library services
EI14 - Use of online collaboration tools (groups, wikis, social networks, etc) among staff
EI15 - Use of online collaboration tools (groups, wikis, social networks, etc) with Industrial firms for RandD purposes

4.6.4 E-business intensity and e-business impact

Result in table 4.49 reveals that e-business intensity (EI) indicator number eleven correlates moderately with nine out of eighteen e-business impact (EM) indicators. Advertisement of programmes, services and products (EI2) was found to correlate with improved marketing of education programmes (EM1) and increased researchers' collaborations with researchers abroad (EM17), while web-based business-to-consumer (B2C) transactions (EI7) correlated positively with improved collaborations between Departments and Faculties with Industry (EM18). In addition, a link was established between EI10 (email communication between departments) and EM15 (improved research activities in the university), between EI14 (use of online collaboration tools among staff) and EM15 (improved research activities in the university) and between EI15 (use of online collaboration tools with Industrial firms for RandD purposes) and EM2 (ability to participate in international market for staff/students).

Table 4.49a. Pearson correlation tests at the level of the component variables of e-business intensity (EI) and e-business impact (EM).

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	EM9
EI1	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]
EI2	.685**	.429	-.042	.073	.279	.245	.094	-.015	.085
	.002	.076	.868	.773	.263	.327	.712	.954	.738
EI3	.387	.236	-.058	.101	.230	.303	.276	.183	.250
	.125	.346	.819	.692	.359	.222	.268	.468	.318
EI4	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]
EI5	-.270	.000	-.123	-.107	-.065	-.036	.039	.216	.141
	.295	1.000	.627	.674	.798	.888	.878	.390	.576
EI6	.236	.088	.238	.150	.416	.388	.376	.174	.229
	.362	.729	.343	.554	.086	.111	.124	.490	.360
EI7	.022	.158	.428	.270	.380	.294	.345	.436	.413
	.935	.531	.076	.279	.119	.237	.161	.070	.088
EI8	.344	.079	.039	.236	.360	.418	.431	.177	.190
	.176	.755	.878	.346	.142	.084	.074	.482	.451
EI9	.133	.313	.246	.213	.325	.286	.390	.216	.353
	.610	.207	.325	.396	.188	.250	.110	.390	.151
EI10	.204	.395	-.039	.067	.195	.090	.012	.191	.112
	.431	.104	.878	.790	.437	.721	.961	.448	.659
EI11	.658**	.661**	.326	.403	.614**	.540*	.339	.554*	.547*
	.004	.003	.187	.097	.007	.021	.169	.017	.019
EI12	.306	.282	-.099	.069	.121	.127	.031	.049	.131
	.233	.257	.695	.786	.634	.617	.902	.848	.605
EI13	.303	-.040	-.020	-.069	.068	-.023	.082	-.424	-.131
	.236	.874	.938	.786	.788	.928	.747	.080	.605
EI14	.161	.079	.156	.337	.360	.215	.321	.177	.290
	.536	.755	.537	.171	.142	.393	.195	.482	.243
EI15	.418	.472*	.372	.322	.381	.310	.324	.179	.414
	.095	.048	.128	.192	.119	.210	.189	.477	.088

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

a. Cannot be computed because at least one of the variables is constant.

Table 4.49b: Pearson correlation tests at the level of the component variables of e-business intensity (EI) and e-business impact (EM). (Continued)

	EM10	EM11	EM13	EM14	EM15	EM16	EM17	EM18
EI1	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]
EI2	.250	.225	.366	-.194	.290	-.147	.471*	-.188
	.317	.368	.136	.439	.243	.560	.049	.455
EI3	.404	.085	.402	0.000	.144	.165	.277	.060
	.097	.739	.098	1.000	.570	.512	.265	.814
EI4	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]	.[a]
EI5	.159	-.060	-.107	-.094	-.169	-.195	-.196	.084
	.530	.814	.674	.709	.502	.438	.435	.739
EI6	.362	.367	.411	-.099	.433	.253	.344	.348
	.140	.134	.090	.695	.073	.311	.162	.157
EI7	.381	.321	.034	.090	.300	.234	.155	.507*
	.119	.194	.894	.724	.227	.350	.539	.032
EI8	.251	.444	.674**	.090	.471*	.321	.403	.333
	.316	.065	.002	.724	.049	.195	.097	.176
EI9	.349	.209	.426	.283	.338	.390	.343	.464
	.156	.405	.078	.254	.170	.110	.163	.052
EI10	.110	.151	.135	-.090	.492*	.123	.155	.267
	.663	.549	.594	.724	.038	.626	.539	.285
EI11	.659**	.395	.322	.107	.524*	.339	.593**	.446
	.003	.104	.192	.672	.026	.169	.009	.063
EI12	.189	-.048	.241	.091	.322	.258	.253	.129
	.452	.850	.336	.718	.193	.302	.311	.609
EI13	-.097	-.212	.275	-.091	.267	-.031	.221	-.252
	.701	.399	.270	.718	.284	.902	.378	.314
EI14	.160	-.066	.169	.359	.471*	.431	.217	.333
	.525	.794	.504	.144	.049	.074	.387	.176
EI15	.420	.113	.403	.429	.396	.457	.408	.271
	.083	.655	.097	.076	.103	.057	.093	.277

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

a. Cannot be computed because at least one of the variables is constant.

Table 4.49c. Pearson correlation tests at the level of the component variables of e-business intensity (EI) and e-business impact (EM). (Continued)

Legend
EI1 – Online information provision or dissemination
EI2 - Online advertising of programmes, services and products
EI3 - Online public and Customer Relations
EI4 - Online information about the university
EI5 - Online administrative services
EI6 - Web-based business-to-business (B2B) transactions
EI7 - Web-based business-to-consumer (B2C) transactions
EI8 - Online institutional repository for research and publications by Academics
EI9 - Online trading of goods or services
EI10 - Email communication between departments
EI11 - Email communication within the university
EI12 - Education and training (eLearning/online course delivery)
EI13 - Electronic/Virtual library services
EI14 - Use of online collaboration tools (groups, wikis, social networks, etc) among staff
EI15 - Use of online collaboration tools (groups, wikis, social networks, etc) with Industrial firms for RandD purposes
EM1 - Improved marketing of our education programmes
EM2 - Enabled us to participate in international market for staff/students
EM3 - Enabled us to innovate new marketing strategies for our education programmes
EM4 - Enhanced the productivity of our Students
EM5 - Enhanced the productivity of our Teaching staff
EM6 - Enhanced the productivity of our Non-teaching staff
EM7 - Improved services to our students
EM8 - Improved services to our suppliers and contractors
EM9 - Improved services to our staff
EM10 - Enabled faster production of educational materials
EM11 - Reduced our costs of operation
EM12 - Reduced the cost of course materials for students
EM13 - Improved applications for admission from abroad
EM14 - Improved applications for admission from outside the university catchment area
EM15 - Improved research activities in the university
EM16 - Increased our researchers' collaborations with other universities in Nigeria
EM17 - Increased our researchers' collaborations with researchers abroad
EM18 - Improved collaborations between Departments and Faculties with Industry

4.6.5 E-business impact and organisational strategy

Despite accepting the null hypothesis that there is no significant relationship between e-business impact and organisational strategy, there exist positive significant relationships between the two constructs at the level of component variables. EM5 (enhanced productivity of teaching staff) significantly correlates with OS 3, 6 and 12 which are deployment of ICT facilities to support activities, fostering linkages with international universities and organisations to create value and promoting service to the community. EM6 (enhanced productivity of non-teaching staff) was found to correlate with OS3, OS6, OS10, OS11 and OS12 which are to deploy ICT facilities to support activities, to foster linkages with international universities and organisations to create value, to internationalize its student intake, to internationalize its academic staff and to promote service to the community; while EM7 (improved services to students) correlates with OS3, OS6 and OS12. EM8 (improved services to suppliers and contractors) and EM18 (improved collaborations between departments and faculties with Industry) correlates with only OS12 (to promote service to the community) and OS11 (to internationalize its academic staff) respectively. Lastly, EM17 (increased researchers' collaborations with researchers abroad) has a link with OS3, OS4, OS6, OS7 and OS12 which are to deploy ICT facilities to support activities, to increase revenue generation, to foster linkages with international universities and organisations to create value, to promote global best practices in its activities and to promote service to the community.

Table 4.50a. Pearson correlation tests at the level of the component variables of e-business impact (EM) and organisational strategy (OS).

