HORIZONTAL INFORMATION SYSTEMS INTEGRATION AND ORGANIZATIONAL SUSTAINABILITY OF TELECOMMUNICATION FIRMS IN RIVERS STATE, NIGERIA

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ABSTRACT

This study examined the relationship between horizontal Information System Integration and Organizational Sustainability of Telecommunication Firms in Rivers State, Nigeria. The study adopted the cross-sectional survey approach for effective data collection and analysis. The population of this study consisted of six (6) Telecommunication firms operating in Rivers State, Nigeria. To eliminate bias, a total of six (6) respondents were chosen from the six Telecommunication firms making up a total of 36 respondents across the six (6) telecommunication firms operating in Rivers State, Nigeria. Structured (closed-ended) questionnaire was designed on a 5-point Likert scale to collect data from the respondents of which out of the thirty-six (36), thirty (30) were properly filled and retrieved and used for data analysis. The study used both descriptive and inferential statistics, Spearman's Rank Order Correlation Coefficient (bivariate analysis) for the test of hypotheses. The results of the findings showed that there is significant positive relationship between horizontal information integration and the measures of Organizational Sustainability of Telecommunication Firms in Rivers State. It was therefore, concluded that Horizontal information systems integration is critical for Organizational Sustainability of Telecommunication Firms in Rivers State, Nigeria. Based on these findings, we recommended that telecommunication firms in Rivers State who are desiring to enhance organizational sustainability in terms of responsiveness, patronage and quality service delivery should implement information system integration.

KEYWORDS: Horizontal Information Integration, Organizational Sustainability, Responsiveness and Quality service delivery.

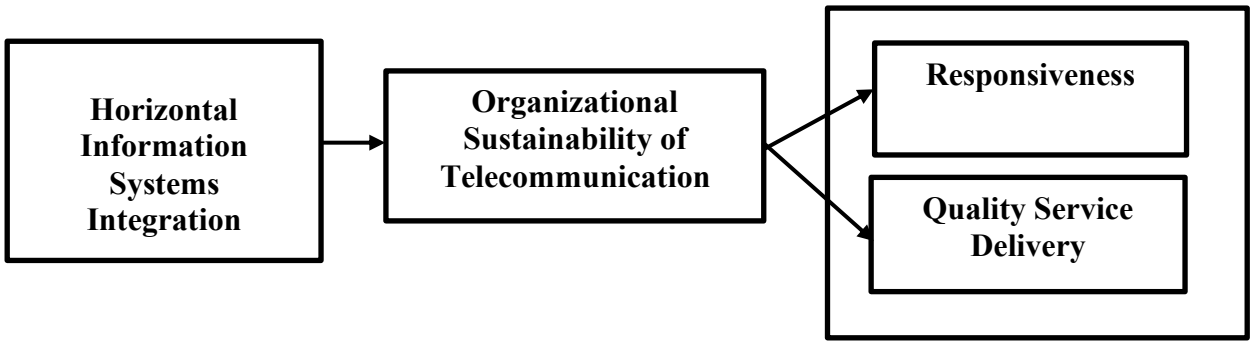
INTRODUCTION

Horizontal information system integration (HISI) refers to the process of combining multiple information systems, applications, or services into unified whole, enabling seamless interactions and data exchange between telecommunication operating within the accessing geographical area (Chaveesuk & Hongsuwan, 2017). Organizational operates on different platforms and provides different services to customers, the also affected the telecommunication in case of company acquisition, the information or data are to be merged as a unified platform for infective services delivery. Just like the Telecommunication firms, different network interface with each other, therefore without proper synchronization of information or data it will be difficult to access the different platform (Shou, Shan & Li, 2022). Horizontal integration involves ensuring the information are integrated into different departments, information flow or processes are integration across different departments or function within an organization (Srinivasan & Stasko, 2017). Information communication technology is the backbone of any competitive organization today, the ability of the organization to access data from different sources and use the information available at its disposal for storing, analysis and reporting is what many organizations lack today (Alzahrani & Seth, 2021). Today, the rate at which information is generated into the organization through different platforms, mobile devices and on the internet

is becoming alarming, organizations are encumbered with different structures of information in the form of text, pictures and audio. Today telecommunication can transmit information via mobile and internet platform. These organizations are designed with different programing applications that may not be compatible with similar organization, the different data structure or format and application use for the information system has made compatibility issue a serious problem for information integration (Ekeine & Odo, 2023).

