International Journal of Business & Entrepreneurship Research
ISSN: 2360-989X, Volume 14, Issue 1, (February, 2023) pages 46 - 74
DOI: 27261752371414
www.arcnjournals.org

Physical Office Information Network and Organisational Efficiency

Dr. E. Tantua (Jnr.)
Department of Office and Information Management, Faculty of Management Sciences, Rivers State University, Nkpolu- Oroworukwo, PMB, 5080, Port Harcourt, Nigeria
Henry Oghenewaire Udoro
Department of Office and Information Management, Faculty of Management Sciences, Rivers, State University, Nkpolu-Oroworukwo, PMB 5080, Port Harcourt, Nigeria

Abstract: *The rise of networking technology in the office environment has revolutionised businesses of all sizes. By enabling individuals to collaborate, share and store information digitally, information networks have led to a marked increase in organisational efficiency. Office information networks, such as internal communication systems and shared databases, play a crucial role in improving organizational efficiency. They allow for easy sharing and access to information, which leads to faster decision making, improved collaboration and increased productivity. However, it's important to ensure that these networks are properly secured to protect sensitive information and to prevent unauthorized access. Additionally, it's important to regularly evaluate and update these systems to ensure that they continue to meet the needs of the organization. In order to make the most out of office information networks, organizations should identify their specific needs, select the appropriate technology, ensure proper security, provide training and support, regularly evaluate and update the technology, consider cloud-based solutions, establish policies and procedures for managing and sharing information, create an environment that encourages communication and collaboration among employees, and consider hiring IT professionals to maintain and update the system, and to ensure the security of the network. This seminar aims to explore the various ways in which office information networks have enabled businesses to streamline processes, shorten production timescales and unlock productivity.*

Keywords: *Physical Office Information Networks, Efficiency, Cost Minimisation, Time Minimisation, Waste Minimisation.*

.

INTRODUCTION

Increasing and intense competitiveness in the market has made efficiency the most important issue for profit and non-profit organisations for businesses. It comprises of three specific areas of firm outcome which includes financial efficiency, product market efficiency and shareholder return (Richard, Simon & Brut, 2009). It is very vital for managers to know which factors influence an organization's efficiency in order for them to take appropriate steps to initiate them. Efficiency guarantees the continuity of the organization to be competitive in a global market place. Efficiency can be seen as a multi-dimensional construct consisting of more than simply financial efficiency (Baker & Sinkula, 2005). It describes the extent to which the organization is able to meet the needs of its stakeholders and its own needs for survival (Griffin, 2003). In this sense, efficiency depicts that an organization is achieving its mission and goals.

Zeb-Obipi (2015) posits that corporate efficiency refers to the record of achievements made by an organization (a corporation) at, or over a given, time measurable through several indices. It is measured by the extent to which an organization achieves set objectives or executes its strategies; hence efficiency measures are sourced from both corporate objectives and strategies. According to Tangen (2005), efficiency can be described as an umbrella term for all concepts that consider the success of a firm and its activities. Efficiency refers to actual results or outputs of certain activity, how an activity is carried out, or an ability to achieve results. Atkinson (2012) defined efficiency as the achievement of results ensuring the delivery of desirable outcomes for a firm‘s stakeholders. Awino (2011) asserts that for an organization to be successful it has to record high returns and identify efficiency drivers from the top to the bottom of the organization. Njihia, Obara and Mauti (2013) highlight efficiency measurement as one of the tools which help firms in monitoring efficiency, identifying the areas that need attention, enhancing motivation, improving communication and strengthening accountability. Efficiency is equivalent to the famous 3Es, that is, economy, efficiency, and effectiveness of a certain program or activity (Javier, 2007). Daft (2010) defined efficiency as the organization's ability to attain its goals by using resources in an efficient and effective manner. Similarly, Sok, O‘Cass and Sok (2013) argue that efficiency is the ability of the organization to achieve its goals and objectives.

Increased globalization and fluidity of boundaries driven by the advent of technological advances has altered the economic definition of borders and distances (Audretsch, 2007). In the present age commonly referred to as the knowledge age, organisations are increasingly witnessing dynamic environments with change and evolution amongst the challenging contexts. Organisations are making every effort to achieve economic supremacy in addition to their endeavour to remain competitive in the global market through increased efficiencies and lean production (Forghani & Tavasoli, 2017). The advent of technology has availed unlimited sources of knowledge to practitioners and academia with pundits signalling the dawn of the knowledge age supplanting the industrial era. This trend has ushered in the virtual organization.

Technology has immensely changed the way people work in the society today. The penetration of communication technologies has seen people increasingly adopt the use of emails, text messages, phone calls, teleconferencing, online meeting and sharing of documents virtually. It has brought a system where people do not need to be seated in a common area to accomplish their tasks and achieve the goals of the organization (Watkins, 2013).

The need for information has led us to establish links with various sources of information and to create networks through which we will facilitate collection, transfer, storage and processing of data. With the rapid development of computer technology in recent years (increase performance with drop in prices) and with the right Internet explosion, the number of computer users and computer networks is growing at a high speed. Newer services are introduced every day with more powerful computer equipment and at the same time higher standards are set in networking. The need for networking is the result of a steady increase in data exchange (letters, messages, memos, business statistics, reports, databases, etc.) among employees. It is estimated that around 60% of working time is used for communication or exchange of data. The amount of information exchanged, today reaches up to 35 pages per person per day.

The concept of information networking is a process of communication, exchange of ideas, resource sharing, and collaboration between individuals, organizations, institutions, and libraries, facilitated by ICT's and the internet. Generally, resource sharing, information networking and library cooperation are used interchangeably in the digital age to mean sharing of resources of a library or institution with the users of other libraries or institutions. The global information on the internet/web is available to those who have the required infrastructural capacity to tap and utilize. Communication is what got us, humans, to where we are today: culture, science and technology are all products of communication, sharing the experience of others, adding something to it, improving it (UNESCO, 1994). The underlying philosophy of networking is cooperation or sharing of ideas, resources, costs, expert personnel, and communication exchange. Thus, networking is a two-way activity.

Definitions of information networking abound. For Omekwu (2004), information networking is a system which effectively integrates institutions such as libraries/information centers into coordinated whole to provide a community of users with relevant data irrespective of its origin, format or physical location. Information networking activities have always been one of the major important concerns of information providers globally. Feather (1999) and Abubakar (2010) observed that information networking is essential in the provision of information since no single individual provider, agency, or institution can be self-sufficient in the provision of information resources to their user community.

Network management implies proper configuration, connection and monitoring of network elements: computers (personal computers and server) and communication equipment. The goal of managing and maintaining a computer network is a reliable, modular and secure computing network. The network administrator manages and maintains the computer network. (Beqiri Edmond, 2015) The advantage of connecting users to a computer network is openness to other computers and other networks, as well as access to information regardless of physical separation. Computer equipment can be accessed from numerous and remote locations that are commonly not under the control of the owner or computer administrator

Previous studies have attempted to solve the problem of efficiency using different variables. Ouma and Kombo (2016) examined the influence of organizational learning on efficiency of food manufacturing firms in Nairobi County, Kenya. Also, Karamat (2013) examined the relationship *between* leadership and efficiency a case study of D&R Cambric Communication. Eletu, Ukoha and Nwuche (2017) examined human capital development and corporate efficiency: A study of food and beverages firms in Port Harcourt. Furthermore, Tamunomiebi, Adim and Adubasim (2018) carried out a study on telecommuting and efficiency of mobile (GSM) telecommunication companies in Port Harcourt, Nigeria. Uchendu, Anijaobi-Idem and Odigwe (2013) examined the relationship that exists between principals' conflict management and efficiency in Cross River State, Nigeria. Also, Mungania (2017) investigated the influence of work life balance practices on efficiency of the banking industry in Kenya and found that flexible work arrangements, wellness programs, family responsibility concerns were more strongly related to efficiency of the banking industry in Kenya.

Despite a large stream of empirical research that examined the concept of efficiency using various predictor variables, there has been relatively little empirical research report that detai

ls how firms can strategically achieve efficiency through office information networks hence a knowledge gap exist. Therefore, this study as its point of departure seeks to intend to empirically fill that gap by investigating the relationship between physical office information networks and efficiency.