	OS1	OS2	OS3	OS4	OS5	OS6	OS7	OS8	OS9	OS10	OS11	OS12
EM1	.176	.033	.167	.111	.213	.252	.285	.067	.023	.337	.275	.289
	.485	.897	.507	.661	.396	.313	.251	.791	.929	.172	.269	.244
EM2	.132	.268	-.055	.255	.268	.073	.122	.214	.215	.401	.232	.082
	.603	.283	.828	.307	.283	.774	.629	.393	.392	.099	.355	.747
EM3	.085	-.079	.060	.099	.235	.121	.224	.057	.109	.367	.414	.060
	.738	.754	.812	.695	.349	.631	.371	.823	.665	.134	.088	.814
EM4	.092	-.173	.293	-.042	.080	.174	.197	-.088	.179	.232	.213	.181
	.715	.493	.239	.870	.753	.490	.433	.728	.478	.353	.397	.473
EM5	.396	.117	.550*	.292	.284	.527*	.424	.157	.343	.384	.395	.510*
	.104	.643	.018	.240	.254	.025	.079	.535	.164	.116	.104	.031
EM6	.339	.309	.471*	.283	.243	.536*	.395	.347	.437	.516*	.510*	.524*
	.169	.212	.048	.255	.331	.022	.105	.158	.070	.028	.031	.026
EM7	.373	.151	.604**	.245	.161	.569*	.362	.308	.383	.248	.429	.538*
	.127	.551	.008	.327	.522	.014	.140	.214	.117	.322	.075	.021
EM8	.131	.279	.255	.038	.196	.383	.219	.468	.378	.439	.324	.547*
	.603	.262	.307	.882	.435	.117	.382	.050	.122	.069	.189	.019
EM9	.073	.034	.174	.066	.222	.304	.250	.175	.236	.406	.438	.344
	.772	.893	.490	.794	.376	.220	.317	.487	.345	.095	.069	.162
EM10	.222	-.045	.275	.135	.209	.331	.350	.074	.118	.296	.395	.306
	.376	.859	.269	.593	.406	.180	.155	.771	.640	.233	.104	.217
EM11	.104	.194	0.000	.023	.112	.020	.221	.248	.234	.417	.191	.061
	.682	.441	1.000	.927	.658	.939	.378	.322	.350	.085	.448	.810
EM13	.159	.095	.206	.281	.294	.414	.321	.007	-.047	.269	.093	.255
	.528	.709	.412	.259	.236	.087	.194	.978	.854	.280	.713	.307
EM14	.096	-.205	.293	-.043	-.012	.211	.222	-.124	.044	.179	.025	.096
	.705	.415	.239	.865	.963	.400	.376	.623	.862	.477	.921	.703
EM15	.198	.081	.169	.361	.240	.337	.280	.030	-.158	-.076	.179	.195
	.431	.748	.502	.141	.338	.171	.260	.905	.530	.765	.478	.437
EM16	.196	.164	.293	.288	.205	.357	.272	.157	.133	.166	.161	.218
	.436	.516	.237	.247	.415	.146	.274	.533	.599	.511	.523	.386
EM17	.456	.449	.627**	.476*	.415	.669**	.573*	.435	.403	.459	.442	.563*
	.057	.062	.005	.046	.087	.002	.013	.071	.098	.055	.067	.015
EM18	.176	.147	.330	.184	.328	.447	.458	.380	.227	.401	.528*	.326
	.485	.560	.181	.465	.184	.063	.056	.120	.365	.099	.024	.187

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.50b. Pearson correlation tests at the level of the component variables of e-business impact (EM) and organisational strategy (OS). (Continued)

Legend
EM1 - Improved marketing of our education programmes
EM2 - Enabled us to participate in international market for staff/students
EM3 - Enabled us to innovate new marketing strategies for our education programmes
EM4 - Enhanced the productivity of our Students
EM5 - Enhanced the productivity of our Teaching staff
EM6 - Enhanced the productivity of our Non-teaching staff
EM7 - Improved services to our students
EM8 - Improved services to our suppliers and contractors
EM9 - Improved services to our staff
EM10 - Enabled faster production of educational materials
EM11 - Reduced our costs of operation
EM12 - Reduced the cost of course materials for students
EM13 - Improved applications for admission from abroad
EM14 - Improved applications for admission from outside the university catchment area
EM15 - Improved research activities in the university
EM16 - Increased our researchers' collaborations with other universities in Nigeria
EM17 - Increased our researchers' collaborations with researchers abroad
EM18 - Improved collaborations between Departments and Faculties with Industry
OS1 - Promote teaching and learning
OS2 - Promote scholarship and research
OS3 - Deploy ICT facilities to support activities
OS4 - Increase revenue generation
OS5 - Foster linkages with local universities and firms to create value
OS6 - Foster linkages with international universities and organisations to create value
OS7 - Promote global best practices in its activities
OS8 - Ensure stable academic calendar
OS9 - Internationalize its programmes
OS10 - Internationalize its student intake
OS11 - Internationalize its academic staff
OS12 - Promote service to the community

CHAPTER 5
DISCUSSION

5.1 Introduction

This discussion chapter focused on findings in respect of the research questions, test of hypotheses, Partial Least Square-Structural Equation Model (PLS-SEM), and Pearson correlation tests of relationships among the component variables of the constructs in the SEM model.

5.2 Research question 1:

What are the organisational strategic objectives that Nigerian universities are focusing upon?

There are several strategic objectives Nigerian universities are focusing upon, but topping the list are: to promote teaching and learning, to deploy ICT facilities to support activities, to increase revenue generation, to promote global best practices in activities, and to promote scholarship and research. Other strategies which ranked after the top five include fostering linkages with local universities and firms to create value, internationalization of student intake, and internationalization of academic staff. It is also evident from these strategic objectives that Nigerian universities are defining strategies that are consistent with their visions.

Despite the greater relative emphasis to which the sampled Nigerian universities are aiming to achieve these strategic objectives, it is important that other strategies like fostering linkages with international universities and organisations and promoting service to the community be given improved priority also, as these they are often complementarily interconnected with those that the Nigerian universities are giving priority to. Collaborations with international universities help to improve the global status and competitiveness of a university, while collaborations with organisations are usually means for turning research outputs into valuable products and services that promote the status of a university nationally and globally. Also, services to the community help universities to

be more socially relevant to their communities and thereby also helping their students and graduates to quickly integrate into diverse careers setting in the local communities, national economies, and global environments. Thus, these strategic objectives have often been used as a key tool for a more rational and systematic approach to bringing about greater internationalization in institutional direction and daily operations.

This argument agrees with the findings of Hunter (2013), who opined that if strategic planning in higher education is designed carefully, it creates a space for collaborative implementation and becomes the glue that holds the internationalization process together. In other words, it can act to strengthen the culture that enables the university to become the institution it wants to be. The implication of this is that in order to progressively strengthen the impact of e-business in Nigerian universities, efforts must be geared towards formulating policies and targeting appropriate organisational capabilities to ensure effective implementation of all the interconnected and mutually complementary strategic objectives.

5.3 Research question 2:

What are the e-business strategies that Nigerian universities have been pursuing towards achieving their strategic objectives?

A university is fundamentally information and knowledge producing and sharing system. Therefore, in order for a modern university to achieve its strategic objectives in the electronic age, effective e-business strategies must be planned and synchronized with its organisational strategies, and also implemented effectively. This study found out that among the e-business strategies that Nigerian universities are emphasizing are: ICT infrastructure deployment strategies, ICT skill development strategies, ICT policy strategies, external electronic linkage strategies, and general e-business strategies. However, other findings of the study suggest that the universities are not doing or achieving enough in the areas of enhancing students ICT skills through special workshops, improving power supply towards 24/7 availability, increasing the university carrying capacity through Open and Distance Learning (ODL)/e-learning, and improving bandwidth for faster and more reliable Internet-based communication.

When there is no adequate power supply and bandwidth for Internet based activities, then e-business activities like email communication, video conferencing, research and collaboration will be low or even impossible to carry out. Drawing from the assertion of Kvavi (2002), the Internet and the browser are tools that make e-business possible, but new business strategies and models of service delivery are needed to make it successful and to capture the imagination and loyalty of students, faculty members, and staff members. Therefore, Nigerian universities need to improve the implementation and effectiveness of the above mentioned currently weak e-business strategies which play a crucial role in determining the state of their preparedness for e-business solutions and innovations. Numerous studies have acknowledged that e-business strategies frequently fail not because of inadequate strategy formulation, but because of insufficient implementation (Andersen, 2011; Lafayette, 2013). Thus, National Universities Commission (NUC) must be ready to not only fund universities in the area of e-business technologies, but to also assist the universities with frameworks and experienced experts within and outside the universities to ensure that such funds are appropriately transformed into effectively planned and implemented e-business strategies by the universities.

5.4 Research question 3:

Is the current level of e-business readiness in Nigerian universities adequate?

E-business readiness comprises two aspects – administrative readiness and infrastructural readiness. The findings of this study lend the understanding that, in terms of administrative readiness, exactly two-third of the university management are highly favorably disposed to e-business. Moreover, fifteen of the eighteen sampled universities have established IT consultancy service units, while thirteen are already using one or more electronic payment systems. However, the investment of financial resources to the development and operation for some of these services have not been sufficient (Achimugu et. al., 2009)

From the data collected through student questionnaire, it was deduced that the state of preparedness of Nigerian universities in the areas of online student information portal and online registration is high, as nearly all the sampled universities have these services in place. This is in agreement with the findings of Oyekunle and Mejabi (2012) which

revealed that more than half of the Nigerian universities they studied had online student information system/portal. Other provided e-services that indicate a high level of e-business readiness are the provision of student email box, online result checking, online payment, e-library services, links to social network and university's page on social media. This trend in the sampled Nigerian universities are similar to the findings of Hanover Research (2014) which revealed that institutions in Canada are using technology to its full potential, particularly with emails, social media and other emerging platforms.

However, the areas that need to be addressed are online ordering of transcripts, online access to university publications, online booking of accommodation, e-learning (e.g. courseware) and online chat with officers of the university, as these equally important e-business services were not found to be available in almost all the sampled universities. This finding is similar to that of Kamba (2009) that e-learning application in Nigerian universities was very poor and below expectation, as well as the finding of Oyekunle and Mejabi (2012) which revealed that online ordering of transcripts is not offered by any Nigerian university.

E-services for the teaching and non-teaching staff for which some level of e-business readiness have been achieved by many of the universities are online staff information system or portal, email box and webmail services. Online uploading of examination results and e-library services are additional e-services that teaching staff enjoy in some universities. On the other-hand, online training/tutorial of staff, facilities for online collaboration with other researchers outside the country, online chat with other staff, and facilities for online collaboration with other researchers in the country have not been given much priority, as these services recorded low availability across the universities. These findings shows that university administration need to give adequate attention to many more aspects of e-business readiness.