There is no definite structure or one unified data structure, programmers are allowed to use any programing language of their choice to achieve the organization goal unlike any other project management (Ekeine & Odo, 2023). Telecommunication firms encountered these problems because they interface or receive calls and messages from similar firms. Unlike other organizations that may not have common interface, the telecommunication companies have inter-organizational collaboration, calls and text messages are initiated by one network to the other (Ekeine & Odo, 2023). In today telecommunication, there is no telecommunication communication companies can actually operate in isolation without having handshake with the other network operation. In having this interoperation, there has always been problem of network failure and poor service quality (Julyeta & Irene, 2017). Information systems integration is the alignment of technology, people, business and processes which has become crucial for survival of any organization especially if the organization needs to find a competitive edge in the current global economy (Consolata, Victoria & Maurice, 2018). The advancement of technologies, nowadays, sees rapid use and diffusion of hardware devices and soft applications, such notebooks, tablets, IPad and smartphones and applications to support or improve performance (Rikhardsson & Yigitbasioglu, 2018).

This has changed the way people communicate and collaborate. Inspite of the rapid used of these devices and applications, there has been no significant improvement in business performance (Friday, Ryan, Sridharan & Collins, 2018). Information system integration must align with business performance (Maiga, 2017). Hence, the conceptualization of this paper horizontal information systems integration and organizational sustainability of Telecommunication firms in Rivers State, Nigeria.



Source: Research survey, 2025

Purpose of the Study

The general purpose of this study is to examine the relationship between Information Systems Integration and Organizational Sustainability of Telecommunication Firms in Rivers State, Nigeria. The study specific objectives were to;

1. Investigate how horizontal information systems integration will enhance organizational sustainability of telecommunication firms in Rivers State, Nigeria.

Research Questions

To effectively understand the research area and find solutions to the research study, the following research questions were raised:

1. How does horizontal information systems integration enhance organizational sustainability of telecommunication firms in Rivers State, Nigeria?

Research Hypotheses

The following research hypotheses were formatted to tentatively find solutions to the research problems as follows;

$H_{01:}$ There is no significant relationship between horizontal information system integration and responsiveness of telecommunication in Rivers State, Nigeria.

$H_{02:}$ There is no significant relationship between horizontal information system integration and quality service delivery of telecommunication firms in Rivers State, Nigeria.

THEORETICAL FOUNDATION

Socio-Technical System Theory

Sociotechnical systems theory is an approach to understanding the interaction between social and technical elements within organizations, it emphasized the need for joint optimization to achieve overall system success. This theory originated in the 1990 at the (STS). Key Principles of this theory relevant to this study are: Interdependence, which is a component of the organizational operation, the organizations are deeply interconnection, change in one subsystem will result to significant impact on the other system which necessitated a holistic approach to organizational design or sector. Another component of this theory is the Joint Optimization. It emphasized the need to optimize both social and technical system simultaneously, both human and technical system. Another basic element of this theory is the user participation which requires the involvement of all stakeholders, emphasized the enclosure of the employees, stakeholders in the design and decision-making processes. Sociotechnical systems take the concepts and metaphors of general systems theory, in particular the notion of 'open systems' (Trist & Bamforth, 1951), as a way of describing, analyzing and designing systems with joint optimization in mind, particularly those that embody some degree of non-linearity within themselves as well as the environment they reside in. Sociotechnical systems theory, the term used throughout the current article (and seemingly the term in most widespread use at the present time) reflects certain specific methods of joint optimization in order to design organizations that exhibit open systems properties and can thus cope better with environmental complexity, dynamism, new technology, and competition (Trist & Bamforth, 1951). Sociotechnical systems theory provides a valuable framework for understanding and improving organizational performance by recognizing the complex interplay between social and technical elements. By adopting

this perspective, organizations can create systems that not only enhance productivity but also support the needs and aspirations of their employees, leading to a more effective and harmonious workplace.

LITERATURE REVIEW

Concept of Information Systems Integration

Business firms rely on information systems to competitively lead the market (Aurelija & Daskevic, 2023). The adoption of information technology into business is not an end to the means without proper integration. Telecommunication firms are defined as a cross functional information system, as functional systems, emphasize a particular business function with different departments such as human resources, accounting, finance, marketing, sales, and productions and operations functions. Even though these systems are designed to functional areas of business, they are not subject to decision. However, these systems often do not support the information needs of just one particular areas of business or a functional business area but are incorporated into combinations of several functional systems (Chuma, 2020). These are components of Business Intelligence that support information processing, and decision-making needs of various departments within and outside the organization. These systems do cross not only the departmental and functional boundaries and distinct business functional areas, but may also cross the borders of the whole enterprise and also support decision making needs of several departments (Jenkin, Chan & Sabherwal, 2019). In spite of the fact that these systems are more sophisticated and more costly to acquire, use and integrated within organization, however it helps companies to improve imperative business processes all across the enterprise (Jenkin, Chan & Sabherwal, 2019).