The purpose of the study was to examine the relationship between physical office information networks and efficiency. In pursuance of this purpose, the study objectives are to:

i. Examine the relationship between physical office information networks and cost minimisation
ii. Investigate the relationship between o physical ffice information networks and time minimization
iii. Determine the relationship between physical office information networks and waste minimisation

Conceptual Framework

This study investigates the relationship amongst three variables. Physical office information network (predictor variable) and efficiency (criterion variable) and information technology infrastructure as (moderating variable). The relationships between these variables are illustrated in the conceptual framework in figure 1.1 below

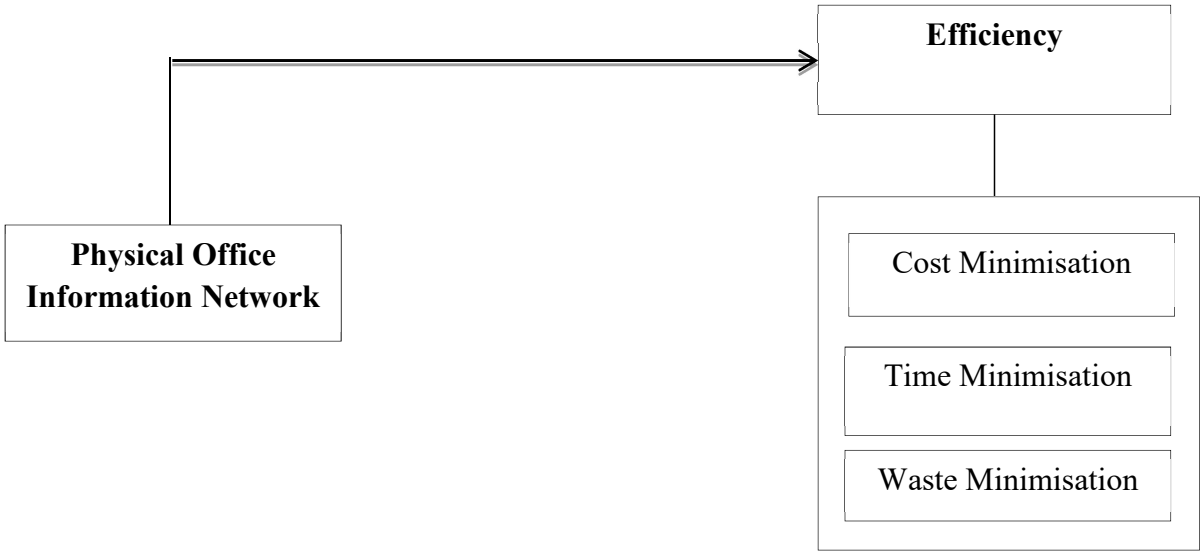

Figure1.1: Conceptual framework for the relationship between office information network and efficiency

Source: Dimensions of physical office information network were adapted from the work of Alibhai (2017) while measures of efficiency: time minimization, cost minimization and waste minimization were sourced from Zeb-Obipi (2015).

LITREATURE REVIEW

Theoretical Foundation

Actor Network Theory

The Actor Network Theory was propounded by Bruno *Latour* and Michel *Callon* (1981). The theory is a sociological theory that recognizes the processes of technological innovation in a heterogeneous network (Callon, 1986; Latour 1996; Law, 1992). The heterogeneous network is a coextensive network comprising a range of dissimilar elements called actors/actants (Tatnall & Burgess, 2002). ANT claims that actors, including human or non-human (social or technical) entities are equally important to a network (Alcadipani & Hassard, 2010); the actors are treated as inseparable by ANT Dolwick (2009) and (3) the interactions and associations between the actors and networks are the key issue (Tatnall & Burgess, 2002). As such, ANT deals with the socio-technical situations in which there are no distinctions between human or non-human (social or technical) actors (Kennan, Cecez-Kecmanovic & Underwood, 2010). Neither social nor technical elements are favored in the network (Kennan *et al.,* 2010). For instance, Tatnall and Burgess (2002) employed ANT in a socio-technical situation involving technological innovation, believe that human actors (e.g. customers, programmers, and development managers) and non-human actors (e.g. computers, modems, telephone lines, and web development tools) are equally important to implement a business-to-business e-commerce portal for regional SMEs in Melbourne, Australia.

The Actor Network Theory approach is conceptually beneficial in helping to appreciate the complexity of an organization's network, the fluidity of this network, and the vigorous role of technology in different contexts (Cresswell, Worth & Sheikh, 2010). This can be demonstrated with an understanding of how social influences are generated as a result of associations between different actors in a network (Linderoth, 2010). Literature on cloud computing shows that theory which aims to explain the cloud computing adoption decisions of organizations needs to consider a complex network and relationships among owner-managers, employees, and external parties which may influence the decision of organization owner-managers (Saya, Pee & Kankanhalli, 2010). The decisions made in the adoption of cloud computing in organizations such as large, medium, small are very complex and involve many actors, both human and non-human. In other words, rather than characteristics of technology itself (non-human actors), human issues also determine how organizations may adopt and migrate to cloud computing (Datta 2011; Low, Chen & Wu, 2011).

Actor network theory is relevant to this study because the recognition and information sharing to enhance the effectiveness of virtual team will be operationalised as events that need to be invested in the organisation so as to attain efficiency. This means that complex networks in organizations benefit from being informed by Actor Network Theory perspectives (Cresswell *et al.,* 2010) and Actor Network Theory offers a suitable framework for analysing the use of virtual work management in various departments in the organization especially the in facilitating efficiency.

Physical Office Information Network

Information networking is a household name in offices in this digital dispensation. It serves as a means of bridging the information gap between offices, institutions, and countries. As emphasized by Odini (1991), resource sharing activities are paramount to offices as no Office can ever be self-sufficient with its collections to suit the information need of users. The basic function, as a dynamic institution, is the provision of adequate resources and the matching of those resources with the needs of its users.

This warrants the coming together of offices to form Office networks or consortia. Omeku (2004) defined Office network as a cooperative arrangement between several offices, for lending book or an electronic network within a Office or interconnecting different offices. Office networks, according to Abubakar (2010), is an omnibus expression to cover cooperation, coordination, inter-Office loans, cooperative acquisition, cooperative storage and processing.

An Office consortium is a group of libraries who partner to coordinate activities, share resources, and combine expertise. These network of libraries metamorphized into a larger array of networks not bounded by distance and expanding the content of services shared through networked arena such as collaborative purchase, resource sharing, expertise among professionals and non-professionals. Office consortia offer significant advantages such as the sharing of resources, and collaboration on shared goals often to enable libraries to deliver higher quality services than they would be able to deliver on their own (Onwuchekwa, 2015)

Office and information networks have the potential to improve Office services in several ways. It brings down the cost of information products and services in the network environment in shared mode. It enables libraries to offer need – based services to the end users eliminating the limitation of size, distance and language barriers among them. With evolution in Office networks, the emphasis has moved from the networks as physical entities to the resources available through the networks. These network-accessible resources include databases of Office holdings, journal articles, electronic text, images, video and audio files, scientific and technical data, etc

While any organization can be considered to be a network in and of itself, there are many definitions for inter-organizational networks. According to researchers, inter-organizational networks are collaborative groups who come together to work toward a common purpose (Popp et. al.), transcend legal and hierarchical boundaries, structure, temporal and geographic boundaries (Meyer and Rowan 1991, as referenced by Jensson and Nybakk 2013, Huerta et. al., 2006).

A more comprehensive definition is offered by Shuman and Twombly (2009) “A collaborative network is a collection of businesses, individuals and other organizational entities that possess the capabilities and resources needed to achieve specific outcome[s]” with an emphasis on collaboration. “Collaboration is a purposeful, strategic way of working that leverages the resources of each party for the benefit of all by coordinating activities and communicating information within an environment of trust and transparency.” (Shuman and Twombly, 2009

Plant (2004) defines the information network as "a set of inter-related information systems associated with communication facilities, which are cooperating through more or less formal agreements and institutional agreements, in order to jointly implement information handling operations, with a view to pooling their resources and to offer better services to the users. They generally follow identical or compatible rules and procedures".

Criteria of Physical Office Information Network

The Office and information networks are characterised by the following aspects:

i. **Equal Opportunity of Access to All Members:** An Office network provides equitable access to all its core resources to all its member libraries. However, resources that are licensed from a third party may be offered on subscription basis.
ii. **Interdependence:** Members of an office network depend on each other for sharing their resources. The interdependency may go beyond sharing of document resources to sharing of expertise, manpower, equipment and so on.
iii. **Use of Standards and Protocols:** Use of common standards and protocols is a pre-requisite to successful implementation of an office and information network. The standards and protocols exist for network technology, database structure, and information representation and for bibliographic records. Use of well-developed, widely used standards and their uniform implementation help in improving the quality of services, interoperability of databases and digital repositories.
iv. **Economics:** The cost involved in maintaining activities and functioning of an office and information network including licensing and hosting of third-party databases get distributed amongst subscribers and members of the network. The products and services through the network, therefore, tend to be more economic than by the subscription directly by the libraries individually.
v. **International Reach and Opportunity for Further Collaboration**: The networks may be connected to other networks through which such networks can have an opportunity to learn from each other and work in collaboration.
vi. **Research and Development**: The Office and information networks, with their elaborate infrastructure and large number of databases, provide an/opportunity for research and development work. The usage statistics of databases and electronic resources, feedback from participating libraries, etc. provides input for further research and analysis.

