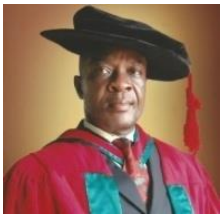
Managing with Information and Communication Technologies Beyond the 21st Century and Business Sustainability.

* *John Nkeobuna Nnah Ugoani,*
Department of Management Sciences
School of Postgraduate Studies
Rhema University, Nigeria, Aba.
**Email: John_ugoani@rhemauniversity.edu.ng; drjohnugoani@yahoo.com; ugoanij@gmail.com*

ORCID: 0000-0002-2403-1851



Abstract
*Most corporate organizations are becoming highly digitalized as a strategic step towards business growth and sustainability. In this business journey the Internet and ICTs combined with superior managerial competencies are driving innovations, productivity and profitability at a faster rate more than what was obtainable in about two decades ago. Business sustainability to a very high extent leverage eco-efficiency and environmental sustainability, for as critical framework for sustainable competitive advantage. For example expert systems like GIS is highly supportive to ensure environmental scanning to make way for desirable friendly ecosystem and business sustainability. Managing with ICTs based on networking*is crucial in the context of business sustainability and this cannot be overemphasized because within any organization there may be several information types for decision making and organizational performance. Organizations use ICTs to improve the quality and efficiency of their services and products, to strengthen organizational information flows internally, to promote accountability and transparency as critical measures of enhancing business growth and sustainability. The investigation literature review research design was adopted for this research and the result showed positive significant correlation between ICTs deployment and business sustainability. The study was not exhaustive due to lack of current relevant literature and research funding. Further study should examine the relationship between ICTs and PFM in view of incessant financial frauds in government business in Nigeria. The study recommends that organizations should deploy GIS to improve on their operational effectiveness and business sustainability.

JEL: M10, M12,

Keywords: Geographic information systems, Global positioning system, Eco-efficiency, Energy, Business-process-reengineering, Risk management, Anticorruption, Neural network, Networking, Sustainable management, Sustainable competitive advantage, E-commerce.

1. INTRODUCTION

Information and communication technologies describe a range of computer-based tools for gathering, storing, sharing, retrieving, analyzing, transmitting and processing information through the Internet which organizational management requires for its functions. They refer also to all of the computer-based information systems applied by organizations and their underlying technologies for effective managerial functions. The use of information and communication technologies (ICTs) in organizations has become increasingly necessary because of the positive relationship with business sustainability. Business sustainability refers to an organization's ability to maintain long-term economic success while considering environmental, economic, governance, cultural and social responsibilities. Sustainability is a management science concept involving the implementation of

sustainable management practices that ensure present and future growth without depleting natural resources unnecessarily, harming the communities, or the interest of future generations. In the whole process of business sustainability ICTs have become essential for helping organizations to deal with changes in global economics and the business unit and ICTs are increasingly important in the effort to promote both business and global sustainability through the Internet. The internet enhances information processing and provides global connectivity with a flexible platform for the seamless flow of information across the business unit and between the organization and its customers and suppliers. This global connectivity of systems, resources, computers or servers and users' for collection and sharing of data or information is the basis of information processing (Stewart, 1994, Stiroh, 2001). Information processing may be defined as the manipulation of data to produce useful information for management activities. Effective managers recognize that ICTs remain the vital link that makes organizations great. The quality of the decision that managers make rests squarely on the accuracy and amount of information they receive from employees and from the external environment and on the manner in which they process such information. The more timely and precise the information, the greater the likelihood that appropriate decisions will result. This is imperative because it is agreed in any theory of organization that communication occupies a central place, because the structure, extensiveness, scope and effectiveness of the organization are almost entirely determined by ICTs management. This hinges on the reality that organizations use ICTs and the Internet to improve their performance and to gain a competitive advantage in the market-place. They now create websites for online advertisements for their products, services, capabilities, and other relevant marketing and historical information (Zhu, et al, 2004). One of the benefits of deploying relevant ICTs include to improve efficiency by reducing costs and also to create a real source of strategy for the organization that will sustain it in the years ahead. Managing with ICTs based on *networking* is crucial for business sustainability because within any organization there may be several information types for decision-making and managerial performance. Increasingly, the internet, a worldwide network of interlinked computers is used as the conduit for connecting the computer systems of different organizations. ICTs infrastructure in the *management process* is important in business sustainability because of the need for harmony between the business and the environment. To pursue sustainability would mean to create and maintain the conditions under which humans and nature can coexist in productive harmony to support the need of the present and future generations. Management is a purposeful process, in other words, information and facts are gathered from a wide range of sources so that the different needs and interests of stakeholders may be met. Thus, effective sustainability governance within the concept of sustainability plays a central role in defining complex socio-ecological problems and defining interventions for their alleviation (Bebbington, and Unerman, 2017). Again, the concept of business sustainability strives on the three legs of economic sustainability, environmental sustainability and social sustainability. While economic sustainability is concerned with ensuring long-term profitability and financial stability, environmental sustainability involves minimizing negative environmental impact through responsible resource management, and social and governance sustainability advocates the promotion of fair labour practices, community development, cultural preservation, and ethical business practices (Africa Internet Forum, 1999, Bhatnagar, 2000, Ugoani, 2016, 2018, 2019[a], 2019[b], Bebbington, 2001, Ernest and Young, 2011, Kenny, et al, 2002, Reagon, 1997).