Information Systems Integration is the alignment of business processes, human resources and technology to achieve organizational productivity (Aydiner, Tatoglu, Bayraktar, Zaim & Delen, 2019). This defined the strategic, horizontal, vertical and electronic data integration. Information Communication Technology firms depend on each other and for effectively communication, the protocols, network and data most be synchronized with other platforms of the different network operators (Coreia, Rocha, Doclus & Veiga, 2021). The competitive business environment is becoming an essential driver pushing business firms to undertake efforts to respond to the fast changes in the customer service sector (Hajjat & Amid, 2023).

Horizontal Information System Integration

Horizontal information system integration defined smooth flow of materials, information and finances between these organizations. In the sub-module of horizontal integration, activities such as planning, control and quality improvement are oriented towards all organizations that collaborate within the value creation process to produce products and services (Sony, Antony & Douglas, 2020). In Industry 4.0, horizontal integration implies the integration of information technologies and production systems with the established exchange of data and information between companies in geographically distant locations throughout the value chain (Chukalov, 2017). This is achieved through the provision of networking through cyber-physical systems, from inbound logistics through warehousing, manufacturing, marketing and sales to outbound logistics (Finance, 2015). Horizontal integration takes place on several levels (Salimova, Vatolkina, Makolov & Anikina, 2020), at the production level, connected machines and production units constantly communicate their status and respond autonomously to production

demands. In multiple production plants - through production execution systems, data about production plants (e.g. inventory levels, unexpected delays) is shared throughout the company. Throughout the supply chain, suppliers and service providers must be firmly integrated horizontally into the company's production control system, examples of successful horizontal integration include Microsoft - Activision Blizzard, Anheuser-Busch InBev and SABMiller, Walt Disney Company and 21st Century Fox (Moltz, 2022; Traver, 2022)

Horizontal integration can take various forms. Available literature shows that the horizontal integration adopted by business firms include horizontal mergers, horizontal acquisition and horizontal alliance. These dimensions of horizontal integration strategies are discussed below: Horizontal information integration also supports organizational merger. Horizontal merger is a business strategy whereby two or more firms in the same industry are consolidated into one corporate body for quality enhancement (Sader, Husti & Daroczi, 2022)

Organizational Sustainability

Organizational Sustainability refers to an organization's ability to maintain its operation, reputation, and financial performance over the long term while minimizing its negative impact on the environment and society (Subramaniam, 2021). Sustainability scholars have utilized different theoretical frameworks such as institutional theory among others to understand why and how sustainability initiatives emerge (Amadi &Mohammed, 2024)) and how such efforts lead to different environmental, financial and market performance outcomes at the organizational level (Alshamrani, Myneni, Chowdhary & Huang, 2019). Institutional theory is based on the concept that organizations are influenced by their 'invisible' institutional environment and are required to conform to the collective norms. Ezeanolue and Shalom (2025), there are two aspects of organizational benefits, i.e. business and strategic success. Business success is whether the goals and objectives have been achieved, and all benefits have been realized. Strategic success is the impact that the project deliverables have on the market and the industry in which the organization functions.

Responsiveness

Responsiveness is the determination that defines the willingness to help customers and to provide prompt services. It is the desire and willingness to assist customers and deliver prompt service. It involves features such as the opening hours of the service provider, the politeness of the employees and the time the customer has to wait in order to get the service. In other words, it describes how quick and effective the response to the customer is. Willingness to help customers is likely to have an important and positive effect on customers' perceived service quality and customer satisfaction in telecommunication companies. Mengi (2019) also found that responsiveness is positively related to service quality and customer satisfaction. It is also involves understanding needs and wants of the customers, convenient operating hours, individual attention given by the staff, attention to problems and customers‟ safety in their transaction (Kumar, Mani, Mahalingam, & Vanjikovan, 2019) Organizations services such as prompt communication to the customer are vital. Customers are concerned whether their fast-food organizations will provide the right information to the right customers promptly (Susie, Huong & Sue, 2017). This creates public confidence and thus helps customers to make the right decisions at the right time. Responsiveness is likely to have an important and positive effect on

customer satisfaction (Glaveli, Petridou, Liassides & Spathis, 2016). The higher customers appreciate problem solving, the higher overall evaluation of retail service quality is.