Components of Physical Office Information Network

1. Human Network: While databases, databanks, computer and communication infrastructure are important for successful implementation of an office and information network, the most important component of an office network is manpower and their willingness to participate in the office network and share resources of their respective libraries. While a office network focuses primarily on the availability and delivery of information, it is the human resource that makes it possible. Willing professional librarians and associated professional staff members can work together to produce innovative and far-reaching improvements in office services. Conferences, annual meets, training programmes for members of a office network help to bring the members together and induce a sense of leadership amongst them

2. Databases: Office networks lease communication and network infrastructure of other data networks and Internet Service Providers and concentrate on developing contents and making them accessible to member institutions. Databases and databanks are the backbone of a office network. The concept of online databases itself has emerged from the idea of sharing information. A database is non-redundant, multi-usable, independent and physically available set of complete data, on a subject, stored in an organised and structured manner to allow users to search the information in an interactive mode. An office network may develop some of its own databases and license or acquire other databases from their producers.

3. Hardware and Software Infrastructure

An office and information network requires computer infrastructure to host databases and databanks developed and maintained by it. The servers are used to host databases, digital objects, browse and search interfaces and to facilitate their access to the member institutions. Servers for an office network need to be computationally powerful; have adequate main memory (RAM) to handle the expected work; have large amount of secured disc storage for the database(s) and digital objects (Li, 2003). An office network may require a number of specialized servers for different tasks so as to distribute the workload on to different servers. It would require one or more computer server(s) to host indices and databases and one or more object server(s) to store digital objects and other multimedia objects. However, for a smaller office network, several distinct activities can be performed on a single server. It is important that the server is scalable so that additional storage, processing power or networking capabilities can be added, whenever required.

Jebaraj and Fredrick (2004) suggested than an office network would also require communication equipments like communication switches, routers, hubs, repeaters, modems and other items required for setting-up a Local Area Network (LAN). These hardware and software items are required for setting-up any network and need not be specific to an office network.

It requires a robust database management system (DBMS or RDBMS) to store bibliographic records, a search engine to provide browse and search facility to the union database of bibliographic records or digital objects and an online data entry interface to facilitate creation of records for new books acquired by member libraries. A library network may also require a document imaging software for scanning of documents, an RDBMS to store and organise these digital objects and a digital library software to provide access to the digital objects with associated metadata. Since a single integrated software package from a single vendor is not available, a software for a library network may be a system with components added onto an open architecture framework.

4. Membership: Number of members in an office network is a yardstick of its success. An office network is more meaningful and effective if it has larger number of members. The cost involved in maintaining activities and functioning of an office network including licensing and hosting of third-party databases getting distributed amongst subscribers and members of the office network. The benefit of larger number of members in an office network is suitably used and passed on to its members (Smith, Lehman Schlozman, Verba & Brady, 2009). The collective strength of

members of an office network provides it the power to bargain with the publishers for better rates of subscription and terms of licenses

Concept of Efficiency

The management of many firms are faced with the challenge to improve their efficiency and deal with the changing competitive arena (Waithaka, 2016). Firms have an important role in our daily lives, and successful firms are a key ingredient for developing nations like Nigeria. Academics and practitioners endeavor to understand and explain the differences in firm efficiency in the face of the complexity of the market, competitive pressures and uncertainties. Firms must be able to cope with the increasingly number of challenges from the business environment, in order to increase their ability to adapt (Gavrea, Ilies & Stegerean, 2011). The concept of efficiency of a business firm is based upon the idea that an organization is the voluntary association of productive assets, including human, physical, and capital resources, for the purpose of achieving a shared purpose (Alchian & Demsetz, 1972; Barney, 1995; Carton, 2004).

Firm efficiency is one of the most relevant constructs in the field of strategic management; a construct commonly used as the final dependent variable in various fields (Cho & Pucik, 2005; Richard, Derinney, Yip, & Johnson 2009). It is believed that the essence of efficiency is the creation of value, therefore, value creation, as defined by the resource provider, is the essential overall efficiency criteria for any organization (Monday, et al,, 2015). Continuous efficiency is the focus of any organization because only through efficiency are organisations able to grow and survive (Gavrea, Ilies & Stegerean, 2011). A business organization could measure its efficiency using the financial and non-financial measures.

The concept of firm efficiency has been viewed by different authors from various perspectives, and consequently there is no consensus on a particular definition. Hence, it has been variously defined by various authors. According to Olabisi, Olagbemi and Atere (2013) firm's efficiency is complex, and is characterized by the firm's ability to create acceptable outcomes and actions. According to Adeleke, Ogundele and Oyenuga (2008), a firm is said to achieve an effective efficiency if it makes use of its resources to attain high level of efficiency. They also affirm that a business firm is effective if it attains its sales or market share goals which depend on efficiency. Moullin (2003) as cited in Wu (2009) defines firm efficiency in terms of how well an organization is managed and the value the organization delivers to customers and other stakeholders. In the view of Laitinen (2002), as cited in O'Regan and Ghobadian (2007), firm efficiency is the ability of an object to produce results in a dimension determined a priori, in relation to a target.

Efficiency is defined as an analysis of a company's efficiency as compared to goals and objectives (Jamrog, 2002). Within corporate organisations, there are three primary outcomes analysed, financial efficiency, market efficiency and shareholder value efficiency (Adler, 2005) The concept of efficiency is based upon the idea that an organization is the voluntary association of productive assets, including human, physical, and capital resources, for the purpose of achieving a shared purpose (Carton, 2004). Efficiency comprises the actual output or results of an organization as measured against its intended outputs. According to Richard, Devinney, Yip & Johnson (2009) efficiency encompasses three specific areas of firm outcomes, financial

efficiency such as profits, return on assets and return on investment), product market efficiency such as sales, market share and shareholder return measure through total shareholder return and economic value added.

Jones and Goerge (2006) also as cited in Adeoye and Elegunde (2012) define efficiency as the measure of how managers utilize resources of the organization in an effective and efficient manner to accomplish goals and satisfy stakeholders while Richard et al. (2009) also cited in Adeoye and Elegunde (2012) see efficiency as real output against expected output which they categorized into financial efficiency, product market efficiency and shareholders return. They summarized efficiency as an approach that is used in assessing the progress made towards achieving goals, identifying and adjusting factors that will limit the progress of the organization in the environment. According to Olabisi, Olagbemi, & Atere (2013) firm's efficiency is complex and is characterized by the firm's ability to create acceptable outcomes and actions. Olayemi (2004) also stated that a productive organization achieves its goals by transforming inputs into output at the lowest costs. An organization that is capable of doing this can be said to be performing. They concluded that efficiency can include survival, profit, return on investment, sales growth and a number of employees. This study sees firm efficiency as a set of financial and nonfinancial indicators which offer information on the degree of achievement of objectives and results of the firm.

Efficiency reflects how the organization understands the needs and expectation of customers (Slater & Naval, 1995 in Kabiru, Mocid & Norlena, 2012). Suleiman (2011) sees efficiency as the reflection of how the organization uses its resources in such a way that will ensure the achievement of its set objectives. While Stephen and Edith (2012) assert that efficiency determines the existence of an organization in the economy, Mackier (2008) in Stephen and Edith (2012) sees efficiency as the effectiveness of the organization in fulfilling its purpose.

Efficiency measurement is essential to enable managers evaluate the specific actions of their firms, and how the firms the firms perform over time (Sabina, 2009). Efficiency is measured in organisations in different form. Ogundele (2005) in Adeleke, Ogundele and Oyenuga (2008) opines that a good system of measurement will have a point of reference, a relationship of the organization with the environment, a framework for a complex organization, a room for uniqueness, change and variability, and a guide to efficiency and action.

Efficiency is therefore the ability of an organization to fulfil its mission through sound management, strong governance and a persistent rededication to achieving results. Parasuraman (2002), proposed that firms delivering services must broaden their examination of productivity from the conventional company-oriented perspective to a dual company-customer perspective. This broadened approach can help reconcile conflicts or leverage synergies between improving service quality and boosting service productivity (Parasuraman, 2002). This research considers organization efficiency relative to the competition from multiple organizational perspectives including quality, productivity, market share, profitability, return on equity, and overall firm efficiency. Other non-financial measure of efficiency such as increase in customer base, market share increase, quality service delivery and increase in firm branch networks (Bernthal and Wellins, 2006).

Efficiency is a measure of results achieved by individual, group, and organization. Organization efficiency is defined as a continuous and action oriented with focus on improving efficiency by using objective, standards, appraisal, and feedback (Ababnch, 2008). Organisations efficiency comprises the actual output or results of an organization achievement as measured against its intended goals and objectives. Organisations adopt efficiency measurement because it creates accountability, provides feedback to operations, and result in more effective planning, budgeting and evaluation (Ammons, 2001).

The efficiency as stated by Hunger and Wheelen (2007) is an end results of an activity, and an efficiency is accumulated end results of all the organisations work processes and activities. Managers measure and control organization efficiency because it leads to better assessment for management, to increase the ability to provide customer value, to improve measures of organizational knowledge, and measure of efficiency do have an impact on an organization's reputation. When the efficiency of the organization is assessed, the past management decisions that shaped investments, operations and financing are measured to know whether all resources were used effectively, whether the profitability of the business met or even exceeded expectations, and whether financing choice were made prudently (Shaukat, Zafarullah, & Abdul Wajid, 2008). Efficiency is conducted to support decisions concerning whether program or project should be continued, improved, expanded, or curtailed (Rossi, Freeman, & Lipsey, 1999). The traditional approach to efficiency measurement is based on productivity measures, including such measures as service inputs and outputs (Holmes, Pineres & Kiel, 2006). In recent years, many organisations have attempted to manage efficiency using the balanced scorecard methodology where efficiency is tracked and measured in multiple dimensions such as: financial efficiency (e.g. shareholder return) customer service-social responsibility (e.g. corporate citizenship, community outreach) - employee stewardship. As this study focuses on measurement of efficiency and effectiveness part of organisations efficiency, therefore, these concepts are elaborated in detail.