Information on the web ranking positions of the sampled universities for the year 2015 revealed that none of the sampled universities ranked among the top 100 African universities in any of the categories. In the world ranking of over 20,000 universities, only Ahmadu Bello University ranked in the first 3000, while the two universities that ranked in the first 4000 are University of Nigeria and University of Benin. Under the Web Presence Rank category, only University of Ibadan and Ahmadu Bello University ranked

in the first 3000 and 4000 respectively. No university in the sample ranked among the first 6000 in the Impact Rank category. Under the Openness Rank category, two universities i.e. University of Ibadan and University of Benin ranked among the first 6000. In the Excellence category, only University of Ibadan and University of Nigeria ranked among the first 2000 and 3000 respectively. The stated primary aim of ranking bodies is to promote academic web presence to support open access initiatives thereby increasing significantly the global transfer and exchange of scientific and cultural knowledge generated by the universities. Clearly, Nigerian universities need to do much more in order to earn better positions in future rankings of universities both in Africa and globally by vigorously promoting their academic web presence. The Federal and State Ministries of Education and the National Universities Commission also need to encourage universities in Nigeria by creating an enabling environment for disseminating research findings (especially those funded with public funds) through institutional and national open access initiatives and repositories. Also, the National Universities Commission should consider seriously the creation of a Database of Abstracts of Research Works in all Nigerian universities.

Webometrics (2015) had stated that "in the second decade of the 21st century, the Web is the key for the future of all the university missions, as it is already the most important scholarly communication tool, the future channel for the off-campus distance learning, the open forum for the community engagement and the universal showcase for attracting talent, funding and resources." Nigerian universities themselves have recognized the strategic importance of websites as nearly all the websites evaluated were functional with only one exception. Also, two third of the websites load quickly with a standard dial-up modem and more than half of the universities had a webmail for staff and students. The area with much untapped scope for strategic e-learning opportunities is that of courseware to support teaching and learning in the universities. Nigerian universities currently have either not yet realized the value of courseware for teaching and learning, or have not yet developed courseware, or do not yet consider it fit to deploy their courseware on their websites. However, courseware development and deployment require much investment.

Nevertheless, there are other e-business services for which improvements are needed and can be easily implemented, such as online ordering of transcripts, availability

of site map on websites and secure credit card transactions on websites. In particular, university administrations should quickly make online ordering of transcripts available to their graduates, as this will surely save cost, time and effort for both parties (i.e. the universities and their graduates), reduce the stress graduates face in getting transcripts from anywhere in the world, cultivate goodwill and support from their graduates, and improve their national and global competiveness.

5.5 Research question 4:

What is the e-business intensity level in the universities in terms of diversity, variety and scope of actual e-business operations?

E-business intensity is the variety and quality of the e-business services that a university has actually deployed. Findings revealed that the e-business intensity level in the universities in terms of diversity and variety is fairly adequate. This is because there is fair availability of Internet, LAN/extranet, management information systems, databases and groupware tools. This supports the outcome of the Internet World Stats (2012), where Nigeria ranked first in Africa in terms of Internet usage, with 48 million people out of an approximate population of 170 million (28.4%) use the Internet.

All the 18 sampled universities disseminate information about themselves, 17 out of 18 advertise their programmes, services and products online, and all the sampled universities have functional websites that provide basic information about each university. But, in the case of e-commerce (i.e. trading in goods and services), web-based business-to-business (B2B) transactions, and using online collaboration tools (such as groups, wikis, social networks, etc) with industrial firms for RandD purposes, the findings revealed low intensity. This finding is similar to that of Oyekunle and Mejabi (2012).

Still on e-business intensity, data collected revealed that the total number of computers in the sampled universities and the total available bandwidth are not commensurate with the number of staff and students in the universities; leading to the estimated weekly band width usage to be much below expectation. When the total bandwidth per period provided by a university is disproportionately lower than the desired total demand, most staff and staff and students who have urgent need for Internet connectivity resort to using only the minimum data bundle services they can afford

through various telecommunication service providers like MTN, Glo, Airtel and Etisalat. Also, due to the lower than expected bandwidth that the universities can afford to make available, the usage of video conferencing facilities by the universities was, not surprisingly, also very low, apart from the finding that only 12 of the 18 universities have such facility.

Furthermore, the number of IT personnel in some of the universities was found to be inadequate, a finding very similar to that reported by Olatokun and Opesade (2008). The management of Nigerian universities needs to employ and train enough IT personnel in different cadres. Of relevance here, the University of Ibadan recently approved a scheme of work classification for ICT staff in the university, a policy initiative that should be emulated by all other Nigerian universities that have not done so.

The clear import of all these findings are that although Nigerian universities have begun to invest in some e-business infrastructure, human resources and services, they still have much ground to cover before their currently patchy e-business applications can be transformed into integrated e-business systems that help them to reap integration and scale economies. Thus, the administrators of Nigerian universities must brace up to find ways and means to boost the e-business intensity levels of their universities in these weak identified areas, in order to transform their value creation through e-business applications. This specific recommendation for Nigerian universities is similar to the general point highlighted by Fuchs et al. (2010).

5.6 Research question 5:

What are the impacts of e-business activities in Nigerian universities in terms of measurable organisational strategy variables?

This study focused its searchlight on the following dimensions of e-business impact: students, staff, productivity, research and collaboration, cost, admission and marketing. The ways the e-business activities of sampled Nigerian universities have impacted on students include improvement in the students' ICT skills, use of improved learning methods (based on courseware), time saving (from online registrations and other related transactions) and better one-click access to some information about their universities, faculties, departments and halls of residence.

For the teaching staff, the areas of impact are speedier information communication and exchange with other teaching staff and with the university, teaching becoming easier with the use of technology, and access to information about the university any day any time. This is in agreement with earlier studies (Achimugu et. al., 2010; Hong and Songan, 2011), which outlined the impacts of ICT diffusion in Nigeria's tertiary education.

For the non-teaching staff, the highest impact area is work made easier as a result of reduced paper work. From the viewpoint of the management, the impact is higher in the area of productivity and also in the area of research and collaboration. This result is in agreement with the findings of Hoosen (2010), who reported that with the use of an online software, Kenyatta University recorded a financial gain of $4 million a year as a result of being able to track student non-payment of fees and an increase in the number of graduates, as computerized administration systems have reduced room for human error, prevented loss of student records, and enabled quicker processing of marks.

Meanwhile, there is low impact in the areas of admissions and marketing, i.e. e-business has not improved applications for admission originating from abroad, has not improved applications for admission from outside the university catchment area, has not improved marketing of academic programmes, has not enabled participation in international markets for staff or students, and has not led to innovations in marketing strategies for programmes. The impact on reduced costs of operation was also not high. This finding supports the conclusion of Fuchs et al. (2010) that there is relatively low e-business impact level with regard to cost savings (e.g., marketing costs, costs of internal processes, and costs of coordinating business partners). Another low impact area, in the purview of the teaching and non-teaching staff, is access to electronic grant and development initiatives. This finding buttresses the previous finding that there is low use of online collaboration tools (groups, wikis, social networks, etc) with industrial firms for RandD purposes. Hence, universities need to make an effort to tap the opportunities created by the online platform for effective online networking for creating and accessing grant databases, and for facilitating collaboration by their staff with domestic and global institutions and firms to attract research and development grants.

5.7 Research question 6:

Are there any major differences in the behavior of the variables across type of universities and geo-political zone?

A cross tabulation was done to see if there were any major differences between the behaviors of organisational strategy, e-business strategy, e-business readiness, e-business intensity and e-business impact across type of universities and geo-political zones. The result revealed that there was no noteworthy difference in the behavior of the variables across geo-political zones and type of universities. This implies that the organisational strategy put in place by federal universities, state universities and private universities are nearly the same. Also the e-business strategies, readiness, intensity and impact in Nigerian universities were found to be nearly the same in private, state and federal universities and also in the six geo political zones of the country. This further demonstrates that even the privately owned universities in the country are investing in e-business infrastructures just like the state and federal universities.

5.8 Research question 7:

What are the challenges faced by Nigerian universities in the adoption of e-business?

For the students, the factors that challenge most of them the most are unavailability when needed of some online services provided by the university, perceived low usefulness of some available services, the websites suffering various problems during registration process for students, and contact us mails not being replied promptly. Online services like webmail, access to university publications, chat with an officer, online payments etc, are sometimes not available when they are needed. For example, chat with an officer online more often than not is hardly available for students. This means that most universities just have it on their website/portal and don't ensure that it works. Also, university websites are often unable to cope with the usually heavy traffic of students to the website during registration periods, thereby making such sites very difficult and frustrating to connect to at such periods. The frustration causes some students not to be able to register as at when due, thereby incurring late registration penalties. University management must therefore ensure that all online services they claim to provide to users are working properly to

guarantee service quality. Universities must also prevent denial of service attacks by installing appropriate web application firewall on their institutional servers.

For the teaching staff too, the major e-business challenges faced are unavailability when needed of some online services provided by their universities, alongside the provision of services of perceived low usefulness to them. For instance, most contact us mails are not replied to, and not even an auto-responder is put in place. As well, some universities put in place online services like search facility on their website which in most cases does not output any result. Hence, universities should at least have auto-responders in place when mails are not likely to be responded to quickly and prompt response should follow as soon as possible. This will ensure that staff and students can count on such channel for information.

For the university management, the topmost e-business challenge are underdeveloped electronic payment systems in the country, high cost of maintenance of IT infrastructure, inadequate policies of Government in the IT sector of the country, inadequate security for online transactions in the country, and lack of commitment from management of the university. According to a cyber survey conducted recently, Nigeria is the most internet fraudulent country in Africa (Ibikunle, 2013). The National Cyber Security Initiative (NCI) began in 2003 as a corrective measure and the Nigerian Cybercrime Working Group (NCWG) began working to meet the objectives of NCI; but their efforts do not seem to match up to the rate of growth of cybercrime. The Nigerian government can reduce the rate of cyber crimes through the use of IP address tracking software, formulation of Cyber ethics and cyber laws and so on.

Meanwhile, the University Management did not consider to be major challenges the low use of library e-resources by students and academic staff of the university, and low use of Internet connectivity infrastructure by students and academic staff of the university, In respect of Internet connectivity, This may be because management only get reports on the small picture that the existing Internet bandwidth is heavily used by students and staff for Internet connectivity during peak periods of the day, but are oblivious of the big picture of the currently very low levels of the provided Internet bandwidth relative to students and staff populations in the universities. University managements need to see, study and address the big picture of Internet connectivity

because the existing situations may be forcing their staff and students to find alternative ways of accessing the Internet at their own cost.