Organizations carry out its business activities in a specific business environment, the environment in which these organizations operate is known to have a grip of influence on their operations. It is an obvious fact that many firms conduct their business in environment whereby they are expected to meet expectations and needs of its diverse publics, hence the need to formulate strategies that would help them not only meet their need but surpass the expectations in a bid to accomplish goals (Wofuru, 2022). Responsiveness enables organizations to detect market changes quickly, reconfigure their processes to meet new market requirements, share information across organizational units, take maximum advantage of information processing systems, and adopt new product and process technologies ahead of competitors (Wofuru, 2022).

Quality Service Delivery

Telecommunication companies in Nigeria are rightly positioned to be major key players in the service delivery. In almost a decade now the government sort to provide quality services and products in the industry that can compete favorably with any other quality service provided by multinationals. To achieve this feat, there is the need to achieve quality service delivery through Quality Management System (QMS). Quality Management System is a general and regular methodology that has become one of the most popular solution strategies for productivity improvement. Effective quality delivery is driven by the need to increase performances of business units in terms of quality, efficiency, customer satisfaction and profitability (Hamel & Prahalad, 2018) Like other standards QMS ensures vital features such as quality, ecology, safety, reliability, compatibility, interoperability, efficiency and effectiveness. It facilitates trade, spreading knowledge and sharing of technological progress and good management and leadership practices (ISO, 2010). It is essentially driven by the fundamentals of quality.

Quality service delivery can be assessed both at the macroeconomic level by indicators such as value added tax, investments, employment, and at microeconomic level by performance and competitiveness (Arimie & Adiele, 2021). For oil and gas companies in developing cities such as South South, Nigeria, relevance and business sustainability is assessed by these microeconomics indexes highlighting the importance of Service Quality driven by an efficient Quality Management System. In recent times, various researchers have carried out a lot of studies on quality management systems. for instance investigated the improvement of service quality and identified that quality management systems sigma must be integrated with management systems concepts (Bharath & Sreedevi, 2020). They recommended a combination of their common features for maximum profit.

EMPIRICAL REVIEW

Wamai, James and Tumuti (2022) empirical results revealed that data integration capabilities bear a positive but significant influence on the performance of commercial banks on Kenya. From the attributes of data integration capability, it was revealed that most managers agreed that data integration capability influences the performance of commercial banks. Consequently, it is concluded that data integration capability leads to enhanced performance of commercial

banks. Kim, J. K. (2022). In his A gentle introduction to data integration in survey sampling, he reported that, if the sampling mechanism is informative, imputation techniques can be developed under the strong model assumptions for the sampling mechanism. As in the non-informative sampling case, the informative sampling assumptions are unverifiable. Thus, sensitivity analysis is recommended to evaluate the robustness of the study conclusions to unverifiable assumptions. Or, if budget is allowed, a follow-up subsampling can be used to build a realistic model for the informative sampling mechanism.

According to Masese, Omari, and Ngacho (2019), the role of horizontal and vertical integration on performance of public organizations from the field findings, it was observed that quality programs was related significantly and positively related with interactions within the departments and shared progress monitoring while interaction within departments' correlated significantly with quality programs, Efficiency operations and shared progress monitoring, shared progress monitoring correlate positively and significantly with all other variables apart from efficient operations which was negative and insignificant and efficiency operations significantly related with interactions within departments but the relationship was negative with shared objectives and shared progress monitoring. Braa, K. and Rolland, K.H. (2000) the challenges concerning the design of large-scale information systems are neither local nor global, they are rather horizontal, and thus the question is not how to achieve a seamless integration between existing local practices – or a global and all-embracing standard. But, to use IT in a flexible way to enable knowledge sharing in communities-of-practice, as well as linking the various communities in a way that do not undermine the local work practices and the established borderline resources in any community-of-practice

Julyeta and Tangkawarow. (2017) concluded that Vertical information systems can help an organization address its ever-increasing uncertainties within the organization and with the outside environment. They become even more useful when the information base of an organization grows. Several approaches can be used in designing BI systems. However, we feel the best approach is the process-oriented approach coupled with management commitment. Since management is the "real" user of such systems and since the information at such aggregated, 'higher', levels are sensitive, full commitment of management should be harnessed to fully realize a vertical information system integration.

DATA ANALYSIS AND REPORT

Bivariate analysis

According to Neuman (2000) cited in Asawo (2009), Scatter graph is one of the techniques used in deciding whether a bivariate relationship actually exist between predictor variable and the criterion variable. Therefore, to determine the trend of the relationship, it is a good decision to plot a scatter chart and find the line of best fit that separate the distribution of dots on the scatter plot. Figure 4.6 showed the relationship between the independent variable and the dependent variable with the predictor on X-axis and criterion variable on the Y-axis.