1.1 Research Problem

Managing with ICTs beyond the 21st Century would rely highly on advanced systems or expertsystems and with certain challenges including costs. Expert systems are the most advanced management information systems available. An expert system is a system that employs human

knowledge captured in a computer to solve problems that would ordinarily exceed human expertise. Expert systems are a variant of artificial intelligence (AI) which involves mimicking human expertise, and intelligence, and requires a computer that can at a minimum, recognize, formulate, and solve a problem, explain the solution, and learn from experience. Recent developments in AI that have such names as *fuzzy logic,* and *neural networks* have resulted in computer programmes that in a certain way try to mimic human thought process. Even though AI is still at a fairly early stage of development in some countries, including Nigeria, an increasing number of computer applications are beginning to patronize expert systems. AI is seen as a teacher as well as a problem solver. It is based on a flexible humanlike thought process, and it can be updated to incorporate new knowledge as it becomes available, eliminating delays and boosting productivity (Rich, 1983). ICTs are advancing at a blinding pace, especially with advances in AI. Although this is a positive development for increasing productivity and profitability, it also comes with certain challenges. For example, new ways of managing with AI are also creating new ethical challenges, in terms of data management and protection. This brings about the need to ensure critical safeguards because AI will not absolve managers from their responsibilities as ICTs including AI must remain as tools for management and not substitute for effective management. Investment in ICTs can be huge, and this makes it important for management to approve only ICTs investment that will produce good returns. Because of lack of transparency associated with bad management, organizations are facing problems about how to ensure that investments in ICTs will indeed produce meaningful result on their money. Bad management can influence investment in obsolete technologies that can result to losses and business failure. It is one thing to use ICTs to design, produce, deliver, and maintain new products, but it is also another thing to make profit as a result of such critical investment. Without sound management, organizational governance or leadership an organization is likely to experience difficulties in determining how much that will be spent on ICTs or how to measure the returns on the actual investment. Most contemporary organizations lack sound decision-making processes due to poor management issues and thus, unable to choose effective ICTs investment outlays. Also, lack of strategic business knowledge often thwarts the ability for realizing significant value from ICTs investment because of weak complementary assets in terms of infrastructure needed to make their ICTs investment profitable. Again, without an eye on global business, realizing value from huge ICTs investment may be difficult and very risky (Donovan, 1994, Hopkins, 2018, Dimoji, 2010, Hartman, 2002).

1.2 Research Objective

This study was designed to explore the relationship between managing with ICTs and business sustainability.

1.3 Research Significance

The result of this study will increase human knowledge on the relationship between ICTs and business sustainability.

1.4 Hypothesis

The study hypothesizes that managing with ICTs has significant positive relationship with business sustainability.

1.5 Conceptual Framework

ICTs belong to a multidimensional field because no single theory dominates the field the study of ICTs can be divided into technical and behavioural approaches. Information systems are sociotechnical systems. Though they are composed of machines, devices and hard physical technology, they require substantial *social, organizational, and intellectual* investments to work