In respect of challenge of low use of library resources that university management did not rate as a major problem, the reason might be that they are not fully aware of the research findings in many universities worldwide that, although university students and staff tend to prefer electronic to print library resources, even the expensively subscribed to electronic resources are often not adequately used by the staff and students, who often prefer to use alternative electronic resources obtained through the Internet more easily anywhere and anytime than from their university portals. In this respect, it is important to recognize that the low available bandwidth problem in the universities and its frustrating effects on students and staff are connected with the low use of library e-resources. Thus, low bandwidth levels usually directly affect Internet access by students and staff through university provided infrastructure, which may indirectly fuel frustrations with other university-provided e-business services such as library electronic resources. This possible connection is an instance of the negative impact of the patchy and un-integrated e-business services highlighted in the discussion of research question four above.

5.9 Test of hypotheses

Findings from the correlation analyses between the constructs of the study revealed a moderate positive linear relationship between organisational strategy and e-business strategy, a strong positive and reliable linear relationship between e-business strategy and e-business readiness, a moderately positive linear relationship between e-business readiness and e-business intensity, a weak positive linear relationship between e-business intensity and e-business impact, and a weak positive linear relationship between e-business impact and organisational strategy.

The positive linear relationship between organisational strategies and e-business strategies of the sampled universities suggests that Nigerian universities appear to be correctly using their organisational strategic objectives to formulate the appropriate e-business strategies; however, the moderate level of the relationship suggests only a moderate level of alignment of organisational strategies of the sampled universities and with their e-business strategies, and indicates need for improved alignment.

The strong positive and reliable linear relationship between e-business strategy and e-business readiness of the universities shows that the e-business strategies put in place by the Nigerian universities is associated with a strengthening of their e-business readiness. As defined and investigated in this study, the investments in hardware, software and human resources are e-business strategies which, when correctly planned, developed and deployed usually results in the availability of improved technical and commercial infrastructures required for e-business.

The strong positive and linear relationship between e-business readiness strategy and e-business intensity that was found from the analyses means that when Nigerian universities preparedness for e-business is achieved in terms of required investments in hardware, software and human resources, they are usually able to integrate the resources into viable technical and commercial e-business infrastructures which they use to provide various e-business services that define their e-business intensity. In other words, e-business readiness (measured by the presence of technical, commercial and social infrastructures) in the universities have often also associated with the actual usage and increased volume of e-business services in the universities. This means that the challenge of Nigerian universities is less likely to be inability to use established infrastructures to provide e-business services and more likely to be the inadequacy of investible resources to boost their technical and commercial e-business infrastructures for higher e-readiness and intensity.

The weak positive linear relationship between e-business intensity and e-business impact, discovered in this study is a source of concern. On the surface, it suggests that although Nigerian universities tend to use their deployed e-business infrastructure to provide services, they are not deriving much or maximal impact from such activities commensurate with the intensity of their e-business services. This is however not surprising, because, as reported in a previous section of this discussion, e-business services in the universities are currently mostly patchy, which means that the transformational benefits of mutually complementary and integrated e-business services are yet to be reaped by the universities. However, correlation analyses between the component variables of the e-business intensity construct and the component variables of the e-business impact construct revealed that some e-business intensity indicators were

significantly correlated with the e-business impact indicators. For instance, advertisement of programmes, services and products was found to correlate with improved marketing of education programmes and increased researchers' collaborations with researchers abroad, web-based business-to-consumer (B2C) transactions correlated positively with improved collaborations between departments and faculties with Industry, while use of online collaboration tools among staff was correlated with improved research activities in the university.

The final hypothesis tested concerns whether there is a significant relationship between e-business impact and organisational strategies. The European Commission (2008) emphasizes that e-business promises substantial impact and gains for institutions and firms. However, the result of the test of this hypothesis illustrates that at least among the sampled universities, the impact of the intensity of use of the deployed e-business resources is not associated with fundamental impact on the universities, not does it bond adequately with the organisational strategies that are expected to drive the chain of positive causal relationships from organisational strategy to e-business strategy, to e-business readiness, to e-business intensity and to e-business impact. Dos Santos and Sussman (2000) had also found similar low level of connection between e-business intensity and impact and organisational strategies among some firms in the United States, and attributed this to that the firms fail to prepare or respond well to the structural changes caused by IT in their operations.

However, it is important to note that significant gains from e-business highlighted by the European Commission (2008) can only be realized when organisations strategize for, and invest adequately in appropriate and complementary e-business infrastructures, human resources and processes. Thus, much depends on, initially the organisational strategy and its value chain interconnections with e-business strategy, readiness, intensity and impact. Thus, university management need not only to regularly look at their strategic objectives and e-business strategies together to ensure adequate alignment, but to also relate the dynamic impact of their e-business systems and services to their organisational objectives. In other words, university administrators must realize that with rapid changes in their physical and online environments, there is need to adopt a dynamic programming approach to synchronize their organisational objectives with their e-business strategies,

readiness and intensities in order to derive maximum transformational benefits from their e-business initiatives and services.

5.10 Structural equation model

The inner model of the PLS-SEM that was estimated suggests significant hypothesized path relationships between organisational strategy and e-business strategy (0.479), between e-business strategy and e-business readiness (0.862), between e-business readiness and e-business intensity (0.600) and between e-business intensity and e-business impact (0.427). This implies that Nigerian universities are formulating organisational strategies that are consistent with their e-business strategies which in turn strengthen their e-business readiness and intensity. Statistically, e-business strategy is seen to strongly predict e-business readiness than other variables predict one another. This means that when the management culture, motivations and policies of a university promotes e-business adoption (e-business strategy indicator), then there will be deployment of ICT hardware/software for teaching and learning (e-business readiness indicator). However, the hypothesized path relationship between e-business impact and organisational strategy is not statistically significant. This is because it's standardized path coefficient (-0.299) is lower than 0.1.

These results of the multi-variate path analysis through PLS-SEM modeling confirm in all respects the results and findings from the bivariate Pearson correlation analyses reported and discussed in the previous section of this chapter, thereby proving the robustness of the results and findings.

5.11 Inter-correlation among component variables of the key constructs

In the tests of hypotheses using the Pearson correlation method, insignificant relationships were revealed between (i) e-business intensity and e-business impact, and (ii) e-business impact and organisational strategy. Also, in the path analysis using the PLS-SEM method, insignificant path relationship was revealed between e-business impact and organisational strategy.

These findings suggest poor synchronization in the universities between these pairs of construct variables. However, despite these insignificant relationships at the construct

level, it was considered important to find out if there were high, moderate, low positive or negative correlation between some of the individual component variables of the e-business intensity construct and some individual component variables of the e-business impact construct (and similarly for the e-business impact and organisational strategy constructs). The rationale was in order to find out if there were significant positive or negative relationships between the component variables of the constructs that are hidden under the construct level analyses. This led to the various Pearson correlation tests that were performed and interpreted at the level of the component variables of the constructs, and reported in Chapter four.

(a) E-business intensity (EI) and e-business impact (EM)

The results revealed that email communication within the university which is the e-business intensity (EI) indicator number eleven correlates moderately with nine out of eighteen e-business impact (EM) indicators. The nine indicators are improved marketing of our education programmes, enabled us to participate in international market for staff/students, enhanced the productivity of our teaching staff, enhanced the productivity of our non-teaching staff, improved services to our suppliers and contractors, improved services to our staff, enabled faster production of educational materials, improved research activities in the university and increased our researchers' collaborations with researchers abroad. This suggests the crucial role email communication plays in the university environment. This finding supports that of Bynoe (2002) who hinted that one of the great benefits of having an email as part of e-business is that it can help break down geographical constraints that previously existed. Bynoe (2002) also noted that by using online communication tools (including email), one can now broaden one's client base and access new markets all over the world-at relatively little cost making it no longer necessary to conduct business face to face.

Advertisement of programmes, services and products (EI-2) was found to correlate with improved marketing of education programmes (EM1) and increased researchers' collaborations with researchers abroad (EM17). Of course, advertisements are fundamental strategies in the marketing of programmes, so the correlation between adverts and marketing is as expected. Furthermore, the correlation between adverts of

programmes, services and products and researchers' collaborations with researchers abroad suggests that such adverts might help researchers in universities to identify possible areas of research expertise that they can collaborate on. These correlations underscore the interwoven opportunities e-business brings to universities.

Also, web-based business-to-consumer (B2C) transactions (EI-7) correlated positively with improved collaborations between departments and faculties with industry (EM18), while a strong correlation was revealed between EI-10 (email communication between departments) and EM15 (improved research activities in the university), between EI-14 (use of online collaboration tools among staff) and EM15 (improved research activities in the university) and between EI-15 (use of online collaboration tools with industrial firms for RandD purposes) and EM2 (ability to participate in international market for staff/students). Research activities are essentially information search and sharing intensive and often entailing much communicative interactions among researchers who might be located in several institutions. So, these findings suggests that research activities in the universities might have improved simply by ensuring that staff and students are easily able to communicate and collaborate with each other using various online platform, tools and services.

(b) E-business impact (EM) and organisational strategies (OS)

Despite accepting the null hypothesis that there is no significant relationship between e-business impact and organisational strategy, the analyses at the component variable level revealed positive significant relationships between some of the component variables of EI and OS. The e-business impact variable EM5 (enhanced productivity of teaching staff) significantly correlates with three organisational strategy indicators which are deployment of ICT facilities to support activities, fostering linkages with international universities and organisations to create value, and promoting service to the community. Furthermore, EM6 (enhanced productivity of non-teaching staff) was found to correlate with five of the organisational strategy indicators which are: deploy ICT facilities to support activities, foster linkages with international universities and organisations to create value, internationalize student intake, internationalize its academic staff, and promote service to the community; while EM7 (improved services to students) correlates with

deployment of ICT facilities to support activities, fostering linkages with international universities and organisations to create value, and promoting service to the community. EM8 (improved services to suppliers and contractors) and EM18 (improved collaborations between departments and faculties with Industry) correlates with only OS12 (to promote service to the community) and OS11 (to internationalize academic staff) respectively. Lastly, EM17 (increased researchers' collaborations with researchers abroad) has a link with five of the organisational strategy indicators which are to deploy ICT facilities to support activities, to increase revenue generation, to foster linkages with international universities and organisations to create value, to promote global best practices in its activities and to promote service to the community.