Previously, efficiency was measured based on financial indicators (Boyd & Reuning, Elliot, 1998; Blahova, 2010), with little attention to non-financial indicators (such as quality, stakeholders' satisfaction and loyalty). Financial statistics has been argued to be an inadequate measure (Eccles, 1991, in Winterton & Winterton, 1997), identifying other measures to be of equal importance based on the organization's purpose and its environments. Different efficiency measures are required for the peculiar strategies of each organization. A firm having survived a complex, dynamic and turbulent environment will consider efficiency effective (Winterton & Winterton, 1997). Efficiency measurement is best achieved by using multiple organizational variables (Chenhall & Langfield-Smith, 2007, in Katou, 2008).

In efficiency measurement, the overall health of an organization is being evaluated this makes measuring efficiency very strategic in an organization (Adekola, 2013; Kinnandhasan & Nandagopal, 2010). Adekola (2013) further identifies management quality, employee talent, return on equity, innovativeness, long-term investment, total return in years, sales growth, return on equity and quality of products as some of the variables used to measure efficiency by other studies. To Atalay, Anafarta and Sarvan (2013) production and productivity are indicators of efficiency in their study on the relationship between innovation and firm efficiency in Turkish

Automotive Supplier Industry. According to Dawes, 1999; Harris, 2001 and Atalay, Anafarta and Sarvan (2013), firm efficiency can be measured with objective or subjective indicators.

Financial efficiency is a measure of a firm's policies and operations in monetary terms. It is a general measure of a firm's overall financial health over a given period of time, and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation (Singh, 2004). There are many different ways to measure a firm's financial efficiency. This may be reflected in the firm's return on investment, return on assets, value added, among others and is a subjective measure of how a firm can use assets from its primary mode of business and generate revenues (Tzafrir, 2006). Non-financial efficiency measures is defined as any quantitative measure of either an individual's or an entity's efficiency that is not expressed in monetary units. This includes any ratio-based efficiency measure in that a non-financial efficiency measure that is ratio-based omits any monetary metric in either the numerator or denominator of that ratio (Delaney and Huselid, 1996). Common examples include nonfinancial efficiency measures of customer or employee satisfaction, quality, market share, and the number of new products. Non-financial efficiency measures are sometimes considered to be leading indicators of future financial efficiency, while current financial efficiency measures such as earnings or return on assets are commonly considered to be trailing measures of efficiency.

2.5 Measures of Efficiency

Measuring corporate efficiency has often been controversial in terms of what exactly it is, how it should be measured and how its measures should be employed. This has resulted in the existence of different schools of thought on it, covering financial and strategic perspectives. The debate seems to be on-going with the emergence of perspectives that seek more relevance to use in different studies and instances of managing (Zeb-Obipi, 2015). The concepts of effectiveness and efficiency as measures of efficiency, either for the individual, group or organization, were first introduced by Peter Drucker (Stoner, Freeman & Gilbert, 1996 cited in Zeb-Obipi, 2015). Efficiency has often been defined in terms of these two concepts. For example, Stoner *et al.* (1996) describe efficiency as the ―measure of how efficient and effective an organization is – how well it achieves appropriate objectives. Diverse definitions of these two concepts have been offered by scholars (Daft, 2001; Stoner *et al.,* 1996; Bateman and Snell, 1999). Just as it is with the corporate efficiency concepts of financial and strategic efficiency, there are diverse measures or approaches to measuring effective and efficient efficiency. (Daft, 2001); Kreitner and Kinicki, 2001; Gibson *et al.,* 1997). In Robbins (1996) framework, specific examples of efficiency measures are cited; such as return on investment, profit per dollar (naira) of sales, output per hour of labor and sales per labor cost. Zeb-Obipi (2015) found Robbins (1996) framework very interesting because of its link to not just efficiency, but productivity. According to Robbins (1996), productivity is a ―efficiency measure including effectiveness and efficiency. Organizational behaviour seeks to explain or predict; and is a critical indicator of how effective an organization's human resources are.

What the above paragraph suggests is a corporate efficiency concept or measure that is more relevant to organizational behaviour. This concept is productivity efficiency. This brings to five the concepts of corporate efficiency (Zeb-Obipi, 2015). In other words, there are several

measures of corporate efficiency. Most of them, if not all could, fall into any or all of, the five approaches or perspectives namely: Financial, Strategic, Effective, Efficient, and Productivity Efficiency. Our preference is for productivity efficiency; hence the concept of corporate productivity efficiency (CPP) (Zeb-Obipi, 2015). Again, Zeb-Obipi (2015) found productivity efficiency as being basic to financial and strategic efficiency; as being inclusive of effective and efficient efficiency; and as being more directly related to organizational behavior variables. By extending the thoughts of the authors to whom Zeb-Obipi (2015) have made references in the preceding paragraphs and describing productivity efficiency as the efficiency of an organization measured in terms of its effectiveness and efficiency, Zeb-Obipi (2015) have constructed two dimensions and selected six indicators of corporate productivity efficiency. These dimensions are Resource Utilization and Product dimension. The researcher has chosen to use the resource utilization dimension of efficiency.

The resource utilization (RU) dimension emerges from Zeb-Obipi's (2015) definition of efficient efficiency. Efficiency refers to the accomplishment of goals with minimum resources or waste. It is measured as the ratio of output to input as evident in resource maximization indices. Important resources include speed, money and raw materials and organisations make maximum use of these by minimizing time, cost and waste. Thus, the resource utilization dimension in our framework deals with how efficiently a company uses its resources in achieving set targets. So it includes measures such as: (a) Time Minimization, (b) Cost minimization and (c) Waste minimization (Zeb-Obipi, 2015).

Cost Minimization

According to Drury (2004), it focuses on cost reduction and continuous improvement and change rather than cost containment. The term cost reduction could be used instead of cost optimization. Whereas traditional cost control systems are routinely applied on a continuous basis, cost optimization tends to be applied on an ad hoc basis when an opportunity for cost reduction is identified. Cost minimization consists of those actions that are taken by managers to reduce costs, some of which are prioritized on the basis of information extracted from the accounting system. Although cost optimization seeks to reduce costs, it should not be at the expense of customer satisfaction. Ideally, the aim is to take actions that will both reduce costs and enhance customer satisfaction.

Cost minimization has become an essential emphasis in today's highly competitive business environment. This study was aimed at defining cost optimization and discussing the philosophies that underpins optimization. Over the past 25 years, there has been a significant shift in the cost accounting and management accounting (Maher and Deakin, 1994, Günther 1997 and Götze, 2004). This shift is the result of an increasing competitive environment due to the introduction of new manufacturing and information technologies, the focus on the customer, the growth of worldwide markets, and the introduction of new forms of management organization (Blocher *et al.,* 1999).

With respect to cost minimization our interest is on monetary expenses incurred as a measure of corporate productivity efficiency. Cost is conceived as expenses incurred on production factors and activities. There is no doubt that every organization seeks to minimize its expenses as much

as possible as a way of maximizing profit. This has been pursed through concepts such as cost effectiveness and cost reduction. Though there are various concepts of cost as could be gleaned from Baumback's (1983) discussion of profit planning and control, we shall limit ourselves to three here. These are quality, labor, and strategic costs.

According to Bateman and Snell (1999), one of the four sets of ―bottom line‖ practices companies must deliver to their customers relate to cost. They assert that goods and services must be available at prices customers are willing to pay and to make this possible, managers must keep costs under control to allow the company to set fair prices that cover costs and achieve profit. In their opinion, there are three different types of costs involved in ―product production; and these are prevention, appraisal and failure costs (Bateman and Snell, 1999). For them, these costs do not only involve trade-offs in their methods of variation, they are components of total cost which management aims to reduce. They relate to quality because their reduction entails improving quality by ensuring that workers do their tasks perfectly or right the first time. Contrary to Bateman and Snell's (1999) view, quality costs are not the only costs involved in production and that require minimization. There is labor cost.

The cost element (cost effectiveness) in the ―Four C's model for evaluating human resource policies is labor cost (Stoner et al, 1996). It encompasses costs in terms of things like wages and benefits, turnover, and absenteeism, disputes and strikes etc. Minimizing cost in this perspective means keeping costs relating to these at minimum. To Stoner et al (1996), cost effectiveness is another way of looking at cost minimization of multinational oil and gas companies in Nigeria. It goes beyond keeping cost at a minimum. For them it ―means that human resource costs such as wages, benefits, and strikes are kept equal to or less than those of competitors (Stoner et al, 1996). Their position is understandable. They have earlier declared that cost (labor cost) is one of the measures of a country's competitiveness and have defined competitiveness as the relative standing of one competitor to another (Stoner et al, 1996). This brings us to the concept of strategic cost.