properly. ICTs are required in business sustainability because the technical aspect emphasizes mathematically-based models to study information systems as well as the physical technology and formal capabilities of these systems. On the other hand, an important part of the information systems field is concerned with behavioural issues that arise in the development and long-term maintenance of information systems. For example, problems such as strategic business integration, design, implementation, utilization, and management cannot be examined properly with the models used in the technical approach. Other disciplines like sociology contribute to the field of ICTs. Sociologists study information systems with the aim of understanding how groups and organizations shape the development of systems and also how systems affect individuals, groups and organizations. Management scientists study information systems with an interest in how much decision makers perceive and use formal information. Also economists study information systems with an interest in what impact systems have on control and cost structures within the organization and within the economic system. To a large extent, ICTs are often seen as the stimulant for business growth and sustainability. In many industries growth and survival without the deployment of extensive ICTs are totally inconceivable because they play major roles in increasing productivity. ICTs can provide the foundation for new products, services and ways of conducting business and they have also become a source of strategic sustainable advantage. Sometimes investment in ICTs form the largest component of infrastructure investment for organizations like witnessed in banks in Nigeria in the 1990s at the time of business process reengineering (BPR) (Ugoani, and Ugoani, 2017[a], 2017[b]). Aconceptual framework is the structure of the study and shows the relationships of the major variables and the problem of the study. It is often demonstrated in a schematic form, explaining important points that would otherwise be buried in an excess of words and leads to theory building. The conceptual framework for this study is shown in table 1 (Ameer, and Othman, 2012, Moller, and Schattegger, 2015, Pemni, and Tencati, 2006, Rodriguez, and Coltran, 2017).

2. LITERATURE REVIEW

ICTs can promote economic efficiency and business sustainability through additional complementary mechanisms to close the access gap in challenging, uneconomic areas or to reach uneconomic customers. These mechanisms include adopting ICTs programmes that focus on maximizing enterprise performance. (Marchand, et al 2001).According to Laudon and Laudon (2006) an information system collects, stores, and disseminates information from an organization's environment and internal operations to support organizational functioning and decision-making, communication, coordination, control, analysis, and visualization.Information systems transform raw data into useful information through three basic activities; input, processing, and output. From a business perspective, an information system creates economic value for the enterprise as an organizational and management solution, based on information technology. The information system is part of a series of value adding activities for acquiring, transforming, and distributing information to improve management action, enhance organizational performance, and ultimately increase organizational profitability and business sustainability (Ugoani, 2018, Kazakar, and Munoz, 2021). ICTs are part of an outcome of organizational structure, culture, politics, workflows, and business process. They are instruments for organizational change and value creation, making it possible to recast these organizational elements into new business models and to redraw organizational boundaries. ICTs both reflect management decisions and serve as instruments for changing the management process. ICTs literature draws extensively on both technical and behavioural approaches and both perspectives can be combined into a sociotechnical approach to promote business sustainability and risk management. Risk management and business sustainability are closely linked, because sustainable management practices help to mitigate long-term risks. From the sustainability perspective, an organization that integrates sustainability into its risk management

framework can proactively address environmental, social and governance (ESG) risks to promote business sustainability (Ugoani, 2021, Kamel, 1998, Grace, et al, 2000).

2.1 Environmental Sustainability

Environmental sustainability focuses on reducing negative environmental impact like environmental degradation through responsible natural resources management. Environmental sustainability is a key strategy for achieving business sustainability and at the fore of the idea is to ensure that the current trends in the loss of environmental resources are effectively reversed at both global and national levels. This corporate strategy would involve anticipating and minimizing environmental risks, adopting ecofriendly policies, focusing on renewable energy, reducing carbon emissions, waste management, water and pollution management, and ensuring that the supply chain is ethical and environmentally friendly. This approach reduces operational risks related to natural resources depletion as well as business ethical concerns. Achieving environmental sustainability requires effective environmental monitoring which is data-intensive,identifying and monitoring the enormously complex web of inputs and relationships within an ecosystem requires the capacity to track large volumes of data and building databases that can analyze and sort out information. This process is only possible through geographic information systems (GIS) which use computer applications to store, integrate, and analyze data collected from remote imaging and other sources that are increasingly powerful tools in designing sustainable management plans and forecasting environmental threats. To promote business sustainability, environmental management requires more than the analysis of environmental threats. It would include communication among governments, and significant stakeholders which is vital if environmental management activities are to meet their objectives in an efficient and equitable manner. ICTs can benefit this process by encouraging communication and knowledge sharing between the public and private sectors and between concerned citizens and scientific experts. To this extent, ICTs can help to include people in the decision-making process and ensuring that traditional forms of environmental knowledge are communicated to a wider audience, and allow the monitoring and enforcement of policies against environmental threats. GIS in environmental management generally refer to three distinct technologies used in combination. The Global Positioning System (GPS) is a satellite-based navigation system that can identify longitudinal and latitudinal co-ordinates and altitude measurements. Remote sensing is generated by satellite or genial advanced photography and monitoring can depict ecosystem diversity, vegetation, density and plant chemistry. GIS is a separate application that often incorporates the use of the previous two applications through computer applications and database management (Brodnig, and Mayer Schonberger, 1998, Maier, et al, 1997, De-Angelis, 2000).