All these findings suggest that in spite of poor synchronization in the universities between e-business impact variables and organisational strategy variables, the impact of the intensity of use of the deployed e-business resources partly correlates with the organisational strategies in some specific ways. This is in agreement with the findings of Gholami, et. al. (2009) that, while the communication and internal administration aspects of e-business positively affect performance outcomes, the more high-profile activities related to online order taking and e-procurement do not.

(c) Organisational strategy (OS) and e-business strategy (ES)

Notwithstanding the significant correlation that was revealed between organisational strategy and e-business strategy at the construct level, it was considered also important to investigate the relationships between the constructs at the level of their component variables. The investigation revealed that the OS components variables of promoting teaching and learning, promoting global best practices in its activities, ensuring stable academic calendar, and internationalizing programmes correlate highly with the ES component variables of strengthening the ICT management unit through provision of hardware/software tools, maintaining an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units, and signing memoranda of understanding with foreign universities on ICT-related activities. However, there was no correlation between each of the OS component variables to promote teaching and learning and the e-business strategy component variable of deploying hardware/software for administration.

This lack of correlations probably reflects the lack of strong link between the strategic objective of promoting quality teaching and learning in academic departments and the e-business objective of acquiring and deploying e-business applications for university administrators (heads of department, deans of faculty, and university management) that enable them to monitor, coordinate and evaluate teaching and learning processes and outcomes in the academic departments. One such application is the use of data mining software by administrators to interrogate databases containing data on teaching and learning processes and outcomes in departments. But that is if other e-business applications have collected the data in the first place. The lack of correlation noted here suggests that although Nigerian universities aim to promote teaching and learning, they are however not deploying hardware/software for administration designed to help achieve this particular organisational strategic objective. There is need for proper alignment of all e-business strategies with organisational strategic objectives considering the view of Kvavi (2002) that new e-business strategies will radically change the service culture of educational institutions and greatly improve the efficiency and effectiveness of service delivery.

(d) E-business strategies (ES) and e-business readiness (ER)

Despite the fact that significant positive correlations were obtained between e-business strategy and e-business readiness constructs, there was lack of association between some individual component variables of the two constructs. For instance, ES1 (deployment of ICT hardware/software for teaching) and ES3 (deployment of hardware/software for administration) individually correlates highly with ER12 (adequate human resources with appropriate IT skills to drive e-business), but only moderately with ER5, ER6, ER10 and ER13 which are: use of one or more electronic payment systems, availability of an IT consultancy service unit, adequate hardware to support e-business, and management culture that promotes e-business adoption. However, ES1 (deployment of ICT hardware/software for teaching) did not correlate with ER2 (University management committing adequate financial resources to e-business development).

Also, there is high correlation between ES2 (deploying ICT hardware/software for learning) and ER2 (commitment of adequate financial resources to e-business

development and ER5 (use of one or more electronic payment systems). On the other hand, the ES strategies of deploying hardware/software for accounts/finance, enhancing staff ICT skills through special workshops, diversification of opportunities for ICT acquisition by staff, maintaining an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units and improvement of power supply towards 24/7 availability did not correlate with any of the ER component variables. These ES component variables influence the quality of the internal and external processes in the universities. This implies that even though e-business strategy (ES) was found to be a good predictor of e-business readiness (ER) at the construct level, some of the component variables of the ES and ER constructs do not contribute to the prediction. These findings underscore the need for Nigerian universities to improve on the computerization and quality of their internal and external processes so as to advance their state of preparedness to embrace e-business technologies.

(e) E-business readiness (ER) and e-business intensity (EI)

There exist no correlation between some of the e-business readiness indicators and the e-business intensity indicators despite the significant and positive correlation that was observed between ER and EI at the construct level. ER7 (adequate capacity building to improve the skills of its IT personnel) correlated positively with EI-3 (online availability of Public and Customer Relations), EI-8 (institutional repository for research and publications by academics) and EI-15 (use of online collaboration tools with industrial firms for RandD purposes). But ER7 did not correlate with provision of electronic/virtual library services and web-based business-to-consumer (B2C) transactions. Also, ER9 (continually searching for new e-business strategies in order to lead competition) correlated strongly with. EI-11 (email communication within the university) and EI-15 (use of online collaboration tools with industrial firms for RandD purposes). This implies that there is need for Nigerian universities to translate all their technical, commercial and social infrastructures as well as behavioral factors into actual usage and increased volume in order for value creation processes to be induced and maximized (OECD, 1999).

CHAPTER 6

SUMMARY AND CONCLUSIONS

6.1 Summary

Nigerian universities need to ensure that the impact of the intensity of use of deployed e-business resources connects effectively to the organizational strategies that are expected to drive the chain of positive causal relationships from organizational strategy to e-business strategy, to e-business readiness, to e-business intensity, to e-business impact, and then back to organizational strategy. The objectives of this study were to (i) investigate the organisational strategic objectives Nigerian universities are focusing on, (ii) identify and assess the e-business strategies that Nigerian universities have been pursuing towards achieving their strategic objectives, (iii) evaluate the adequacy of e-business readiness in Nigerian universities, (iv) measure e-business intensity levels in the universities in terms of diversity, variety and scope of actual e-business operations, (v) investigate the impact of e-business activities in Nigerian universities in terms of measurable organisational strategy variables, (vi) find out whether there are major differences in the behavior of the variables across type of universities and geo-political zone, (vii) find out the challenges faced by Nigerian universities in the adoption of e-business.

This study adopted triangulation method for data collection and these were survey of university management; survey of ICT staff; survey of users of the e-business services; i.e. staff and students; and lastly evaluation of university's websites. The total number of copies of the student questionnaire administered was 3,909 on undergraduates and 567 on postgraduates, making a total of 4,476, while 2597 and 479 were returned for undergraduate and postgraduate respectively. A total of 743 copies of the questionnaire for teaching staff and 1,498 for the non-teaching staff were also administered, while 638 and 1003 were returned. The fourth questionnaire designed for Management Staff in the universities (comprising Principal Officers, Deans and Heads of Department and Units) was administered on 160 of them with 108 returned. Finally, five copies of the fifth

questionnaire designed for IT staff was administered in each university, for a target total of 90 and 82 were returned.

The findings of the study are summarized as follows:

1. Nigerian universities are defining strategies that are consistent with their visions and there are several such strategic objectives they are focusing upon. Nevertheless, some strategies need to be given improved priority, as they are often complementarily interconnected with those that the Nigerian universities are giving more priority.
2. Nigerian universities are not doing or achieving enough in some of the e-business strategies and therefore, they need to fortify their e-business strategies as it plays a crucial role in determining the state of preparedness of an organisation to embrace or adopt e-business technologies.
3. The findings of this study lend the understanding that, in terms of e-business readiness, there is adequate administrative readiness, but infrastructural readiness needs to be improved.
4. The e-business intensity level of the universities is fairly adequate in terms of diversity/variety, but rather inadequate in scope. So in order to transform their value creation through e-business applications university administration need to give adequate attention to many more aspects of e-business readiness.
5. Information on the web ranking positions of the sampled universities for the year 2015 revealed that in the world ranking of over 20,000 universities, none of the sampled universities ranked among the top 100 African universities in any of the categories.
6. Findings from the correlation analyses between the main constructs of the study revealed a moderate positive statistical relationship between organisational strategy and e-business strategy, suggesting that there is a moderate level of alignment of organisational strategies of the sampled universities and their corresponding e-business strategies
7. A strong positive and dependable linear relationship exists between e-business strategy and e-business readiness, meaning that e-business strategies put in place by Nigerian universities tend to strengthen their e-business readiness.

8. Significant moderate positive relationship was found between e-business readiness and e-business intensity, implying that e-business readiness (measured by the presence of technical, commercial and social infrastructures) in the universities have often also resulted to the actual usage and increased volume of e-business services in the universities.
9. A weak positive but insignificant relationship between e-business intensity and e-business impact, suggesting that on the surface, although Nigerian universities tend to use their deployed e-business infrastructure to provide services, they are not deriving much or maximal impact from such activities commensurate with the intensity of their e-business services.
10. There was insignificant positive linear relationship between e-business impact and organisational strategy, denoting the fact that the impact of the intensity of use of the deployed e-business resources does not connect effectively to the organisational strategies of the universities.
11. The result of the estimated inner model of the PLS-SEM suggests statistically significant hypothesized path relationships between organisational strategy and e-business strategy (0.479), between e-business strategy and e-business readiness (0.862), between e-business readiness and e-business intensity (0.600), and between e-business intensity and e-business impact (0.427). However, the hypothesized path relationship between e-business impact and organisational strategy is not statistically significant. This is because it's standardized path coefficient (-0.299) is lower than 0.1 and also negative.
12. All of the T-statistics are greater than 1.96, indicating that the outer model loadings of the PLS-SEM are significant.
13. Each latent variable's Average Variance Extracted (AVE) values except for one are greater than 0.5, confirming that there is convergent validity.
14. The indicator reliability values, except for a few, are larger than the minimum acceptable level of 0.4 and the values of the composite reliability (which is replacement for Cronbach's alpha) are larger than the acceptable 0.7 level, meaning that there is high level of internal consistency reliability among all five reflective latent variables.