A company's strategic cost of a product is the cost of the internal activities involved in the production of that product relative to that of its rivals or competitors. It involves a price-cost competition aimed at achieving cost and price competitiveness. Thus, the issues of strategic cost relate to internal cost, relative cost, and the price at which a product is offered to the customer, which is also cost from the perspective of the customer. These are some of the issues addressed by Thompson and Strickland (2001) with this question about a company: ―Are the company's prices and costs competitive? From the foregoing literature review, it is obvious that cost minimization involves reducing the total cost of quality, making labor cost effective and achieving cost and price competitiveness, an element of strategic cost. Consequently, cost minimization as a measure of corporate productivity efficiency employs the indices of quality costs, labor costs and strategic costs.

The idea of cost minimization of a production unit was first introduced by Farell (1957), under the concept of "input oriented measure". According to Farell, a technical optimization measure is defined by one minus the maximum equi proportionate reduction in all inputs that still allows continuous production of given outputs. Technical optimization is linked to the possibility of

avoiding wasting by producing as much outputs as the use of input allows it (output oriented measure), or by using as less as input that the production objective plans it (input oriented measure). This optimization is measured by comparing observed and optimal values of production, costs, revenue, profit or all that the production system can follow as objective and which is under appropriate quantities and prices constraints. Optimization measurement is one aspect of investigating a firm's efficiency. Cost minimization can be measured in three ways; maximization of output, minimization of cost, and maximization of profits. In general, optimization is divided into two components (Kumbhakar & Lovell, 2003).

A firm is regarded as technically efficient if it is able to obtain maximum outputs from given inputs or minimize inputs used in producing given outputs. The objective of producers here is to avoid waste. According to Koopmans (1951) a producer is considered technically efficient if, and only if, it is impossible to produce more of any output without producing less of some other output or using more of some inputs. On the other hand, a locative optimization relates to the optimal combination of inputs and outputs at a given price. The objective of producers might entail the following: to produce given outputs at minimum costs; to utilize given inputs so as to maximize revenue; and to allocate inputs and outputs so as to maximize profit. This technique of production is widely known as economic optimization where the objective of producers becomes one of attaining a high degree of economic optimization (cost, revenue or profit optimization). Theoretically, competition is good because it ensures that the costs of production are minimised and at the same time it promotes optimization (Nickell, 1996). Increased competition could force firms to operate more efficiently in order to survive. It forces the banks to produce products and provide services that are most demanded by the customers. If they can provide services demanded efficiently and with the least cost, there is no reason why they cannot make more profits. Otherwise, they will make losses and possibly go out of business.

Time Minimization

When the employees are productive, they accomplish more in a given amount of time. In turn, efficiency saves their company money in time and labour. When employees are unproductive, they take longer time to complete projects, which cost employee's more money due to the time lost (Olajide, 2000). The importance of higher productivity of the employees in public enterprise cannot be overemphasized, which include the following; Higher incomes and profit; Higher earnings; Increased supplies of both consumer and capital goods at lower costs and lower prices; Ultimate shorter hours of work and improvements in working and living conditions; Strengthening the general economic foundation of workers (Banjoko, 1996).Armstrong (2006) stated that productivity is the time spent by an employee actively participating in his/her job that he or she was hired for, in order to produce the required outcomes according to the employers' job descriptions. As suggested by Bloisi (2003) the core cause of the productivity problems in the South African society are people's motivation levels and their work ethics.

That speed and time are important resources, that organisations seek to maximize speed and minimize time, and that the way they do these indicates their efficiency should be obvious. Speed and time were the essence of time and motion studies since the days of scientific management introduced by Taylor that led to management efficiency. They are the sources of

competitive advantage and ―Time-based Competition (TBC) (Bateman and Snell, 1999). They aim at reducing the total time it takes to deliver a product or service, and this is because they entail fast and timely design, execution, response and delivery of results. It is, therefore, very apt to say: Organisations must respond to market needs quickly by introducing new products fast; quickly delivering customer orders; and responding quickly to customer requests‖ (Bateman and Snell, 1999). There are, therefore, at least three possible indices of time minimization. These are: (1) Design-to-market Time, (ii) Product Delivery Time, and (iii) Job Completion Time. These indices are based on the conception of time as the amount of man-hour spent or duration taken to accomplish a task (Zeb-Obipi, 2015).

Time minimization is recognized as an important component of work efficiency (Downs, 2008) Time minimization is a way of developing and using processes and tools for maximum efficiency, effectiveness, and productivity (Downs, 2008) It involves mastery of a set of skills like setting goals, planning and making decisions better. At the end we have better efficiency (Brogan, 2010). According to Thompson, Arthur, Strickcan and Gamble (2010), accurate and timely information about daily operations is essential if managers are to gauge how well the strategy execution process is proceeding. Time is an essential resource since it is irrecoverable, limited and dynamic (Downs, 2008) Irrecoverable because every minute spent is gone forever, limited because only 24hours exist in a day and dynamic because it's never static (Claessens, Roe & Rutte, 2009) According to North (2004) time management is the organization of tasks or events by first estimating how much time a task will take to be completed, when it must be completed, and then adjusting events that would interfere with its completion is reached in the appropriate amount of time. Effective time management is the key to high efficiency levels. Effective time management not only affects the efficiency of employees, but also helps to cope with stress, conflicts and pressure more efficiently North (2004).

Time minimization is a method managers used by managers to increase work efficiency (Claessens, Roe, Rutte 2009) Efficiency can be seen as the consistent ability to produce results over prolonged period of time and in a variety of assignments (Galbraith, 2007) High efficiency in organisations is when an organization is so excellent in so many areas that it consistently outperforms most of its competitors for extended periods of time (North, 2004) Efficiency can be seen as the consistent ability to produce results over prolonged period of time and in a variety of assignments (Phillips, Jory & Mogford, 2007) Efficiency also determines the success and survival of every organization (Eruteyan, 2008).

There are various ways in which organizational timeliness is affected which include procrastination (Phillips, Jory & Mogford, 2007). Procrastination is the deferment of actions or tasks to a later time, or even to infinity (Phillips, Jory and Mogford, 2007) A wide array of studies link procrastination to personal behavioral factors, such as lack of motivation, disorganization, and poor time management (Ackerman & Gross, 2005) Timeliness is needed for all activities performed by an organization. In the absence of standards of timeliness management are not able to ascertain the efficiency of the staff, sales and revenue ratios (Eruteyan, 2008) Modern businesses depend upon timelines to analyze efficiency (Galbraith, 2007) These are derived from the overall company strategy and provide critical data and information about key processes, outputs and results (George, 2008) Timeliness can be attributed

to the ratio of actual hours on the job to the total hours available. This ration is used as a primary indicator of the utilization of the total available employee hours (Eruteyan, 2008) Ratio of hours in transit to total hours available which is used to gauge idle time lost in transit.

Time minimization has been adopted in many organisations for instance, in an attempt to manage time, most financial institutions have adopted the queue management system (Daintith, 2013). Eruteyan (2008) defines queue management system as the way in which customers join a queue in order to wait for service, and by the way in which customers already in the queue are selected for servicing. Queuing theory is the study of waiting lines which is a common feature in organisations providing services where customers arrive randomly to receive service at a service point (Eruteyan, 2008).

Waste Minimization

The measures of the resource utilization dimension of corporate productivity efficiency is Waste minimization. Waste or wastage refers to the less than maximum use of resources (Zeb-Obipi, 2015). London (2005) identifies three categories of wastages; namely: production, personnel and managerial wastages. She argues that an organization embraces waste minimization because with ―fewer mistakes, fewer delays and better use of machine time and materials, productivity would inevitably improve….This does not only suggest that waste minimization of multinational oil and gas companies in Nigeria. This is a measure of productivity, it also suggests what wastages are minimized. A more comprehensive list of waste is provided by the ―Muda philosophy of the Toyota Production System (TPS) propounded by Ohno (Ultimate Business, 2002 cited Zeb-Obipi, 2015). This philosophy divides waste into seven categories: overproduction, transporting, inventories or unnecessary stock on hand, producing defective goods, unnecessary motion or excess movement, excess processing, and excess waiting time. The above philosophy was partly credited with the outstanding efficiency associated with Toyota. Before the introduction of this philosophy, Ohno realized that waste was prevalent in Toyota, and if this could be eliminated, productivity could increase (Ultimate Business, 2002; Zeb-Obipi, 2015). For the purpose of a convenient discussion of waste minimization as a measure of the resource utilization dimension of corporate productivity efficiency, the above listed wastes and others can be conceived to fall into three categories. Our categories are: (i) Quality Failures (such as mistakes and defects), (ii) Idle Capacity (delays, unused or underused resources, materials and equipment, and non-productive time), and (iii) Excess Items (such as those listed by Ohno with the ―excess‖ qualifier) (Zeb-Obipi, 2015).