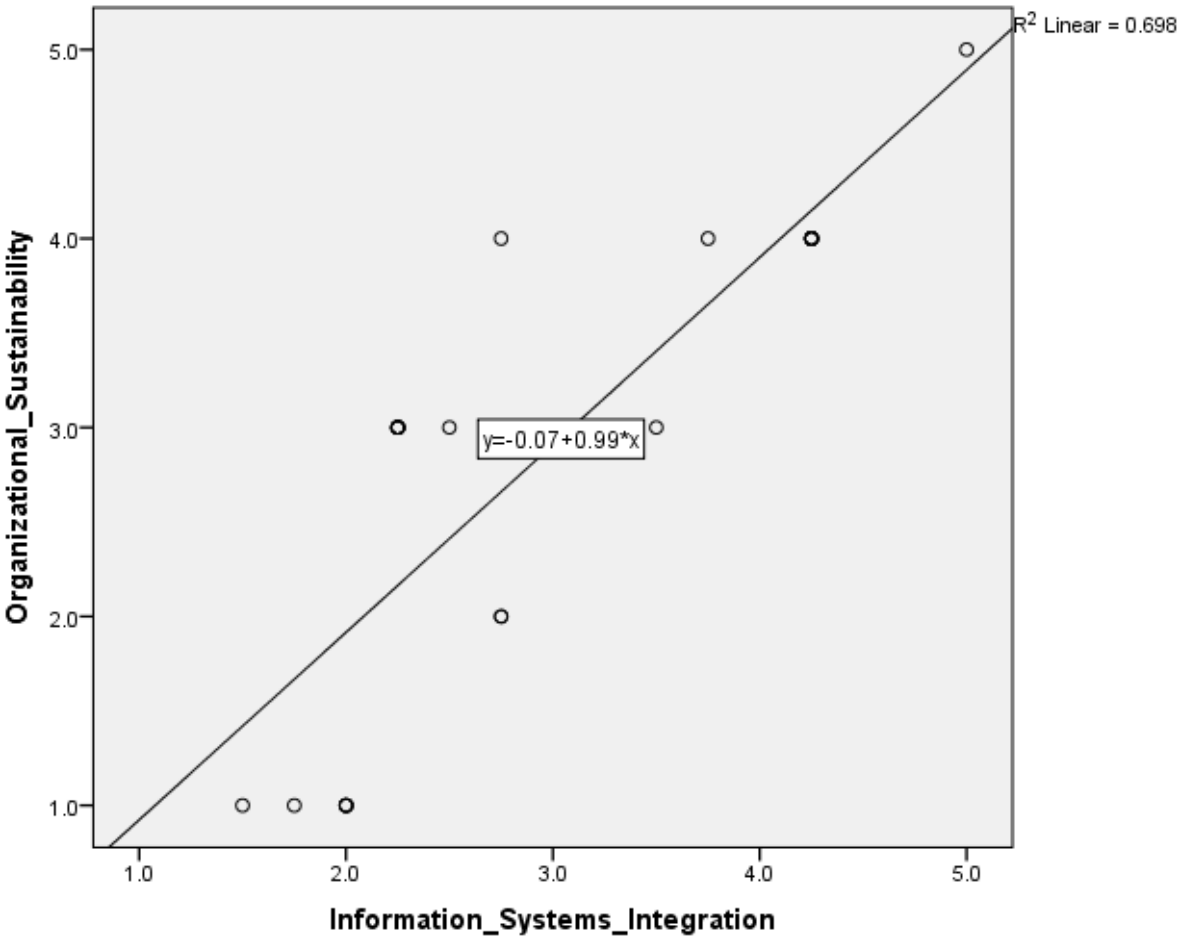


Figure 2: Linear Relationship between Information System Integration and Organizational Sustainability of Telecommunication Firms, Rivers State, Nigeria

Table 1 Relation between horizontal integration and responsiveness

			Horizontal Integration	Responsiveness
Spearman's rho	Horizontal Integration	Correlation Coefficient	1.000	.952**
		Sig. (2-tailed)	.	.000
	Responsiveness	Correlation Coefficient	.952**	1.000
		Sig. (2-tailed)	.000	.