15. In the tests of hypotheses using the Pearson correlation method, insignificant relationships were revealed between (i) e-business intensity and e-business impact, and (ii) e-business impact and organisational strategy. Also, in the path analysis using the PLS-SEM method, insignificant path relationship was revealed between e-business impact and organisational strategy. However, despite these insignificant relationships at the construct level, significant positive relationships were found between some of the component variables of the constructs, which were hidden under the construct level analyses.
16. The R^2 value for the developed model is 0.458 which is higher than the suggested value, the model is considered to have substantial degree of explained variance of organisational strategy by e-business strategy, e-business strategy by e-business readiness, e-business readiness by e-business intensity and e-business intensity by e-business impact.

6.2 Conclusions

On the whole, Nigerian universities are formulating organisational strategies that are consistent with their e-business strategies which in turn strengthens their e-business readiness and intensity. Nevertheless, e-business services in Nigerian universities are at present mostly erratic, which means that the transformational benefits of mutually complementary and integrated e-business services are yet to be reaped by the universities. There is need to effectively re-strategize their organisational and e-business objectives based on the impact realized from previous and ongoing e-business operations in their universities. The challenge of Nigerian universities is more likely to be from the inadequate investible resources to boost their technical and commercial e-business infrastructures for higher e-readiness than their inability to use the infrastructure to provide e-business services. For instance, both public and private universities can develop and deploy adequate e-business resources within a public-private partnership paradigm, as some Nigerian private universities have already been doing.

6.3 Contributions to knowledge

The study has made substantial contributions to e-business research in the following ways:

1. The developed and validated structural equation model of the path relationships among the five key constructs of the study provides adequate levels of explained variance of organisational strategy by e-business strategy, of e-business strategy by e-business readiness, of e-business readiness by e-business intensity, and of e-business intensity by e-business impact in the Nigerian university system. This demonstrates the viability and value of the data conceptualization, measurement collection and analysis approaches that was used for researching the interrelationships of e-business development and variables in the universities.
2. The study contributes to the e-business research literature by contributing new conceptualizations of the five key variables of the thesis in the contexts of Nigerian universities which can be adopted, adapted or improved upon by researchers for other universities worldwide.
3. The detailed conceptualization and measurement of each of the five key constructs of the study – organisational strategy, e-business strategy, e-business readiness, e-business intensity and e-business impact - in terms of diverse and specific policy-related sub-variables in the environmental context of Nigerian universities had not been attempted before. This enabled deep level analyses of the relationships among these sub-variables and provides a database of information and baseline analyses which policy makers in specific Nigerian universities in the sample of universities or policy makers in Nigerian tertiary education can use as the foundation for further strategy development and implementation to deepen and optimize e-business in the Nigerian tertiary education system.
4. The study has identified important areas of weakness in the current levels and synchronization of the five key constructs and their component sub-variables, on which Nigerian universities need to refocus their attention in order to catalyze, sustain or consolidate their transformation and value creation through e-business investments. The policy imports of this weakness have been provided as

recommendations to the various stakeholders in the development of Nigerian universities and tertiary education.

6.4 Recommendations

Based on the findings from the study, it is therefore recommended that:

1. University management must gear efforts towards formulating policies and targeting appropriate organisational capabilities to ensure effective implementation of all the interconnected and mutually complementary strategic objectives in order to progressively strengthen the impact of e-business in their institution.
2. The National Universities Commission (NUC) should not only fund universities in the area of e-business technologies, but also assist the universities with frameworks and experienced experts within and outside the universities to ensure that such funds are appropriately transformed into feasible and effectively implemented e-business strategies by the universities.
3. The Federal, State Ministries of Education and the National Universities Commission (NUC) need to encourage universities in Nigeria by creating an enabling environment for disseminating research findings (especially those funded with public funds) through institutional and national open access initiatives.
4. The National Universities Commission (NUC) should consider the creation of a Database of Abstracts of Research Works in all Nigerian universities.
5. The management of Nigerian universities needs to employ and train enough IT personnel in the various cadres to enable the delivery of maximal e-business value to their institutions.
6. Nigerian universities ought to make an effort to tap the opportunities created by the online platform for effective online networking for creating and accessing grant databases, and for facilitating collaboration by their staff with domestic and global institutions and firms to attract research and development grants.
7. University management need to adopt a dynamic programming approach to synchronize their organisational objectives and their e-business strategies, readiness and intensities in order to derive maximum transformational benefits from their e-business initiatives and services.

8. Universities must create and implement evolutionary ICT strategic plans, policies, standards, operational plans, and budgets that are adequately sensitive to emerging technologies and their changing needs and practices.
9. As more buildings are erected in universities, the university management should factor in Internet connectivity for all new buildings and endeavor to increase the number of data access points in existing buildings.
10. University management should ensure that IT policies and procedures are evaluated and reengineered periodically and regularly.

6.5 Suggestions for further research

There are some propositions for further research that logically arise from the findings and limitations of this research. Hence, suggestions for further research include:

1. The use of longitudinal testing and multiple time period measurements could be useful to observe causal relations between all the study variables. A longitudinal design overcomes problems in observing a time lag between the variables.
2. To extend the scope of the relationships among the variables. For example looking at the relationship between organisational strategy and all other variables, and not only e-business strategy.
3. It would be interesting to test the model characteristics in a different context, for example in other sectors of the economy.

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APPENDIX I
MANAGEMENT QUESTIONNAIRE
Africa Regional Centre for Information Science
University of Ibadan

Dear Respondent,

I am conducting a doctoral research on "Relationships among Organisational Strategy and E-business Strategy, Readiness, Intensity and Impact in Nigerian Universities", and your University has been sampled to participate in this study. Your responses and views are highly important in achieving the objectives of this study. The information provided will be treated as confidential and only aggregated data from all respondents will be used and reported for this study. Thank you for your valuable time, attention and cooperation.

Yours Faithfully,

Rafiat Ajibade Oyekunle (Researcher) **Professor M. A. Tiamiyu (Supervisor)**

PART 1: DEMOGRAPHIC DATA:

1. Name of University: _____
2. Your designation/position _____

PART 2: ORGANISATIONAL STRATEGY, E-BUSINESS STRATEGY, READINESS, INTENSITY, IMPACT AND CHALLENGE

.

Section A: Organisational Strategy

1. To what extent do you think your university is aiming to achieve each of the following strategic objectives in the next five years?

	Very low	Low	Moderate	High	Very high
Promote teaching and learning					
Promote scholarship and research					
Deploy ICT facilities to support activities					
Increase revenue generation					
Foster linkages with local universities and firms to create value					
Foster linkages with international universities and organisations to create value					
Promote global best practices in its activities					
Ensure stable academic calendar					
Internationalize its programmes					
Internationalize its student intake					
Internationalize its academic staff					
Promote service to the community					

Section B: E-business Strategy

2. Which of these e-business strategies does your university employ to achieve its strategic objectives?

ICT deployment strategies Deploying ICT hardware/software for teaching	Yes	No	Don't know
Deploying ICT hardware/software for learning			
Deploying hardware/software for administration			
Deploying hardware/software for accounts/finance			
Deploying hardware/software for library services			
Deploying specialized software to support research in various disciplines			
Skill Development Strategies Enhance staff ICT skills through special workshops			
Enhance students ICT skills though special workshops			
Strengthen the ICT management unit through staff recruitment			
Strengthen the ICT management unit through staff training			
Strengthening the ICT management unit through provision of hardware/software tools			
Policy Strategies Regular update of the university ICT policy			
Restructuring of academic programmes to integrate ICT teaching and learning tools			
Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by staff			
Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by students			
External Linkage Strategies Maintain an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units			
Increase the University carrying capacity through Open and Distance Learning (ODL)/e-learning			
Signing Memoranda of Understanding with foreign universities on ICT-related activities			
Signing Memoranda of Understanding with local firms on ICT-related activities			
General E-business Strategies Improvement of power supply towards 24/7 availability			
Improvement of bandwidth for Internet-based communication			

Section C: E-business Impact

3. What are the observable impacts of e-business adoption in your university? Tick all that applies.

E-business has	No Extent	Low Extent	Moderate Extent	High Extent	Very high Extent
Impact on Marketing Improved marketing of our education programmes					
Enabled us to participate in international market for staff/students					
Enabled us to innovate new marketing strategies for our education programmes					
Impact on Productivity Enhanced the productivity of our Students					
Enhanced the productivity of our Teaching staff					
Enhanced the productivity of our Non-teaching staff					
Improved services to our students					
Improved services to our suppliers and contractors					
Improved services to our staff					
Enabled faster production of educational materials					
Impact on Cost Reduced our costs of operation					
Reduced the cost of course materials for students					
Impact on Admission Improved applications for admission from abroad					
Improved applications for admission from outside the university catchment area					
Impact on Research and Collaboration Improved research activities in the university					
Increased our researchers' collaborations with other universities in Nigeria					
Increased our researchers' collaborations with researchers abroad					
Improved collaborations between Departments and Faculties with Industry					

Section D: E-business Challenges

4. To what extent does each of the following pose a challenge in the implementation of e-business? Tick all that applies.

E-business challenges	No Extent	Low Extent	Moderate Extent	High Extent	Very high Extent
Underdeveloped electronic payment systems in the country					
Inadequate policies of Government in the IT sector of the country					
Inadequate security for online transactions in the country					
Low Internet capacity/bandwidth in this university					
Inadequate IT personnel in this university					
High cost of maintenance of IT infrastructure					
Low use of infrastructure by students of this university					
Low use of infrastructure by teaching staff of this university					

Low use of infrastructure by non-teaching staff of this university					
Low use of e-resources by students of this university					
Low use of e-resources by staff of this university					
Low use of library e-resources by students of this university					
Low use of library e-resources by academic staff of this university					
Low use of Internet connectivity infrastructure by Academic staff of this university					
Low use of Internet connectivity infrastructure by students of this university					
High cost of training of staff for IT applications					
Lack of commitment from Management of this university					
Ineffective approach to e-business in the university					
Inappropriate e-business strategy in this university					
Ineffective implementation of e-business strategy in this university					
Others (please specify): _____					

5. In what ways have your university tried to overcome the challenges mentioned above?

_____
_____
_____
_____

APPENDIX II

IT STAFF QUESTIONNAIRE SURVEY

Africa Regional Centre for Information Science
University of Ibadan

Dear Respondent,

I am conducting a doctoral research on "Relationships among Organisational Strategy and E-business Strategy, Readiness, Intensity and Impact in Nigerian Universities", and your University has been sampled to participate in this study. Your responses and views are highly important in achieving the objectives of this study. The information provided will be treated as confidential and only aggregated data from all respondents will be used and reported for this study. Thank you for your valuable time, attention and cooperation.