Waste is defined by Gobbi (2008) as unnecessary work or holding stocks as a result of errors, poor organization or communication. Contributing to the same, Li and Olorunniwo (2008) focused on the disastrous implication of having wastes in the form of repairs, recalls and image control. On their part, Elmas and Erdogmus (2011) summarize the importance of waste reduction as positive environmental impact, legal compliance, competitiveness advancement and improved customer service. Liu (2008) defines waste minimization as the process and the policy of reducing the amount of waste produced by an entity. This is shared by Wang (2005) who adds that waste reduction involves efforts to minimize resource and energy use during manufacture. For the same commercial output, usually the fewer materials are used, the less waste is produced.

Waste reduction usually requires knowledge of the production process and detailed knowledge of the composition of the waste. In any manufacturing process, there will always be wastes and scraps. In Srivastava (2008), waste is further defined as unnecessary work or holding stocks as a result of errors, poor organization or communication, while scrap refers to defective product or material that cannot be repaired, used or sold. Gobbi (2011) found that reasons for the creation of waste sometimes include requirements in the supply chain. For example, a company handling a product may insist that it should be packaged using particular packing because it fits its packaging equipment.

Total quality management (TQM) philosophy advocates for getting it right the first time and all the times (Lysons, 2006). This would ensure minimum waste is generated in the supply chain. Material waste in publishing includes tree parts not turned into pulp, packaging materials, rejected print runs and wastes, returns and used publications (Agrawal, 2012). In addition, Prahinski and Kacobasoglu (2006) argues that idle labour time as a waste lead to increased overhead costs. In efficient production processes and defective equipment may also lead to increased wastes, which Cheng (2006) notes would have disastrous implications in form of repairs, recalls and image control. Companies have been pushed by competitive pressures towards cost reduction and efficiency improvement of operations to provide better quality products to very demanding markets. The approach of waste reduction and efficiency has been gaining importance in organisations operations (Gurumurthy & Kadal, 2011; Taj & Morosa, 2011). Waste reduction can be achieved through implementation of lean production systems that includes assessing current situation and designing a production system based on lean system concepts &techniques (Womack &Jones, 2003).

Emphasis is placed on the three R's reduction, reuse and recycle. This helps in creating of less waste and increased material recovery. Waste reduction is achieved through waste minimization at its source so as to minimize the quantity required to be treated and disposed of. This can be achieved through better product design and or process management. Waste recycling is the process for recovering waste products as inputs or resources. Promotion of waste re-use can be realized through using waste as an input for other purpose. Waste can as well be transformed into a form that is less costly or difficult to dispose of a process known as waste transformation (March, 1998).

Waste minimization of multinational oil and gas companies in Nigeria. in the organisations is not only concerned with output of the operations that damage the environment but of great essence is the input of resources as well as totality of systems and processes involved in the operation of production facilities (Kirk, 1998; Lorente, 2001). Kirk (1998) indicates that, proper waste management practices are of much value to firm's operational efficiency in that: it improves efficiency in service delivery, reduce organisations operational cost through efficient operations, reduces time spend to offer service, enhances quality of service, and productivity. As a result, organisations image is improved in the eyes of the public enhancing company's competitive advantage (Kirk, 1996).

Organisations are faced with challenges of cost containment, more demanding customers in terms of quality and speed of service delivery. The success of any organization is dependent to a large extent on its flexibility to the ever changing internal and external environment. Adoption of

best waste management systems reduces operational cost through waste minimization and efficient production processes. Also, by practicing waste management, organisations improve on hygiene standards and as a result, the quality of its services and products are improved.

Zhu, Sarkis and Lai (2008) observed that based on RBV firms that waste management as a strategic resource will have higher chances of minimizing cost of production through lowering waste management fees, lowering hazardous material management fees, less time and costs for reporting; savings from conserving energy, water, fuel and other resources which will positively impact on efficiency. In efficient production processes and defective equipment may also lead to increased wastes, which Li and Olorunniwo (2008) observed would have disastrous implications in form of repairs, recalls and image control. Thus, waste reduction strategy would have direct impact on cost, labour and time savings.

Physical Office Information Networks and Organisational Efficiency

The modern workplace has come to heavily rely on the use of office information networks in order to remain organized and efficient. Information networks allow the smooth flow of data between staff and departments, and information sharing is increasingly becoming an essential component of workplace productivity. Understanding the ways in which information networks can benefit organizations and their workers is essential to taking full advantage of their potential. Through this essay, I will explore how office information networks can improve organizational efficiency, allowing for better communication and collaboration between individuals as well as increased business productivity.

Organisations in the 21st century are increasingly relying on office information networks to enhance their efficiency. According to a study conducted by Li et al. (2006), networks can help to improve communication, coordination, and collaboration within and across departments. Furthermore, they can facilitate the sharing of critical information, reduce the time and effort required to access data, and enable organisations to benefit from the increased speed and accuracy of information transfer. Moreover, networks can help to improve the quality of decisions by enabling managers to access and analyse data in real-time. This can lead to more informed decision-making, and consequently, improved organisational efficiency. Additionally, office information networks can reduce the costs associated with storage and retrieval of documents, as well as the costs of duplicating documents. Furthermore, by automating processes, organisations can benefit from improved efficiency and agility as they are able to better respond to changing market conditions. Overall, it is evident that office information networks offer a range of benefits for enhancing organisational efficiency.

Office information networks (OINs) have been shown to have a positive impact on organizational efficiency. In a 2012 study conducted by G Soda and A Zaheer, the authors found that OINs can be an effective tool for improving the efficiency of organizations. By providing an easy-to-use system of communication, collaboration, and data sharing, OINs can help to streamline processes and reduce the amount of time spent on certain tasks. Additionally, the authors found that OINs can increase the accuracy of data and reduce errors, leading to more efficient operations. Furthermore, OINs can provide a more efficient way of sharing information among employees, reducing the need to duplicate work and allowing for faster decision-making.

Overall, the authors concluded that OINs can be a useful tool for improving organizational efficiency, allowing for more efficient operations and better decision-making.

Office Information Networks (OIN) have been shown by S Li et al. (2006) to be highly beneficial in terms of enhancing organisational efficiency. OIN facilitate the sharing of data and information between employees, which not only helps to reduce the need for time-consuming manual processes, but also helps to improve the accuracy of data. In addition, OIN can be used to streamline communication processes, making it easier for employees to access the resources and information they need in order to do their jobs effectively. Furthermore, OIN can help to reduce the overall cost of operations, as the need for manual data entry and the associated overhead costs are eliminated. By improving the speed and accuracy of data sharing, OIN can also help to improve decision-making processes, leading to higher levels of efficiency and effectiveness across the organisation. In short, OIN have the potential to bring about significant improvements in terms of organisational efficiency, and are therefore well worth considering for any organisation that wishes to remain competitive.

In conclusion, office information networks play a critical role in improving organisational efficiency. A properly managed office information network can increase efficiency by simplifying communication, streamlining data exchange, and facilitating collaboration. By allowing organisations to access real-time data, these networks increase accuracy and reduce time wastage. Furthermore, they enable organisations to share resources, automate processes, and quickly deploy applications. Thus, networked offices can help organisations become faster, more agile, and better-equipped to succeed in an increasingly competitive global marketplace.

Based on the foregoing, the study thus hypothesized that:

Ho_1: There is no significant relationship between physical office information networks and cost minimisation.

Ho_2: There is no significant relationship between physical office information networks and time minimisation

Ho_3: There is no significant relationship between physical office information networks and waste minimisation

CONCLUSION

Office information networks, such as internal communication systems and shared databases, can greatly improve organizational efficiency by allowing for easy sharing and access to information. This can lead to faster decision making, improved collaboration and increased productivity. However, it's important to ensure that these networks are properly secured to protect sensitive information and to prevent unauthorized access. Additionally, it's important to regularly evaluate and update these systems to ensure that they continue to meet the needs of the organization.

Recommendations

Recommendations for implementing and maintaining effective office information networks for organizational efficiency include:

1. Identify the specific needs and goals of the organization and select the appropriate technology to support them.
2. Ensure proper security measures are in place to protect sensitive information and prevent unauthorized access.
3. Provide training and support for employees to effectively use and maintain the technology.
4. Regularly evaluate and update the technology to ensure it continues to meet the needs of the organization.
5. Consider using cloud-based solutions that can be accessed from anywhere and any device to support remote work and collaboration.
6. Establish policies and procedures for managing and sharing information to ensure consistency and compliance.
7. Create an environment that encourages communication and collaboration among employees to maximize the potential of these networks.
8. Consider hiring IT professionals to maintain and update the system, and to ensure the security of the network.

References

Ababneh, R. I. (2008). A comprehensive efficiency evaluation of the Jordanian customs department using the balanced scorecard. *Jordan Journal of Business Administration*, *4*(4), 63-484.

Abubakar, B. M. (2010). Digital Offices in Nigeria in the Era of Global Change: A Perspective of the Major Challenges. Trends in Information Management, 6(2), 125-131.

Ackerman, D., & Gross, B. L. (2005). My instructor made me do it: Task characteristics of procrastination. Journal of Marketing Education, 27(5), 5-13.