**. Correlation is significant at the 0.01 level (2-tailed).
b. Listwise N = 30

Source: Research survey, 2025

Table 1: showed the relationship between horizontal integration and responsiveness of Telecommunication firms in Rivers State, Nigeria. The correlation coefficient showed that there was a strong positive relationship between horizontal integration and responsiveness. The

correlation coefficient of 0.952 confirms the magnitude and strength of this relationship which was statistically significant at ($\rho = 0.01<0.05$). Based on this value, the null hypothesis **Ho_1** was rejected and the research (Alternate) hypothesis **H_{A1}** accepted. Thus, there is a strong positive relationship between horizontal integration and responsiveness of Telecommunication Firms in Rivers State, Nigeria.

Table 2: Relationship between horizontal integration and quality service delivery

			Horizontal Integration	Quality Service delivery
Spearman's rho	Horizontal Integration	Correlation Coefficient	1.000	.892**
		Sig. (2-tailed)	.	.000
	Quality Service Delivery	Correlation Coefficient	.892**	1.000
		Sig. (2-tailed)	.000	.

**. Correlation is significant at the 0.01 level (2-tailed).
b. Listwise N = 30

Source: Research survey, 2025

Table 2 showed the relationship between horizontal integration and quality service delivery of Telecommunication firms in Rivers State, Nigeria. The correlation coefficient showed that there was a strong positive relationship between horizontal integration and quality service delivery. The correlation coefficient of 0.892 confirms the magnitude and strength of this relationship which was statistically significant at ($\rho = 0.01<0.05$). Based on this value, the null hypothesis **Ho_2** was rejected and the research (Alternate) hypothesis **H_{A2}** accepted. Thus, there was a strong positive relationship between horizontal integration and quality service delivery of Telecommunication Firms in Rivers State, Nigeria.

DISCUSSION OF MAJOR FINDINGS

The output of the coefficient of correlation showed that there is a strong positive relationship between information system integration and organizational sustainability of Telecommunication firms in Rivers State Nigeria. The univariate analysis showed that the respondents supported that the dimensions of information system integration, which are horizontal, vertical and data integration enhanced organizational sustainability of Telecommunication firms in Port Harcourt, Rivers State, Nigeria. The various mean obtained from the respondents supporting the extent to which information system integration enhanced organizational sustainability were all the criterion of 3.00 for a 5-point Likert scale.

Horizontal information system integration and organizational sustainability

The output of the statistical analysis showed that there existed a strong positive relationship between horizontal information system integration and organizational sustainability. The correlation coefficient of 0.952 confirms the magnitude and strength of this relationship which was statistically significant at ($\rho = 0.01<0.05$), for horizontal information system integration

and quality service delivery, the correlation coefficient of 0.892 confirms the magnitude and strength of this relationship which was statistically significant at ($\rho = 0.01<0.05$) and for the relationship between horizontal information integration and patronage correlate at 0.527, this also confirms the magnitude and strength of this relationship which was statistically significant at ($\rho = 0.01<0.05$).These result are in line with the work of Stankova et al, (2018) and Also (2010) which affirmed that horizontal merger is a business strategy whereby two or more firms in the same industry are consolidated into one corporate body. Also, according to Dinc and Erelin Ngaru (2016) combining firm or merging two firms there must be corresponding cnhange or modification of the information system to achieve a common objective. It therefore confirmed that firms that merge horizontally can be used to gain a competitive advantage in the market. Information system integration is essential to firm's competitive advantage and survival in the 'new global digital economy (Lee, Choi, Lee, Min, & Lee, 2016).

SUMMARY

The concept of information system integration and organization sustainability of Telecommunication firms in Rivers State, Nigeria has been properly reviewed, these three dimensions of organizational sustainability adopted in this research are horizontal information system integration, vertical information system integration and data integration. These are critical aspect of the telecommunication firms as they received information from different information system (network) the information needs to be synchronized to fit into the system design. Horizontal integration defined smooth flow of materials, information and finances between these organizations. In the sub-module of horizontal integration, activities such as planning, control and quality improvement are oriented towards all organizations that collaborate within the value creation process to produce products and services. Vertical integration is a growth strategy whereby a firm engages in multiple stages of the value chain and telecommunication firms today produced huge volumes of highly heterogeneous data (big data) that need to be integrated to feed various applications providing descriptive analytics or prediction models, there information system integration highlight the method and technique of merging, enhancing growth strategy and the ability for telecommunication firms in Rivers to acquire, store, analysis and effectively communicate the information among the different network operating in Rivers State, and Nigeria in general.

