

NETWORK TECHNOLOGY INFRASTRUCTURE AND SUPPLY CHAIN PERFORMANCE: A THEORETICAL REFLECTION

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Abstract

This study focused on unraveling the relationship between network technology infrastructure and supply chain performance. The study sought to conceptualize network technology infrastructure and determine its link to supply chain performance with service quality, operational efficiency and delivery speed as the measures. The study undertook literature review to gain insights into the meaning and relevance of network technology infrastructure on supply chain performance. From the studies reviewed, it was observed that network technology infrastructure positively affects supply chain performance. Thus, the study concludes that network technology infrastructure relates to supply chain performance; and recommends that firms should invest in network technology infrastructure, if they aspire to improve the performance of their supply chain.

Keywords: Delivery speed, network technology infrastructure, operational efficiency, supply chain performance, service quality

Introduction

Prior to the advent of network and communication technology, computers were seen as devices for making calculations, storing data, and automating business processes. However, as network devices evolved, it became apparent that many of the functions of telecommunications could be integrated into the computer (Tshiyole & Jokonya, 2016). During the 1980s, many organizations began combining their once-separate telecommunications and information systems departments into an Information Technology (IT) department (Rahmanseresht et al., 2016).

The ability of computers to communicate and to facilitate communication between individuals and groups is necessitated by network and communication technology. Presently, it is unthinkable to have a computer that does not include network and communications capabilities. This implies that network and communication technologies are fundamentally transforming the way we live.

In today's business world, a computer network is more than a collection of interconnected devices. For many businesses, the computer network is the resource that enables them to gather, analyze, organize, and disseminate information essential to their profitability (Mukangu, 2016). The rise of Intranets and Extranets is the latest indication of the importance of computer networking to businesses. Intranets and Extranets are private business networks that are based on Internet technology (Tshiyole & Jokonya, 2016).

Businesses implement Intranets at a breakneck pace and for one reason only: to enable the collection, management, and dissemination of information more quickly. Many businesses implement Intranets simply to remain competitive (Rahmanseresht et al., 2016). Though studies on network technology infrastructure are only just beginning, the relevance of network technology to supply chain performance is widely acknowledged (Diabat et al., 2013).

Managers across different sectors desire to reap the benefits of network technology infrastructure, and are most likely to invest resources to install robust network technology infrastructures,

especially, once they are convinced that their investment will yield commensurate returns. Thus, this study is focused on undertaking extensive literature review to determine the relationship between network technology infrastructure and supply chain performance in terms of service quality, operational efficiency and delivery speed. The remaining parts of the paper presented the baseline theory of the study, conceptual review on network technology infrastructure, supply chain performance and its measures and empirical reviews on network technology infrastructure and supply chain performance.

Baseline Theory

This study is based on resource-based view (RBV), a framework used to determine strategic resources a firm can exploit to achieve competitive advantage (Barney, 1991). The main thrust of RBV is the relationship between customer value, competitive advantage and superior performance (Delke, 2015). The firm can provide value to customers in many ways: superior production systems, low cost structures, or customer service through flexible and dynamic technological systems (Delke, 2015).

RBV posits that key resources such as; intangible assets (relationships and systems) and capabilities (skills and knowledge) are characteristics that a firm implement strategies to meet needs of customers, thereby enhancing its ability to secure sustained competitive advantage. The relevance of RBV to this study is in its position that internal resources (network technology infrastructure in this instance) is critical to supply chain performance. This view aligns with that of Alemu (2016) that effective use of resource enable firms achieve competitive advantage.

Concept of Network Technology Infrastructure

A network can be anything from a simple combination of hardware, software, and particular connectivity medium, which together allow multiple computing devices to communicate. It is also a collection of computers and other hardware components interconnected by communication channels that allow sharing of information. Simply, a set of computers interconnected through a communication medium for information interchange is called a computer network.

Computer networks store and manipulate electronic data, and are interconnected in such a way that users can store, retrieve, and share information. Commonly connected devices include microcomputers, minicomputers, mainframe computers, terminals, printers, fax machines, pagers, mobiles and various data storage devices (Tshiyole & Jokonya, 2016).

The field of networking and communication includes the analysis, design, implementation, and use of local, wide-area, and mobile networks that link computers together. The Internet itself is a network that makes it feasible for nearly all computers in the world to communicate (Rahmanseresht et al., 2016). The most obvious benefit of networking and communication is that a firm can store and retrieve virtually any kind of information on a computer network (Mukangu, 2016).

In addition to information storage and retrieval, there is a host of other important benefits of computer networks. Having a computer network enable us to combine skills of different people and the power of different equipment, regardless of the physical locations of the people or the equipment (Tshiyole & Jokonya, 2016). Computer networking enable people to easily share information and hardware, allowing them to take advantage of communication mediums such as electronic mail, newsgroups, and video conferencing. It also allows them to work more securely,

efficiently, and productively (Rahmanseresht et al., 2016).

Supply Chain Performance

Performance refers to how well an organization achieves its market and financial goals. Supply chain performance therefore, is a measure of how effectively, a supply chain operates and achieves its objective of meeting customers' expectation. It encompass various key performance indicators (KPIs) such as cost, quality, delivery time, flexibility, and responsiveness.

Supply chain performance is also viewed as the effectiveness and efficiency of a supply chain in achieving its objectives, meeting customer requirements, and delivering value to stakeholders" (Chopra & Meindl, 2015). Supply chain performance is the achievement of desired outcomes such as cost reduction, lead time reduction, and service level improvement through effective coordination and collaboration among supply chain partners.