Adeleke, A, Ogundele, O. J. K., & Oyenuga, O. O. (2008). *Business policy and strategy (2nd* Ed). Lagos: Concept Publications Limited

Adeoye, A.O. & Elegunde, A.F. (2012). Impacts of external business environment on organisational efficiency in the food and beverage industry in Nigeria. *British Journal of Arts and Social Sciences*, *6*(2), 194-201.

Agarwala, T. (2010). Strategic human resource management, 9th Edition. Oxford: Oxford University Press

Alcadipani R and J Hassard. 2010. Actor-Network Theory, organizations and critique: Towards a politics of organizing. Organization 17: 419–35.

Alchian, A., &Demsetz, H. (1972). Production, Information Costs, and Economic Organisation. *American Economic Review, 62,* 777-795.

Alibhai, A. (2017). The Influence of virtual platforms on teamwork efficiency at the United Nations: A case of the United Nations Office for project services, East Africa Hub (Unops-Eah), Masters Thesis- The United States International University (USIU)

Ammons, D. (2001). *Municipal Benchmark, 2nd ed*. Oaks: Sage Publication, Thousand.

Armstrong, M. (2006). *A hand book of human resource management practice 7th edition.* London: Kogan Page Limited.

Atalay, M., Anafarta, N. & Sarvan, F. (2013). The relationship between innovation and firm efficiency: an empirical evidence from Turkish Automotive Supplier Industry. *Procedia - Social and Behavioral Sciences 75*, 226 – 235.

Atkinson, M. (2012). Developing and using a performance management framework: a case study. *Measuring business excellence*.

Audretsch, D.B. (2007). Entrepreneurship capital and economic growth. *Oxford Review of Economic Policy, 23*(1), 63-78.

Awino, Z. B. (2011). An empirical investigation of selected strategy variables on firms Efficiency: A study of supply chain management in large private manufacturing firms in Kenya. *Journal of Public Administration and Policy Research, 3*(8), 228-236.

Baker, W.E., & Sinkular, J.M. (2005). Market Orientation and the new product paradox. *Product Innovation Management, 22*(6), 483-502.

Banjoko, S.A. (1996). *Human resource management*. Lagos: Saban Publishers

Bateman, T. S., &Snell, A. S. (1999). *Management: Building Competitive Advantage*. Boston: Irwin McGraw-Hill

Baumback, C. M. (1992): *Basic small business management,* Ife: Obafemi Awolowo University Press Ltd

Beqiri, E. (2018). The implications of information networking at the pace of business development. *International Journal of Knowledge*, *27*, 17-22.

Bernthal, Paul, R., &Wellins, R. (2006).China Global Comparison. Best practices for tomorrow's global leaders. Development Dimensions International, Inc.

Bhojaraju, G. (2005). Knowledge management: Why do we need it for corporate? *Malaysian journal of Library and Information Science*, 10(2), 37-50

Blocher, E., Chen, K. & Lin, T. (1999). *Cost management: A strategic emphasis*. New York: The McGraw Hill Companies, Inc.

Bloisi W. (2003). *Management and organizational behaviour.* London: Prentice Hill.

Boyd, B., & Reuning-Elliott, E. (1998). A measurement model of strategic planning. *Strategic Management Journal*, *19(*2), 181.

Callon, M. (1986). 'Some elements of a sociology of translation: domestication of the scallops and the fishermen of St. Brieuc Bay'. In Law, J. (Ed.), Power, Action, and Belief: A New Sociology of Knowledge? London: Routledge and Kegan Paul.

Carton, R. B. (2004). Measuring efficiency: An Exploratory Study. A Published Ph.D Dissertation of the University of Georgia, Athens, Georgia

Chenhall, R.H., & Langfield-Smith, K. (2007). Multiple perspectives of efficiency measures. *European Management Journal, 25*, 266-282.

Cho, H., & Pucik, V. (2005). Relationship between innovativeness, quality, growth, profitability, and market value. *Strategic Management Journal*, *26*(6), 555-575

Claessens, B., Roe, R., & Rutte, C.G. (2009). Time management: Logic, effectiveness & challenges, In: Roe, R., Waller, M. & Clegg, S. (Eds), time in organizational Research. London, Routledge, UK, 23-41.

Cresswell, K., & Sheikh, A. (2013). Organizational issues in the implementation and adoption of health information technology innovations: an interpretative review. *International journal of medical informatics*, *82*(5), e73-e86.

Daft, R. L., & Weick, K. E. (2010). Toward a model of organisations as interpretation systems. *Academy of Management Review*, *9*(2), 284-295

Datta, P. (2011). A preliminary study of ecommerce adoption in developing countries. Information Systems Journal, 21 (1), 3-32.

Dawes, J. (1999). The relationship between subjective and objective company efficiency measures in market orientation research: further empirical evidence. Marketing Bulletin-Department of Marketing Massey University, *10,* 65-75.

Delaney, J. T., & Huselid, M. A. (1996). The impact of human resource management practices on perceptions of efficiency: *The Academy of Management Journal, 39(*4), 949-969.

Dolwick, J. S. (2009). 'The social'and beyond: Introducing actor-network theory. *Journal of maritime archaeology*, *4*(1), 21-49.

Downs, L. J., & American Society for Training and Development. (2008). Time management training. Alexandria, Va: ASTD Press.

Drury, C. (2004). *Management and cost accounting.* London. Thomson Learning Publishers.

Eccles, R.G. (1991). The efficiency measurement manifesto. *Harvard Business Review*, January/February, 131-137.

Eletu, I. S., Ukoha, U., & Nwuche, C. A. (2017). Human capital development and corporateefficiency. A study of food and beverages firms in Port-Harcourt, *International Journal of Advanced Academic Research, Social and Management Sciences*, *3*(6), 63-82.

Elmas, G., &Erdogmus F. (2011).Importance of reverse logistics. International Journal of Business and Management Studies, 3(1), 1309-8047 (Online)

Eruteyan, J.O. (2008). Effective time management for high efficiency in organisations, Journal of Nigerian Institute of Management, 44(3), 21-26

Farrell, M.J. (1957). The measurement of productive efficiency. *Journal of the Royal Statistical Society, Series A (General)* 120 (III), 253-281(290)

Feather, J. C. (1999). The Information Society: Study for continuity and change. London: Offices Association.

Forghani, M. A., &Tavasoli, A. (2017). Investigating the relationship between knowledge management dimensions and efficiency in lean manufacturing. *International Journal of Management, Accounting and Economics*, 4(3), 218-226.

Gavrea, I., Ilies, L., & Stegerean, (2011). Determinants of efficiency: The case of Romania. *Management and Marketing Challenges of Knowledge Society, 6*(2), 285-300

Gibson, C. B., & Cohen, S. G. (Eds.). (2003). *Virtual teams that work: Creating conditions for virtual team effectiveness.* San Francisco, CA: Jossey-Bass Inc.,U.S.

Gobbi, C. (2008).The reverse supply chain: configuration, integration and profitability, PhD thesis, DTU Management Engineering, Technical University Denmark, Copenhagen

Griffin, E.A. (2003). *A first look at communication Theory (5 ed.).* Boston: Mc Graw-Hill.

Gurumurthy, A., & Kodali, R. (2011). Design of lean manufacturing systems using value stream mapping with simulation: A case study. Journal of Manufacturing Technology Management, 22(4), 444-473.

Holmes, J., Pineres, S., & Kiel, D. (2006). Reforming government agencies internationally: Is there a role for the balanced scorecard? *International Journal of Public Administration, 29,* 1125-1145.

Hunger, J. D., & Wheelen, T. L. (2007). *Essentials of strategic management, 4th ed*. Prentice-Hall, Inc., Upper Saddle River, New Jersey.

Jamrog, J. (2002). *Employee diversity; Evaluating the impact of diversity on Efficiency.* St. Petersburg, FL

Jebaraj, F. D & Fredrick R. D. (2004). "Library and Information Networks in India". Library Philosophy and Practice 6, 2: 1-8. Print.

Karamat, A. U. (2013). Impact of leadership on efficiency. Unpublished doctoral dissertation, University of Applied Sciences, Finland.

Kennan, M. A., Cecez-Kecmanovic, D., & Underwood, J. (2010). Having a Say.

Kirk, D. (1998). Attitudes to environmental management held by a group of hotel managers in Edinburgh. *International Journal of Hospitality Management, 17*(1), 33-47.

Kreitner, R., &Kinicki, A. (2001). *Organizational behavior.* Boston: Irwin McGraw-Hill

Kumbhakar, S., & Lovell, C. A. K. (2000). *Stochastic frontier analysis.* Cambridge University Press: Cambridge

Latour, B. (1996). Aramis, or the Love of Technology. Cambridge, MA: MIT Press

Latour, B., & Callon, M . (1981). Unscrewing the Big Leviathan; or how actors macrostructure reality, and how sociologists help them to do so? In Knorr K. Cicourel A. Eds. Advances in social theory and methodology. Londres (UK): Routledge Kegan Paul.