CONCLUSION

Information system integration is an effective tool that enhanced the sustainability of telecommunication firms in Rivers State, in Nigeria. The effective information system integration defined the method of merging the different organizations or companies can carry out merger, effectively defined the growth strategies and ensures the huge amount of data coming from the different network operators are synchronize to ensure that there is adequate responsiveness, quality service delivery that will enhance customer patronage in telecommunication firms in Rivers State, Nigeria.

RECOMMENDATION

Based on the literature properly reviewed, and the output of the analysis carried out, the following recommendation are made for the effective integration of information system integration that will enhance effective organizational sustainability of telecommunication firms in Rivers State Nigeria as follows;

1. There should proper integration of horizontal information system across the various department of the organization to ensure organizational responsiveness
2. Ensure the integration of horizontal information systems to support and enhance the employees to carryout quality service delivery in the telecommunication firms in Rivers State, Nigeria.
3. The integration of horizontal information should always consider customers satisfaction as the major or sure way of attaining sustainability.

REFERENCES

Alzahrani, L. & Seth, K. P. (2021). Factors influencing students with continuous use of learning management systems during COVID-19 pandemic: An empirical study: *Education and Information Technology*, 26, 6787 – 6805.

Alshamrani, A., Myneni, S., Chowdhary, A., & Huang, D. (2019). A survey on advanced persistent threats: Techniques, solutions, challenges, and research opportunities. *IEEE Communications Surveys & Tutorials, 21*(2), 1851–1877.

Amadi, C., & Mohammed, M. (2024). Direct marketing and customers' patronage of deposit money banks in Nigeria. *British Journal of Marketing Studies, 12*(3), 18–42.

Aurelija, B. & Daskevic, D. (2023). Contemporary concept of business competitiveness. *Vadyba Journal of Management*, 1(39), 1648-7974.

Aydiner, A. S., Tatoglu, E., Bayraktar, E., Zaim, S., & Delen, D. (2019). Business analytics and firm performance: The mediating role of business process performance. *Journal of Business Research*, 96(3), 228–237.

Arimie, B. E. & Adiele, K.C. (2021). Supplier integration and competitiveness of oil and gas exploration and production companies in the Niger Delta Region of Nigeria*. British Journal of Management and Marketing Studies,* 4(1), 72-86.

Bharath, M. and Sreedevi, V. (2020). Zooming in on the levels of employee engagement, perception, satisfaction, and employee roles influenced the health care sample study. Vilakshan - *XIMB Journal of Management*, 18(1), 62–75

Braa, K. and Rolland, K.H. (2000). Horizontal Information Systems: Emergent Trends and Perspectives. In: Baskerville, R., Stage, J. and DeGross, J.I.(eds.) Organizational and Social Perspectives on Information Technology. Boston: Kluwer Academic Publishers, 83-101.

Chukalov, K. (2017). Horizontal and vertical integration, as a requirement for cyber-physical systems in the context of industry 4.0. *International scientific journal "industry 4.0*", 2(4), 155-157.

Chuma, L. L. (2020). The Role of Information Systems in Business Firms Competitiveness: Integrated Review Paper from Business Perspective*. International Research Journal of Nature Science and Technology*, 2(4), 30 – 42.

Consolata, G., Victoria F. 7 Maurice M. (2018). Information Technology in Government Services Delivery: A Case Study of Huduma Center Kenya. *International Journal of Scientific & Technology Research,* 7(12), 67-69.

Coreia, A. M. M., Rocha, C.F., Doclus, L. C. & Veiga, C. P. (2021). Integration of Business Processes with activities and Information. Open Access pages. Retrieved 12th November, 2024 from: (https://us.sagepub.com/en-us/nam/open-access-at-sage

Ezeanolue, U. S., & Shalom, A. A. (2025). Diversification strategies and the survival of manufacturing firms in Anambra State, Nigeria. *International Journal of Management and Sustainability Research, 3*(1), 12–25.

Friday, D., Ryan, S., Sridharan, R. & Collins, D. (2018). Collaborative risk management: a systematic literature review, *International Journal of Physical Distribution & Logistics Management*, 48(3), 231-253.

Glaveli, N., Petridou, E; Liassides, C.& Spathis, C. (2016). Fast food organizations Service Quality: evidence from five Balkan countries. Managing Service Quality: Global Trends and Challenges in Services, 16(4), 380-394

Hajjat, T. & Amid,K. B. (2023). The Impact of Information Technology on Service Quality, Satisfaction, and Customers Relationship Management (Case Study: IT Organization Individuals). *Journal of Management Science & Engineering Research, 6*(2), 24 – 31.