2.2 Economic Sustainability

Economic sustainability is concerned with ensuring long-term productivity, profitability as well as financial stability and sustainability of the enterprise. Indirectly, ICTs through the Internet drive e-commerce, and have an ever-increasing role in promoting sustainable economic growth through the promotion of international business, especially exports and imports and services by creating the functioning of markets and increasing the quality and efficiency of goods and services. The Internet leverages the potential value of computers and relevant ICTs to suggest that the economic effects of networking will be far greater in the future. At the microeconomic level, the internet provides opportunities for organizations and entrepreneurs to reduce costs, increase market coverage, and achieve economies of scale. The ICTs and the Internet might have a dramatic impact on trade and investment in many countries thus, spurring growth, providing complementary measures covering macroeconomic, financial and entrepreneurial activities necessary for business sustainability. From the point of view of economics, ICTs change both the relative costs of capital and the costs of

information. ICTs can be viewed as a factor of production that can be substituted for traditional capital and labour. According to *transaction cost theory,* organizations and individuals seek to economize on transaction costs, much as they do on production costs. ICTs can also reduce internal management costs. According to *agency theory,* the enterprise is viewed as a *nexus of contracts* among self-interested individuals rather than as a unified, profit-maximizing entity (Jensen and Meckling, 1976). *Agency theory* explaining that the *owner* employs *agents* known as *employees,*or managers to perform work on his or her behalf. However, agents need constant supervision and management; otherwise, they will tend to pursue their own interests rather than those of the owners. As the enterprise grows in size and scope, agency costs or co-ordination costs rise because owners must expend more effort supervising and managing employees or managers. ICTs, by reducing the costs of acquiring and analyzing information, permit organizations to reduce agency costs because it becomes easier for managers to oversee a greater number of *agents* (Malone, 1997, De George, 2003).

2.3 Social & Governance Sustainability

Social sustainability primarily focuses on promoting good labour practices, social welfare, and employees' well-being. This often overlaps with governance sustainability which is concerned with organizational leadership and sustainability. Governance sustainability is a concept that seeks also to enhance cultural preservation, leadership excellence and employee participation and ultimate business sustainability. It also relates to corporate governance strategy, incorporating the elements of risk management to enhance organizational performance and stability. Risk management is the systematic process of identifying, assessing, and mitigating risks to minimize adverse effects on an organization's objectives. It involves developing strategies to handle potential threats and to capitalize on opportunities. Effective risk management enhances decision-making, strengthens financial stability and improves overall organizational resilience. Risk management is a component of modern corporate governance strategy with the potential for improving business sustainability. This position cannot be strongly challenged because organizations today operate in an increasingly volatile business environmental market by economic fluctuations, regulatory fluctuations, advances in ICTs, and environmental problems (Hubbard, 2020). There are four main types of formal information areas for which ICTs are relevant in organizational governance (Heeks, 1998). ICTs support internal management, including human resource management, and the budgeting process. They support policy and regulatory decision-making, including economic and financial matters, business policies, among others. ICTs can improve the efficiency of management by reducing opportunities for mismanagement associated with misuse of funds and other assets. Although management is a universal process, but it is *culture-bound*. Because of the impact of globalization, e-commerce, and B2Bthrough the internet and computer connectivity, ICTs can play important roles in preserving and providing access to cultural resource to promote business sustainability among the people of different backgrounds and cultures. Organizations can use ICTs to improve the quality and efficiency of services to strengthen organizational information flows internally to promote accountability and transparency as well as sustainability to procure goods and services fairly and efficiently. Heeks (1999) suggests that incorporating ICTs must be seen as secondary to a broader management agenda that suggests acceptance by key stakeholders, identification of the type of ICTs for the organization, and identification of the role of ICTs in meeting organizational requirements and the emergence of a growing global economy for ICTs that can support both producing and exchanging goods and services in many different countries (Ugoani, 2020, 2022[a]). The increasing importance of ICTs in business sustainability would therefore, suggest the development and integration of multinational ICTs so that business can leverage global hardware, software, and communication standards, create cross-cultural structures to pursue transnational B2B processes through C2C connectivity. It is emphasized that competing in the global market