Law, J. (1992). Notes on the theory of the actor network: Ordering, strategy and heterogeneity. Retrieved from

Li, A. (2003) "CALIS: Acquiring Electronic Resources". Library Collections, Acquisitions & Technical Services, 27: 261–267. Print.

Li, X. & Olorunniwo, F. (2008).An exploration of reverse logistics practices in three companies. Supply Chain Management: An International Journal, 13(5), 381-6.

Linderoth, H. C. J. (2010). Understanding adoption and use of bim as the creation of actor networks. Automation in Construction, 19 (1), 66-72.

Low, C., Chen, Y., and Wu, M. (2011). Understanding the determinants of cloud computing adoption. Industrial Management & Data Systems, 111 (7), 1006-1023.

Lysons, K., & Farrington, B. (2006). Purchasing and supply chain management. Pearson Education: London

Mackie, B. (2008). A summary of international efficiency management literature highlighting best practice in efficiency & it's management & applicability in a central government context. Retrieved 05/05/2012, from http://www.scotland.gov.uk/ Publications/2008/08/25142353/0. Accessed: 11th August, 2021.

Maher, M., & Deakin, E. B. (1994). *Cost accounting*. Boston: Irwin.

March Consulting Group (1998). Reducing Costs and Improving Environmental Efficiency through Waste Minimisation. The Aire & Calder Experience. Manchester: March Consulting Group.

Monday, J. U., Akinola, G. O., Ologbenla, P., & Aladeraji, O. K. (2015). Strategic management and firm performance: A study of selected manufacturing companies in Nigeria. *European Journal of Business and Management*, *7*(2), 161-171.

Moullin, M. (2003). Defining efficiency measurement in perspectives on efficiency, 2(2):3

Mungania, A. K. (2017). *Influence of Worklife Balance Practices on Performance of the Banking Industry in Kenya* (Doctoral dissertation, JKUAT-COHRED).

Nickell, S.J. (1996). Competition and corporate efficiency. *Journal of Political Economy, 104*(4), 724-46

Njihia, M., Obara, M. &Mauti, M. (2013). The Critical Success Factors and Challenges in E-Procurement Adoption among Large Scale Manufacturing firms in Nairobi. *Kenya. European Scientific Journal*, 9(13), 375-401.

North: Y (2004) God's Clock maker; Richard of Wallingford & the invention of time Oxbow Books. of Issues in Nursing. http://www.nursingworld.org/ojin/topic10/tpc10_5.htm.

Odini, C. (1991). Problems and Prospects of Resource Sharing in Developing Countries. African journal of library, archives sand information science. 1(2), 93-108.

Olabisi, S. Y., Olagbemi, A. A., & Atere, A. A. (2011). Factors affecting small-scale enterprises efficiency in informal economy in Lagos State Nigeria. *Africa Journal of Enterprises management*, *1*(13), 201-212

Olajide, A. (2000). *Getting the best out of employees in a developing economy*. Ibadan: University of Ibadan, Nigeria.

Olayemi, O. O. (2004). Measuring business efficiency. (Ogundele, O.J.K Ed.) Introduction to business organisations: A Book of Readings. Lagos: Molofin Nominees, 263-274.

Omekwu, C. O. (2004). Networking Concepts and Cooperation among Legislative Offices: Lesson for Nigeria and other Developing Countries. The Information Technologist: *An International Journal of Information and Communication Technology*, (1 & 2), 59-70

Onwuchekwa, E. (2015). Resource sharing and networking in Office and information centres in Africa. Information Resource Management. 3870-3879.

O'Regan, N., & Ghobadian, A. (2007). Formal strategic planning: annual rain dance or wheel of success? *Strategic Change, 16*(1-2), 11-22

Ouma, R. A. & Kombo, H. (2016). Effect of organizational learning on efficiency of food manufacturing firms in Nairobi County, Kenya. *European Journal of Business and Management*, *8*(3), 54-61.

Parasuraman, A. (2002). Service quality and productivity: a synergistic perspective. *Managing Service Quality: An International Journal*.

Phillips, J. G., Jory, M., & Mogford, M. (2007). Decisional style and e-participation, proceedings of the 19th Australasian conference on computer-human interaction: Entertaining user interfaces, Adelaide, Australia, November 28-30, 2007, 139-141.

Plant, R. (2004). Online communities‟ in Technology in Society 26(1):51–6.

Richard, O.C., Simon, T. & Brut, G. (2009). Measuring efficiency: Towards methodological best practice. *Journal of Management Sciences*, *76,* 276- 323.

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring efficiency: towards methodological best practice. *Journal of Management, 35*(3), 718-804.

Robbins, S. P. (1996). *Organizational behavior: Concepts, controversies, applications, (7ed),* New Delhi: Prentice-Hall of India.

Rossi, P., Freeman, H., & Lipsey, M. (1999). *Evaluation: A systematic approach, 11th ed*. Sage Publication, London.

Saya, S., Pee, L. G., and Kankanhalli, A. (2010). The impact of instutational influences on preceived technological characteristics and real options in cloud computing adoption. Paper presented at the ICIS 2010 Proceedings, St. Louis

Shaukat, M., Zafarullah, M., & Abdul Wajid, R. (2000). Impact of information technology on efficiency: A comparative quantitative analysis of Pakistan's Banking and Manufacturing Sectors. Oxford Business and Economics Conference Program.

Shuman, J., & Twombly, J. (2010). Collaborative networks are the organization: an innovation in organization design and management. Vikalpa, 35(1), 1-14

Singh, K. (2004). Impact of HR Practices on perceived firm efficiency in India. *Asia Pacific Journal of Human Resources*, *42*(3), 301-317

Smith, A., Lehman Schlozman, K., Verba, Si. & Brady (2009) The internet and civic engagement. PEW Internet and America Life Project, Washington DC.

Sok, P., O'Cass, A. & Sok, K. (2013). Achieving superior S E efficiency: the Overarching role of marketing, innovation, and learning capabilities. *Australasian Marketing Journal*, *21* (3), 161-167.

Srivastava, S.K., & Srivastava, R.K. (2006). Managing product returns for reverse logistics. International Journal of Physical Distribution & Logistics Management, 36 (7), 524-546.

Steven, N. M. N., & Edith, A. O. (2012). A study of the practice of the learning organisation and its relationship to efficiency among Kenyan commercial banks. Problems of management in the 21th Century. *Journal of Management, 2*, 22–28.

Stoner, J. F., Freeman, R. E., & Gilbert, D. R. (1996). *Management.* Englewood Cliffs: Prentice-Hall, Inc.)

Tamunomiebi, M. D., Adim, C. V., & Adubasim, I. E. (2018). Telecommuting and organisational efficiency of mobile (GSM) telecommunication companies in Port Harcourt, Nigeria. *British Journal of Economics, Finance and Management Sciences,* 16(1), 99-112.

Tangen, S. (2005). Demystifying efficiency and productivity. *International Journal of Productivity and Efficiency Management*, 54(1-2), 34-46

Tatnall, A., & Burgess, S. (2002). Using actor-network theory to research the implementation of a bb portal for regional smes in melbourne, australia. Paper presented at the 15th International Bled eCommerce Conference, Bled, Slovenia.

Thompson, A. A. & Strickland, A. J. (2001). *Strategic management: Concepts and case*. Boston: McGraw Hill Irwin.

Thompson, J., Arthur A., Strickcan, A. J., & Gamble, J. E. (2010). Crafting and executing Strategy. New York, NY.

Tzafrir, S. S. (2006). A universalistic perspective for explaining the relationship between HRM practices and firm efficiency at different points in time. *Journal of Managerial Psychology*, 21(2), 109-130.

Uchendu C. C., Anijaobi-Idem, F. N., & Odigwe, F. N. (2013). Conflict management and efficiency in secondary schools in Cross River State, Nigeria. *Research Journal in Organizational Psychology & Educational Studies, 2*(2), 67-71

United Nations Educational, Scientific and Cultural Organization. (1994). *Final report: World conference on special needs education: Access and quality*. Paris: UNESCO

Waithaka, P. (2016). Competitive Intelligence practices and efficiency of firms listed on the Nairobi securities Exchange, Kenya. *European Scientific Journal, 12* (19), 107-126.

Wang, K. (2005). Reverse logistics based on recycle legislation for electronic products. China Logistics and Purchasing, 14, 12-15

Watkins, M. D. (2013). Making virtual teams work: Ten Basic Principles. *Harvard Business Review*. Retrieved from https://hbr.org/2013/06/making-virtual-teams-work-ten. Accessed: August, 24, 2021.

Winterton, J. and Winterton, R. (1997), "Does management development add value", British Journal of Management, Vol. 8, pp. s65-s76.

Womack, J. P., & Jones, D. T. (2010). Lean thinking: banish waste and create wealth in your corporation. Simon and Schuster.

Zeb-Obipi, I. (2015). Corporate productivity efficiency: A harmonist framework. *International Journal of Business and General Management*, *4*(1), 19-22.

Zhu, Q., Sarkis, J., & Lai, K.H. (2008). Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, *111* (2), 261-273.