Hamel, G. & Prahalad, C.K. (2018). Strategy as stretch and leverage. *Harvey Business Review*, 71, 75–84.

Jenkin, T.A., Chan, Y.E. and Sabherwal, R. (2019), "Mutual understanding in information systems development: changes within and across projects", *MIS Quarterly*, 43(2,), 649-671

Julyeta P. A. R. & Irene R. H. T. (2017). Vertical Information System: A Case Study of Civil Servant Teachers Data in Manado City. *Indonesian Journal of Electrical Engineering and Computer Science*, 6(1), 42 – 49.

Kim, J. K. (2022). A gentle introduction to data integration in survey sampling. *The Survey Statistician*, 85, 19–29.

Kumar, S. A., Mani, B. T., Mahalingam, S., and Vanjikovan, M., (2019). Influence of Service Quality on Attitudinal Loyalty in Private Retail Fast food organizationsing: An Empirical Study. *Journal of Management Research*, 9(4): 21-38.

Lee, S. M., Lee, D., & Kang, C.-Y. (2012). Impact of high-performance work systems in the healthcare industry: employee reactions, service quality, customer satisfaction, and customer loyalty. *The Service Industries Journal*, 32(1), 17–36.

Maiga, A.S., (2017). Assessing the main and interaction effects of activity based costing and internal and external information system integration on manufacturing plant operational performance, *Advances in Management Accounting*, 29, 55-90.

Masese, E. K., Omari, S. & Ngacho, C. (2019). Empirical Evaluation of the Role of Horizontal and Vertical Integration on Performance of Public Organizations. *International Journal of Research and Innovation in Applied Science, 5(10),* 2454-6194

Mengi, P., (2019). Customer Satisfaction with Service Quality: An Empirical Study of Public and Private Sector Fast food organizationss. *Journal of Management Research*, 8(9):7-17

Moltz, B. (2022). Vertical and Horizontal Integration for Expansion. Retrieved from https://www.americanexpress.com/en-us/business/trends-and-insights/articles/should-you-expandthrough-horizontal-and-vertical-integration/

Sader, S., Husti, I., & Daroczi, M. (2022). A review of quality 4.0: Definitions, features, technologies, applications, and challenges. *Total Quality Management & Business Exce*llence, 33(9-10), 1164-1182.

Salimova, T., Vatolkina, N., Makolov, V., & Anikina, N. (2020). The perspective of quality management system development in the era of industry 4.0. *Humanities & Social Sciences Reviews,* 8(4), 483

Sony, M., Antony, J., & Douglas, J. A. (2020). Essential ingredients for the implementation of Quality 4.0: a narrative review of literature and future directions for research. *The TQM Journal*, 32(4), 779-793

Shou, Y., Shan, X. and Li, L., (2022). The roles of JIT supply chain practices in new product ramp-up: the moderating effects of IT integration. *International Journal of Logistics Research and Applications*, 1-18.

Srinivasan, A. & Stasko, J. (2017) Natural Language Interfaces for Data Analysis with Visualization: Considering What Has and Could Be Asked. Proceedings of the Eurographics. *IEEE VGTC Conference on Visualization: Short Papers,* Barcelona, 12-16

Subramaniam, T. (2021). An Analysis of Quality 4.0 Competency Level in the Malaysian Electronics Industry. *International Research Journal of Humanities and Interdisciplinary Studies,* 2(7), 126-168

Susie, K., Huong, H. & Sue, L.T. (2017). Service quality and student/customer satisfaction in private tertiary education sector in Singapore. *Journal of Economics, Management and Business Administration,* 31(4), 430-444.

Rikhardsson, P. & Yigitbasioglu, O. (2018). Business intelligence & analytics in management accounting research: status and future focus. *International journal of accounting information system*, 29, 37-58.

Traver, E. (2022). Horizontal Integration vs. Vertical Integration: What's the Difference? Retrieved from https://www.investopedia.com/ask/answers/051315/what-difference-between-horizontal-integrationand-vertical-integration.asp

Trist, E.L. & Bamforth, K.W. (1951). Some Social and Psychological Consequences of the Longwall Method of Coal-Getting. *Human Relations*, 4 (1), 3-38

Wamai, J., James, R. & Tumuti, J. (2022). Data Integration Capabilities and Performance of Commercial Banks in Kenya. *Journal of Business Strategy Finance and Management,* 4(1), 49-158

Wofuru, A. R. (2022). Knowledge management systems and organizational competitiveness of manufacturing firms in Rivers State. *Journal of International Research in Accounting and Management,* 10(3), 102-113.