Supply chain performance is the measurement and evaluation of the efficiency and effectiveness of supply chain processes in achieving organizational objectives and delivering value to customers" (Monczka et al., 2015). Supply chain performance is "the assessment of how well a supply chain achieves its strategic and operational objectives, including cost reduction, service improvement, and risk mitigation (Christopher, 2016). This study adopts service quality, operational efficiency and delivery speed as measures of supply chain performance.

Service quality

Service quality is customers' evaluation of a service and the extent to which it meets their expectations and provides satisfaction; or customers' assessment of the overall excellence of services they receive (Ghotbabadi et al., 2015, as cited in Ateke & Amangala, 2021). Tjiptono and Chandra (2012) define service quality as a measure of how well the level of service provided is in line with customer expectations.

Firms that seek increased profits through acquisition of new customer and retention of current ones, pursue their goals using service quality as a tool (Ateke & Amangala, 2021). Service quality is essential to attracting, keeping, and expanding customers, as well as motivating and eliciting purchase behaviour.

Literature shows that service quality confers competitive advantage by driving customer satisfaction and loyalty, repeat purchase intention, and high market share; reduced marketing costs and improved profitability (Rasyida et al., 2016). Service quality is thus a critical success factor firms (Amangala & Ateke, 2018).

Operational efficiency

Operational efficiency is what occurs when the right combination of people, process, and technology comes together to enhance the productivity and value of any business operation, while driving down cost of routine operations to a desired. Efficiency is the result of business' activities in relation to resources used to implement those activities.

The concept of operational efficiency encompasses the practices meant to improve a company's processes so it can run efficiently and provide consistent, quality services. Operational efficiency

focuses on the improvement in internal customer performance and is measured in terms of flexibility, consistency, productivity, and cycle time (Abdifatah, 2012).

Delivery speed

Delivery speed is a value-added service that denotes the period between the placement of an item and actual delivery of the item to the customer's location (Wisner et al., 2014). Delivery speed refers to the speed at which goods or services are delivered to a customer. It encompasses the speed at which a customer's order is processed and shipped (Handfield & Pannesi, 1992). It can also be referred to as the speed at which a package is delivered by a courier service or the speed at which a service is provided to a customer (Ziółkowski et al., 2022).

Generally, delivery speed is concerned with the time between when an order is placed and when it is received by the customer is shorter (Dada et al., 2019). Delivery speed refers to the time required to fulfill an order from the time it is received until it is delivered to the customer, including all processing, handling, and transportation activities (Wisner et al., 2014).

Empirical Review

Several empirical studies allude to the nexus between network technology infrastructure and supply chain performance. For instance, Pérez-Aróstegui et al. (2019) explored the relationship between information technology competence and quality management. Structural equation modeling with data collected from managers in 230 Spanish firms. The study showed the existence of positive and significant relationship between technology competence and quality management.

Mukangu (2016) examined the role of computer-based information system on organizational performance in the aviation industry in Kenya; and found that computer-based information system plays significant role on organizational performance. Relatedly, Jackson and Josphat (2016) assessed ICT adoption and performance of SMEs in Nairobi County Kenya; and that ICT infrastructure, ICT user skills, ICT services, and government policies as licenses showed statistically significance relationship with performance of SMEs.

Zengwa and Choga (2016) examined the role of information and communication technology (ICT) in company's inventory management. The study exposed that the organizations' appropriation of ICT stock administration enhanced the stock capacity through constant preparation of exchanges, availability and management of data from a brought together database, profitability and productivity over every one of the offices. The device enabled tests and balances on all stock transactions. It additionally revealed that ICT helped in advancing standardized stock management actions, diminishing on workload as nicely as on enhancing the nice for the inventory function.

Tshiyole and Jokonya (2016) evaluated benefits of cloud computing for SMEs in Gauteng, South Africa. The study revealed that networking and communication has positive impact on SME performance. Similarly, Rahmanseresht et al. (2016) studied the relationship between information technology and organizational structure of government banks of Iran. Results showed that there was a positive and direct correlation between using information technology and organizational structure in governmental banks.

Also, Akande (2015) investigated the influence Information Technology (IT) on entrepreneurial performance in Nigeria. Finding reveals that IT has positive influence on entrepreneurial

performance. The study of Kariuki (2015) sought to determine the level of use of IT use and its relationship with organizational performance Kenya's population services. The study defined IT as anything related to computing technology, such as networking, database management, hardware, software, the Internet, or people that work with these technologies, to store, process, and deliver information. The findings revealed that there is a positive relationship between IT use and organizational performance of Kenya's population services. Akande and Yinus (2013) investigated influence of IT on operational performance of SMEs in Nigeria. The result showed that IT has significant impact on operational performance of SMEs in Nigeria.

Conclusion and Recommendations

Network technology infrastructure is an integral part of information technology that help firms to safely network with customers and without geographical boundaries. The study reviewed extant literature on the relationship between network technology infrastructure and supply chain performance. Based on the reports and arguments of scholars, it is apparent that that network technology infrastructure has both direct and indirect relationship with supply chain performance. Therefore, this study deduces that network technology infrastructure has connection with supply chain performance.

This deduction follow from reports that technology competence relates to quality management; that computer based information system play significant role in organizational performance; IT correlates with organizational structure of government banks; and that networking and communication technology impacts SME performance. Our conclusion is also based on the fact that network and communication technology has positive influence on entrepreneurial performance, organizational and inventory control system; and to improved customer relationship, sustainable competitive advantage.

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