Yours Faithfully,

Rafiat Ajibade Oyekunle (Researcher) **Professor M. A. Tiamiyu (Supervisor)**

PART 1: DEMOGRAPHIC DATA:

1. Name of University: _____
2. Your designation/Position: _____

PART 2: ORGANISATIONAL STRATEGY, E-BUSINESS STRATEGY, READINESS, INTENSITY, IMPACT AND CHALLENGE

.

Section A: E-business Strategy

1. Which of these e-business strategies does your university employ to achieve its strategic objectives?

ICT deployment strategies	**Yes**	**No**	**Don't Know**
Deploying ICT hardware/software for teaching			
Deploying ICT hardware/software for learning			
Deploying hardware/software for administration			
Deploying hardware/software for accounts/finance			
Deploying hardware/software for library services			
Deploying specialized software to support research in various disciplines			
Skill Development Strategies			
Enhance staff ICT skills through special workshops			
Enhance students ICT skills though special workshops			
Strengthen the ICT management unit through staff recruitment			
Strengthen the ICT management unit through staff training			
Strengthening the ICT management unit through provision of hardware/software tools			
Policy Strategies			
Regular update of the university ICT policy			
Restructuring of academic programmes to integrate ICT teaching and learning tools			
Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by staff			

Diversify opportunities for ICT acquisition (computers, internet connectivity, etc) by students			
External Linkage Strategies Maintain an updated, dynamic and interactive website with regularly updated inputs from Faculties/Units			
Increase the University carrying capacity through Open and Distance Learning (ODL)/e-learning			
Signing Memoranda of Understanding with foreign universities on ICT-related activities			
Signing Memoranda of Understanding with local firms on ICT-related activities			
General E-business Strategies Improvement of power supply towards 24/7 availability			
Improvement of bandwidth for Internet-based communication			

Section B: E-business Readiness

2. Please tick the extent to which you agree or disagree with the following statements about your university.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The management of this University is highly favorably disposed to e-business operations					
The management of this University commits adequate financial resources to e-business development					
This University has a documented IT policy that can supports e-business effectively					
This university is already operating an e-commerce system for some of its services					
This University is already using one or more electronic payment systems					
This university has an IT consultancy service unit					
This university engages in adequate capacity building to improve the skills of its IT personnel					
This university tries to implement its e-business strategies only when competitors do so					
This university continually searches for new e-business strategies in order to lead the competition					
There is adequate hardware to support e-business in this university					
There is adequate software to support e-business in this university					
There are adequate human resources with appropriate IT skills to drive e-business in this university					
The type of management culture in this university promotes e-business adoption					

3. Which of the following e-business infrastructures are in place in your University?

Infrastructures	Yes	No	Don't know
Internet connectivity			
LAN/Intranets			
Extranets			
Campus fiber optics backbone			
E-commerce software for ordering services e.g. etranzact (State services supported) _____ _____			
Enterprise Resource Planning (ERP) system			
Electronic Accounting System			
Content management system (CMS) Specify type/name : _____			
Customer Relationship Management System (CRM) Please give name: _____			
Management Information System			
Decision Support System			
Video Conferencing System			
Groupware tools			
Student database			
Staff Database			
Asset database			
Alumni database			
Finance database			
Others (Please specify) _____ _____			

Section C: E-business Intensity

4. Which of the following activities does your University provide online? Please tick all that applies to you.

Activities	
Information provision or dissemination	
Advertising of programmes, services and products	
Public and Customer Relations	
Information about the university	
Administrative services	
Web-based business-to-business (B2B) transactions	
Web-based business-to-consumer (B2C) transactions	
Institutional repository for research and publications by Academics	
Trading of goods or services	
Email communication between departments	

Email communication within the university	
Education and training (eLearning/online course delivery	
Electronic/Virtual library services	
Use of online collaboration tools (groups, wikis, social networks, etc) among staff	
Use of online collaboration tools (groups, wikis, social networks, etc) with Industrial firms for RandD purposes	
Others (please specify):	

5. What is the total number of computers in your university? _____
6. What is the total bandwidth for your university? UP:_____ DOWN_____
7. What is the estimated weekly band width usage? UP_____ DOWN_____
8. What is the average number of daily connections to the web server? _____
9. How many types of webmail interface/clients does your university have? _____
10. What is the average number of daily log-ins to the e-mail server? _____
11. What is the average number of daily log-ins to the database server? _____
12. What is the total number of monthly transactions using electronic payment system? ____
13. In what other ways does your university determine the frequency and usage of its ICT facilities?_____ _____
14. How many of each of the following categories of IT personnel do you have in your university?
    Web Designers/Administrators [ ] System Administrator/Analyst [ ]
    Computer Technician/Engineer [ ] Database Administrator [ ]
    Software Engineer/Programmers [ ] Others: _____
15. What is the percentage of all offices connected to the Internet in your university? Enter the percentage number below
    0_____100%
16. Is email the major mode of communication between management and staff?
    Yes [ ] No [ ]
17. Has your university subscribed to online databases or journals? Yes [ ] No [ ]
18. If your response to the question above is yes, kindly list them or provide a list of them on a separate sheet.
    _____
    _____
    _____
19. Does your university conduct computer based tests/examination? Yes [ ] No [ ]
20. In the last one year, how many times have you used the video conferencing facilities? _____

Section D: E-business Impact

21. What are the observable impacts of e-business adoption in your university? Tick all that applies.

E-business has	No Extent	Low Extent	Moderate Extent	High Extent	Very high Extent
Impact on Marketing Improved marketing of our education programmes					
Enabled us to participate in international market for staff/students					
Enabled us to innovate new marketing strategies for our education programmes					
Impact on Productivity Enhanced the productivity of our Students					
Enhanced the productivity of our Teaching staff					
Enhanced the productivity of our Non-teaching staff					
Improved services to our students					
Improved services to our suppliers and contractors					
Improved services to our staff					
Enabled faster production of educational materials					
Impact on Cost Reduced our costs of operation					
Reduced the cost of course materials for students					
Impact on Admission Improved applications for admission from abroad					
Improved applications for admission from outside the university catchment area					
Impact on Research and Collaboration Improved research activities in the university					
Increased our researchers' collaborations with other universities in Nigeria					
Increased our researchers' collaborations with researchers abroad					
Improved collaborations between Departments and Faculties with Industry					

Section E: E-business Challenges

22. To what extent does each of the following pose a challenge in the implementation of e-business? Tick all that applies.

E-business challenges	No Extent	Low Extent	Moderate Extent	High Extent	Very high Extent
Underdeveloped electronic payment systems in the country					
Inadequate policies of Government in the IT sector of the country					
Inadequate security for online transactions in the country					
Low Internet capacity/bandwidth in this university					
Inadequate IT personnel in this university					
High cost of maintenance of IT infrastructure					
Low use of infrastructure by students of this university					
Low use of infrastructure by teaching staff of this university					
Low use of infrastructure by non-teaching staff of this university					
Low use of e-resources by students of this university					
Low use of e-resources by staff of this university					
Low use of library e-resources by students of this university					
Low use of library e-resources by academic staff of this university					
Low use of Internet connectivity infrastructure by Academic staff of this university					
Low use of Internet connectivity infrastructure by students of this university					
High cost of training of staff for IT applications					
Lack of commitment from Management of this university					
Ineffective approach to e-business in the university					
Inappropriate e-business strategy in this university					
Ineffective implementation of e-business strategy in this university					
Others (please specify): _____ _____					

23. In what ways have your university tried to overcome the challenges mentioned above?

_____

_____

_____

APPENDIX III

TEACHING STAFF QUESTIONNAIRE SURVEY

Africa Regional Centre for Information Science
University of Ibadan

Dear Respondent,

I am conducting a doctoral research on "Relationships among Organisational Strategy and E-business Strategy, Readiness, Intensity and Impact in Nigerian Universities", and your University has been sampled to participate in this study. Your responses and views are highly important in achieving the objectives of this study. The information provided will be treated as confidential and only aggregated data from all respondents will be used and reported for this study. Thank you for your valuable time, attention and cooperation.