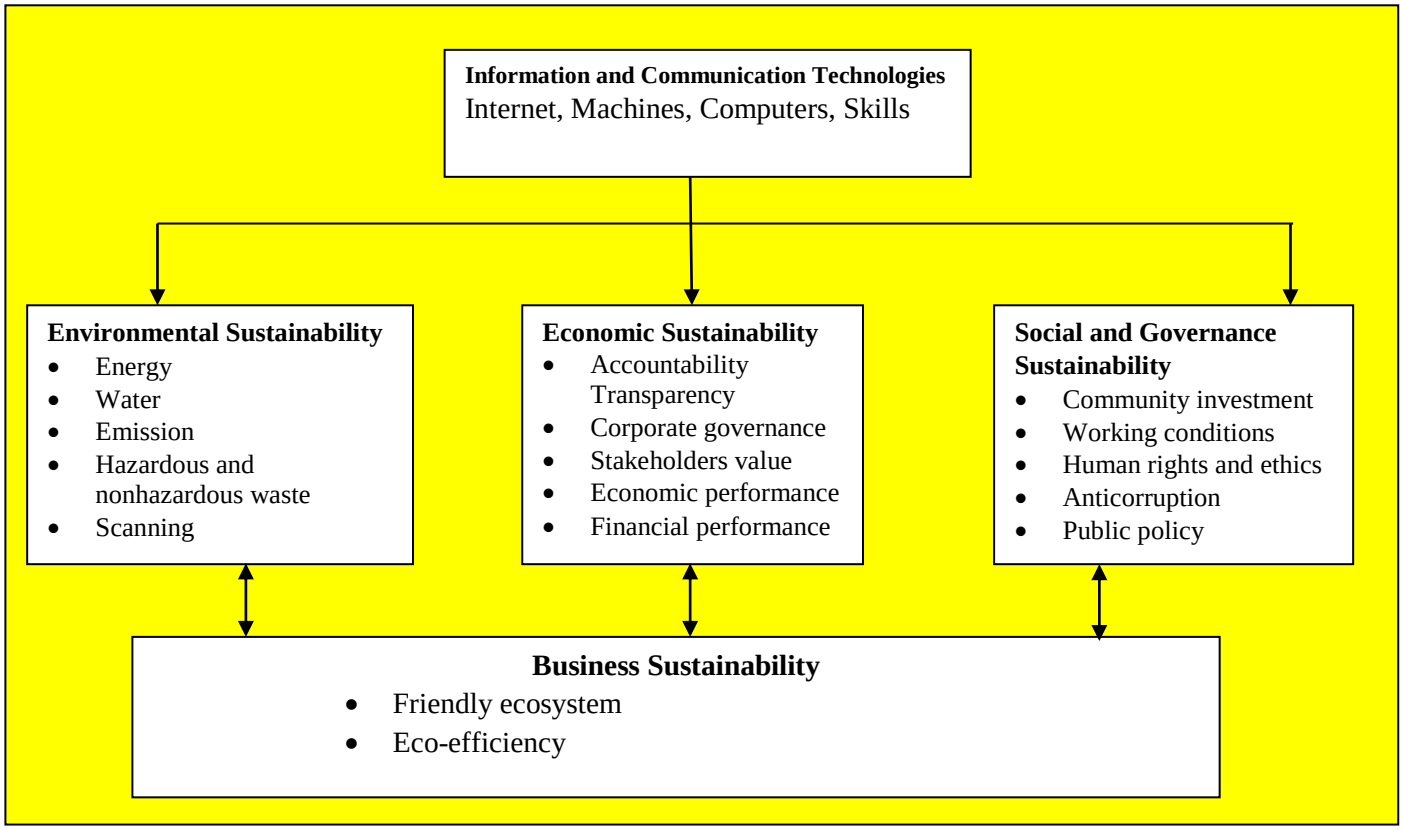
space requires organizations still struggling to integrate their *Islands* of ICTs to upgrade their ICTs infrastructure that can support their goals in the ever-changing global business environment. These organizations will have the formidable challenge of fostering ethical standards to enhance security or risk which is fundamental to business sustainability. It is agreed in the management literature that ICTs provide enormous opportunities and efficiencies, they also create new ethical and social problems for organizations including the misuse of AI. Thus, a great management challenge will be to make informed decisions that are sensitive to the negative consequences of ICTs as well as to the positive ones. This is essential to find out how ICTs can monitor employees activities, and also worry about when ICTs designed to increase efficiency, productivity and profitability rather show an inverse relationship (Brynjolfson, 2003). It is imperative to state also that ICTs drive e-commerce which requires a supportive level of legal framework in many sectors, including the banking and industrial sectors as well as legal and judicial changes in response to challenges that have emerged in tandem with the new ICTs in the global business environment. These include standards and protection of digital signature, regulation and development of standardized e-commerce model. There is equally regard for laws designed for regulating legal coverage of electronic communication andthe transmission of goods and services through and across borders. These measures are foundational for successful ICTs applicability as the Internet has become very important in the era of e-commerce. Business and consumer ethics and trust in electronic forms of payment must be enhanced through effective management and technical capacity as critical tools for the promotion of management, transparency, accountability governance business performance and business sustainability (Adams and Frost, 2005, 1989, Brynjolfson, and Lorin, 2000).