Yours Faithfully,

Rafiat Ajibade Oyekunle **Professor M. A. Tiamiyu**
(Researcher) **(Supervisor)**

PART 1: DEMOGRAPHIC DATA:

1) Name of University: _____
2) Sex: Male [ ] Female: [ ]
3) Age group: 21 – 30 [ ] 31 – 40 [ ] 41 – 50 [ ] 51 and above [ ]

PART 2: E-BUSINESS ACTIVITIES, IMPACT AND CHALLENGE

SECTION A: E-BUSINESS ACTIVITIES

1. Which of the following e-services does your university provide to you online? Tick all that is applicable.

E-services	
Online staff information system or portal	
Online uploading of result	
Email address, box and webmail services	
Online training/tutorial of staff	
E-library services	
Links to social network from university website e.g. Face book	
Online chat with other staff	
Online access to university's publications	
Online access to databases or subscription journals	
Online repository for research and publications of academic staff	
Regular online communication of new research grant opportunities to academic staff	
Facilities for online collaboration with other researchers in the country	
Facilities for online collaboration with other researchers outside the country	
Online distribution of the university bulletin/newsletter	
Others (Please specify): _____	

2. In which of the following ways are you allowed to access the Internet facility provided by your university?
    a) Computers in the laboratory [ ]

b) Computers in the laboratory in my faculty/department [ ]
c) Using my laptop/notebook/Smartphone to connect with a password [ ]
d) Physical connection in the lab in faculty/dept/library [ ]
e) Wireless connection in faculty/dept/library [ ]

3. How would you rate your experience while using your university's website/portal?

Experience with university's website/portal	**Strongly Agree**	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
The website is always available when needed					
Privacy and security is guaranteed while using the site					
The feedback mechanism on the website is adequate					
Information about upcoming events is available on the website/portal					
I can easily access the publications on my university's website					
I can easily contact my students because the website provides information about student and e-mail addresses					
The website is regularly updated with new information					
This website's appearance is beautiful and pleasing					
I can easily move from one place to the other on the website					
Using my university's website/portal is usually a satisfying experience					

SECTION B: E-BUSINESS IMPACT

4. Which of the following statements do you agree to? Tick all that is applicable.

	Strongly Agree	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
I can now use ICTs better					
My work has been made easier as a result of reduced paper work					
I have easier access to online scholarly materials					
There is a better relationship between me and my university					
Teaching has become easier with the use of technologies					
I have access to information about my university any day anytime					
I can easily find the information I need on the website					
I have access to electronic grant and development initiatives					
I enjoy collaboration with colleagues within and outside the country					
Others (Please specify) _____					

SECTION C: CHALLENGES OF E-BUSINESS ACTIVITIES

	Strongly Agree	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
Some of the online services provided by my university are not available when I need them					
Some of them are available but not useful to me					
I have problem accessing Internet through my university's network					
I do not believe that my personal information is secured on the university network					
The website suffers problems during registration process for students					
I do not believe that the payment platform the university is using is safe and secured from fraud					
I usually wait too long when downloading a file through my university's network					
I usually wait too long when opening a webpage through my university's network					
The information on my university website are not updated regularly					
Contact us mails are not replied to promptly					
Contact us mails are not replied to at all					
Others (Please specify) _____					

APPENDIX IV

NON-TEACHING STAFF QUESTIONNAIRE SURVEY

Africa Regional Centre for Information Science
University of Ibadan

Dear Respondent,

I am conducting a doctoral research on "Relationships among Organisational Strategy and E-business Strategy, Readiness, Intensity and Impact in Nigerian Universities", and your University has been sampled to participate in this study. Your responses and views are highly important in achieving the objectives of this study. The information provided will be treated as confidential and only aggregated data from all respondents will be used and reported for this study. Thank you for your valuable time, attention and cooperation.

Yours Faithfully,

Rafiat Ajibade Oyekunle **Professor M. A. Tiamiyu**
(Researcher) **(Supervisor)**

PART 1: DEMOGRAPHIC DATA:

1) Name of University: _____
2) Sex: Male [ ] Female: [ ]
3) Age group: 21 – 30 [ ] 31 – 40 [ ] 41 – 50 [ ] 51 and above [ ]

PART 2: E-BUSINESS ACTIVITIES, IMPACT AND CHALLENGE

SECTION A: E-BUSINESS ACTIVITIES

1. Which of the following e-services does your university provide online? Tick all that is applicable.

E-services	
Online staff information system or portal	
Email services	
Online training of staff	
E-library services	
Links to social network from university website e.g. Face book	
Online chat with other staff	
Online access to university's publication	
Online version of university bulletin/newsletter	
Others (Please specify): _____	

2. In which of the following ways are you allowed to access the Internet facility provided by your university?
    a) Computers in the laboratory [ ]
    b) Computers in the laboratory in my faculty/department [ ]
    c) Using my laptop/notebook/Smartphone to connect with a password [ ]
    d) Physical connection in the lab in faculty/dept/library [ ]
    e) Wireless connection in faculty/dept/library [ ]

3. How would you rate your experience while using your university's website/portal?

Experience with university's website/portal	**Strongly Agree**	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
The website is always available when needed					
Privacy and security is guaranteed while using the site					
The feedback mechanism on the website is adequate					
Information about upcoming events is available on the website/portal					
I can easily access the publications on my university's website					
I can easily contact my students because the website provides information about student and e-mail addresses					
The website is regularly updated with new information					
This website's appearance is beautiful and pleasing					
I can easily move from one place to the other on the website					
Using my university's website/portal is usually a satisfying experience					

SECTION B: E-BUSINESS IMPACT

4. Which of the following statements do you agree to? Tick all that is applicable.

	Strongly Agree	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
I can now use ICTs better					
My work has been made easier as a result of reduced paper work					
I have easier access to online scholarly materials					
There is a better relationship between me and my university					
My job has become easier with the use of technologies					
I have access to information about my university any day anytime					
I can easily find the information I need on the website					
I have access to electronic grant and development initiatives					
I enjoy collaboration with colleagues within and outside the country					
Others (Please specify) _____					

SECTION C: CHALLENGES OF E-BUSINESS ACTIVITIES

	Strongly Agree	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
Some of the online services provided by my university are not available when I need them					
Some of them are available but not useful to me					
I have problem accessing Internet through my university's network					
I do not believe that my personal information is secured on the university network					
The website suffers problems during registration process for students					
I do not believe that the payment platform the university is using is safe and secured from fraud					
I usually wait too long when downloading a file through my university's network					
I usually wait too long when opening a webpage through my university's network					
The information on my university website are not updated regularly					
Contact us mails are not replied to promptly					
Contact us mails are not replied to at all					
Others (Please specify) _____					

APPENDIX V

STUDENT QUESTIONNAIRE

Africa Regional Centre for Information Science
University of Ibadan

Dear Respondent,

I am conducting a doctoral research on "Relationships among Organisational Strategy and E-business Strategy, Readiness, Intensity and Impact in Nigerian Universities", and your University has been sampled to participate in this study. Your responses and views are highly important in achieving the objectives of this study. The information provided will be treated as confidential and only aggregated data from all respondents will be used and reported for this study. Thank you for your valuable time, attention and cooperation.

Yours Faithfully,

Rafiat Ajibade Oyekunle **Professor M. A. Tiamiyu**
(Researcher) **(Supervisor)**

PART 1: DEMOGRAPHIC DATA:

1) Name of University: _____
2) Category: Undergraduate [ ] Level: _____ Postgraduate [ ]
3) Sex: Male [ ] Female: [ ]
4) Age group: 16 – 25 [ ] 26 – 35 [ ] 36 – 45 [ ] 46 and above [ ]

PART 2: E-BUSINESS ACTIVITIES, IMPACT AND CHALLENGE

SECTION A: E-BUSINESS ACTIVITIES

1. Which of the following e-services does your university provide to you online? Tick all that is applicable.

E-services	
Student email box and webmail	
Online student information portal	
Online registration	
Online result checking	
Online payment of fees, levies, charges etc.	
Online ordering of transcripts	
Online access to university's publication	
Online booking of accommodation	
E-learning e.g. courseware,	
E-library services/OPAC	
Links to social network from university website e.g. Face book	
University's page on Face book/YouTube/Twitter	
Online chat with Officers of the university	
Others (Please specify):_____ _____	

2. In which of the following ways are you allowed to access the Internet facility provided by your university?
    a) Computers in the laboratory [ ]
    b) Computers in the laboratory in my faculty/department [ ]
    c) Using my laptop/notebook/Smartphone to connect with a password [ ]
    d) Physical connection in the lab in faculty/dept/library [ ]
    e) Wireless connection in faculty/dept/library [ ]

3. How would you rate your experience while using your university's website?

Experience with university's website/portal	**Strongly Agree**	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
The website is always available when needed					
Privacy and security of my information is guaranteed					
The contact us messages are quickly replied					
I can easily access the registration page to register for academic sessions					
I can easily access the registration page to register for courses					
I can easily find the information I need on the website					
I can use the website to contact my instructors to obtain information,, seek permission or book appointment					
I can easily move from one place to the other through adequate hyperlinks on the website					
The website is regularly updated with new information on courses					
This website's appearance is beautiful and pleasing					
Using my university's website/portal is usually a satisfying experience					

SECTION B: E-BUSINESS IMPACT

	Strongly Agree	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
My ICT skills have been improved					
My learning has become more interesting					
I have easier access to online library materials					
I have easier access to online journal articles					
I can check my result anytime and anywhere					
I have access to information about my university anytime any day					
I have access to information about my courses anytime any day					

My time is saved as I don't queue for registration any longer					
My academic performance has improved as a result					
I can communicate with my instructor more easily					
I can now more easily obtain most of the information I need for my activities at the university from the website					
Others (Please specify) _____					

4. To what extent do you agree to the following statements in relation to your use of the ICT based services provided by the university to you? Tick all that is applicable.

SECTION C: CHALLENGES OF E-BUSINESS ACTIVITIES

	Strongly Agree	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
Some of the online services provided by my university are not available when I need them					
Some of them are available but not useful to me					
I have problem accessing Internet through my university's network					
I do not believe that my personal information is secured on the university network					
The website suffers problems during registration process for students					
I do not believe that the payment platform the university is using is safe and secured from fraud					
I usually wait too long when downloading a file through my university's network					
I usually wait too long when opening a webpage through my university's network					
The information on my university website are not updated regularly					
Contact us mails are not replied to promptly					
Contact us mails are not replied to at all					
Others (Please specify) _____ _____ _____					

APPENDIX VI

CHECKLIST FOR EVALUATING E-BUSINESS READINESS AND INTENSITY

Name of University _____

Type of University _____

	Yes	No
1. Is the university website fully functional?		
2. Does the site load quickly and completely with a standard dial-up modem?		
3. Does the university have a webmail?		
4. Is there a courseware link on the university's website?		
5. Can students apply for their transcripts online?		
6. Does the university have a student portal?		
7. Is there a way of contacting the university from the website?		
8. Does the web site contain a search engine?		
9. Is online application and registration available on the university's website?		
10. Is there a site map on the website?		
11. Is there detailed information on courses/programmes offered by the university on the university's website?		
12. Are there links to other sites from the university's website?		
13. Can subscription of any kind with respect to the university be made through the web site?		
14. Does the site support secure credit card transactions?		
15. Is there access to the university's publication on their website?		
16. What is the web ranking figure of the university for the current year?		