3. METHODOLOGY

The investigation literature review research design was adopted for this study conducted in Nigeria. The purpose of this type of investigation is to develop conjectural statement about the relationship of two or more variables. This may involve exploring relevant literature. Investigating relevant literature means obtaining secondary data from other published materials. Such materials include academic, publications, books, newspapers, and other related documents. This review of previous literature throws more light regarding the meanings and importance of the relationships between the variables of interest (Ugoani, 2022[a]).

4. PRESENTATION OF RESULT

Table 1: ICTs and Business Sustainability Model



Source: Author Designed (2025)

It emphasizes that ICTs and management skills are combined to increase efficiency, quality and responsiveness in order to give the organization a sustainable competitive advantage.

4.1 Discussion

The psychometrics model in table 1 demonstrates the relationship between ICTs and business sustainability. Models are increasingly used in business and management research because they help to provide insight into reality. Almost all organizations or instuttions around the world today combine the use of ICTs, the internet and management skills to enhance sustainable management to increase their productivity and efficiency. Sustainable management strategies based on a sustainable framework on the three dimensional levels of the environment, economic and social and governance perspectives has the overall objective of promoting the exchange of ideas and communication within and outside of the organization in a manner to improve sustainable growth and business sustainability. As in this model ICTs help in generating information on environmental factors like energy and water, economic factors like accountability and corporate governance as well as social issues like community investment and public policy that must be considered to ensure business growth and sustainability. ICTs and the Internet or computers as electromechanical devices have the capacity to accept data, store data, process data, and give out the useful result called information, on the different dimensions of the sustainability framework. Business sustainability requires measuring environmental-economic-social interrelationships, with a focus on the physical exchange between the economic system and the natural environment. This wealth-based approach to business sustainability explains the preservation of stock of wealth, in terms of capital base of the organization as may be contained in the financial statements that are measured during a certain accounting year and contained in the annual report. Through this management

sustainability reporting stakeholders often want to see the level of performance as measured by profit before taxation, (PBT) return on assets (ROA) return on investments (ROIs) and cash flowed from operations in a certain financial year. The Internet as a global connectivity linked to computers now empower planning, directing and controlling of work activities and information. ICTs increase access and help in environmental scanning using GIS, improving co-operation and innovation through the use of AI and enhancing organizational performance and business sustainability. The investigation literature review research design was adopted for this study and the result showed significant positive relationship between ICT and business sustainability as in table 1. This is the interest of the study.

4.2 Recommendations

i. Eco-efficiency is vital for business sustainability and organizations need to deploy expert systems like GIS to improve their operational effectiveness.
ii. While AI is important for promoting business growth, organizations should at the same time improve on human development to provide corresponding skill levels to meeting increasing requirements for expertise.
iii. Community investment is crucial to earn support and respect within the environment of operation as an approach towards business growth and sustainability.
iv. Organizations must wage a total war against corruption to improve corporate governance, enhance economic performance and business sustainability.
v. Organizations should try to avoid the procurement of obsolete ICTs that would rather become a drain on revenue instead of profitability which is a fundamental source of business growth and sustainability.

4.3 Scope for Further Study

Because of the need of ICTs in business sustainability further study should examine the relationship between ICTs and public financial management (PFM) in Nigeria.

Acknowledgements

This author appreciates Professor C. Adams and Professor G. Frost over their work on *Integrating Sustainability Reporting into Management Practices,* which provides insights on sustainability and management practices.

Originality / Contribution

Issues of business failures in many parts of the world make an important business case in investigating the relationship between ICTs and business sustainability. Despite the need of a study of this nature this is the newest investigation in Nigeria and other researchers should do more work in the areas.

Funding

No funding was received from anywhere regarding this research and / or the publication of this paper.

Author Contribution

Professor John Nkeobuna Nnah Ugoani, the sole author is responsible for the collection of data, and analysis thereto in respect of this study. He is thus, solely responsible for any errors or omissions arising from this report.

Conflict of Interests

The author declares no conflict of interests whatsoever as regards the authorship and publication of this paper.

REFERENCES

1) Adams, C. and Frost, S. (2008) Integrating Sustainability Reporting into Management Practices. *Accounting Forum*, 32(4): 288-302.
2) Africa Internet Forum (1999) Economic Toolkit For African Policy Makers. Downloaded from http://www.worldbanking.org/infoder/projects/finafan.htm 17/4/25
3) Ameer, R. and Othman, R. (2012) Sustainability Practices and Corporate Financial Performance: A Study Based on the Top Global Corporations. *Journal of Business Ethics*, 108(1): 61-79.
4) Bebbington, J. (2001) Sustainable Development: A review of the international development, business and accounting literature. *Accounting Forum*, vol. 25, pp: 128-157.
5) Bebbington, J. Unerman, J. (2017) Achieving the United Nations Sustainable Development Goals: An Enabling Role for Accounting Research. *Accounting Auditing Accountability Journal* 31(1): 2-24.
6) Bhatnagar, S. (2000) Social Implications of Information-Communication Technology in Developing Countries: Lessons from Asian Success Stories. *The Electronic Journal of Information Systems in Developing Countries*, vol. 1:1-9,
7) Brodnig, G. and Mayer-Schonberger, V. (2000) Bridging the Gap: The Role of Spatial Information Technologies in the Integration of Traditional Environmental Knowledge and Western Science. *The Electronic Journal of Information Systems in Developing Countries*, vol. 1.
8) Brynjolfson, E. (2003) The IT Productivity Gap. *Optimize Magazine*, 21(July 2003).
9) Brynjolfson, E. and Lorin, M. H. (2000) Beyond Computation: Information Technology, Organizational Transformation, and Business Performance. *Journal of Economic Perspectives*, vol. 14, No. 4 (2000).
10) De Angelis, T. (2000) Is Internet addiction real? *APA Monitor*, pp: 24-27.
11) DeGeorge, R. T. (2003) The Ethics of Information Technology and Business. Oxford, Blackwell Publishing.
12) Dimoji, E. O. (2010) Practical Approach to Information and Communication Technology (ICT) Nigeria, Onii Graphic Press.
13) Donovan, J. J. (1994) Business Reengineering with Information Technology. Englewood Cliffs, NJ: Prentice Hall.
14) Ernest and Young (2011) Climate Change and Sustainability: How Sustainability has Expanded the CFO's role PDF. Retrieved 22/4/2025.
15) Grace, J. C. Kenny, J. Liu, C. Qiang, T. R. (2000) Telecommunication, the Internet and Broad Based Development, Washington, D. C. World Bank.
16) Hartman, A. (2002) Why Tech Falls Short of Expectations, *Optimize Magazine*, (July 2002).
17) Heeks, R. (1998) Information Age Reform of the Public Sector. The Potential and Problems of IT for India. Information Systems for Public Sector Management Working Paper Series. Paper 6 Institute for Development Policy and Management (IDPM).
18) Hopkin, P. (2018) Fundamentals of Risk Management: Understanding, Evaluating and Implementing Effective Risk Management, India, Kogan Page Publishers.
19) Hubbard, D. W. (2020) The Failure of Risk Management: Why Its Broken and How to Fix It USA, Wiley & Sons.
20) Jensen, M. C. and Meckling, W. H. (1976) Theory of the Firm: Managerial Behaviour, Agency Costs, and Ownership Structure. *Journal of Financial Economics*, 3(1976).
21) Kamel, S. (1998) Information-Systems for Public Sector Decision Making in Egypt. Information Systems for Public Sector Management Working Paper Series. Paper 3. IDPM, University of Manchester. Downloaded from http://www.maniac.uk/idpm/idpm-dp.htm/isps-wo 17/4/25.
22) Kazakar, A. and Munoz (2021) Impact of ICT & Internal Marketing Orientation-Blending on Organizational Performance in Small & Medium Enterprises. *European Journal of Management and Business Economics*, vol. 30.

23) Kenny, C. Navas-Sabater, J. and Qiang, C. (2002) Information and Communication Technologies. In J. Klugman (ed) A Source book for Poverty Reduction Strategies. Vol. 2: Macroeconomic and Sectoral Approaches. The World Bank, Washington, D. C. pp: 405-438.
24) Laudon, K. C. (1989) A General Model of the Relationship Between Information Technology and Organizations. Working Paper. National Science Foundation Centre for Research on Information Systems, New York University.
25) Laudon, K. C. and Laudon, J. P. (2006) Management Information Systems: Managing The Digital Firm, 9th edition Pearson, Prentice Hall, USA.
26) Maier, J.L.R. Rainer, Jr. K. and Snyder, C. A. (1997) Environmental Scanning for Information Technology: An Empirical Investigation. *Journal of Information Systems,* 14, No. 2(Fall 1997).
27) Malone, T. W. (1997) Empowerment Just a Fad? Control, Decision-Making and IT. *Sloan Management Review,* (Winter 1997).
28) Marchand, D. A. Williams, J. K. and Rollins, J. D. (2001) Informational Orientation: The Link to Business Performance. Oxford, Oxford University Press.
29) Moller, A. and Schattegger, S. (2015) The Sustainability Balanced Scorecord as a Framework for Eco-Efficiency Analysis. *Journal of Industrial Ecology,* 9(4): 73-83.
30) Pemni, F. and Tencati, A. (2006) Sustainability and Stakeholder Management: The Need for New Corporate Performance Evaluation and Reporting Systems. *Business Strategy and the Environment,* 15(5): 296-308.
31) Reagon, G. (1997) The Managers of the 21st Century Inventory: In The 1997 Annual Volume 1 – *Training,* pp: 187-189.
32) Rich, E. (1983) Artificial Intelligence. New York. McGraw-Hill.
33) Rodriguez, A. and Coltran, H. S. (2017) Evaluating the Effectiveness of Sustainability. Disclosure: findings from a recent SASS Study. *Journal of Applied Corporate Finance,* 29(2): 100-108.
34) Stewart, T. A. (1994) Managing in a Wired Company. *Fortune,* July 11, 1994, pp: 54.
35) Stiroh, K. (2001) The Economic Impact of Information Technology Federal Reserve Bank of New York.
36) Ugoani, J.N.N (2016) Cultural Dimensions in Global Human Resource Management: Implications for Nigeria. *Independent Journal of Management & Production.* 7(3): 645-670.
37) Ugoani, J.N.N (2018[a]) Effective Management Decision Making and Operational Effectiveness in Nigeria. *Amity Business Journal,* 7(2): 1-8.
38) Ugoani, J. N.N (2018[b]) Exploring the Relationship Between Ethics and Corporate Social Responsibility and Productivity in Nigeria Extractive Industry. *American Journal of Business and Society,* 3(2): 28-37.
39) Ugoani, J.N.N (2019[a]) Sustainable Management of Enterprise Resource Wealth and Business Sustainability. *International Journal of Economics and Business Administration,* 5(1): 34-43.
40) Ugoani, J.N.N (2019[b]) Business Ethics and Its Effect on Organizational Sustainability. *Global Journal of Social Sciences Studies,* 5(2): 119 – 131.
41) Ugoani, J.N.N. (2020) Business Policy and Strategy Implementation and its Effect on Organizational Effectiveness. *IMSU Business and Finance Journal,* 11(2): 68-81.
42) Ugoani, J.N.N (2021) Corporate Governance Perspective on Enterprise Risk Management and Organizational Sustainability. *Independent Journal of Management & Production,* 12(5) 1520 – 1541.
43) Ugoani, J. N. N. (2022[a]) Basic Research Methodology. Germany Lambert Academic Publishing.
44) Ugoani, J. N. N. (2022[b]) Business Policy & Strategy. Germany Lambert Academic Publishing.
45) Ugoani, J.N.N and Ugoani, A. (2017[a]) Business Process Reengineering and Nigerian Banking System Efficiency. *Independent Journal of Management & Production,* 8(4): 1173-1190.

46) Ugoani, J.N.N and Ugoani, A. (2017[b]) Information and Communication Technologies Management and Nigerian Banking Sector Liquidity. *Independent Journal of Management & Production,* 8(3): 1-25.
47) Zhu, K. Kraemer, K. L. Xu, S. and Dedrick, J. (2004) Information Technology Payoff in E-Business Environments: An International Perspective on Value Creation of E-Business in the Financial Services Industry. *Journal of Management Information Systems,* 21, No. 1 (Summer 2004).

Biography

John Nkeobuna Nnah Ugoani is Professor of Management and Dean School of Postgraduate Studies at Rhema University, Nigeria. His research interest focuses on business, management, governance, leadership, entrepreneurship, sustainability, and emotional intelligence. John is recognized for presenting the first best PhD Dissertation in Management at the Faculty of Business Administration, Imo State University, Owerri, Nigeria. He has over 200 scholarly publications with over 100000 full paper readership downloads, and ranked among Top Ten Authors by SSRN/Elsevier. Before entering academia, he was a Senior Manager at First Bank of Nigeria Plc.