Enterprise Information Infrastructure and Administrative Efficiency in the Civil Aviation Enterprises in the South-South of Nigeria.

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Abstract

This study investigated the relationship that exist between Enterprise Information Infrastructure and Administrative Efficiency of the Civil Aviation Industry in the South-South of Nigeria. The highlights of the research pointed out that, critical information infrastructure or global Information Infrastructure is the rallying and enabling base for all shared information technology capabilities which provide the foundation and platform for all other Information Infrastructure in the enterprise today. That is to say, every business system in the globe, now depend and must remain reliant on the internet and telecommunication industry that make up the global information infrastructure. And that the era of standalone enterprise information systems are over. Eighty (80) copies of research instruments were distributed to senior staff of four International Airports in the Civil Aviation Industry in the South-South of Nigeria. While the Pearson Product Moment Correlation Coefficient and rank order statistics were used in analyzing data with the aid of SPSS (version 20). A significant level of 0.05% correlation coefficient was used as the standard for the decision to accept or reject the null hypotheses as used in the study. From the analysis, the result of the Pearson's Correlation Coefficient for each of the four hypotheses were 0.924%, 0.818%, 0.899% and 0.999% respectively. It was established that there existed no significant difference on all the variables tested to affirm that there is a positive relationship between Enterprise Information Infrastructure and Administrative Efficiency. The study recommended that Top managers of civil aviation authorities should strongly support the use of Human Resource Information System (HRIS) and make use of human resource information infrastructure to make strategic decisions and planning. The organizations need to have seamless flow of information between various departments. This means that the organizations need to consider HRIS components when they are developing organization strategy.

Key words: Human Infrastructure, Last Mile Infrastructure, Innovation.

1. Introduction

The world's economic trends in business require organisations to respond quickly to demand and opportunities through competition and continuous expansion of domestic and international markets and by being innovative as well. This requires organisational members to move beyond and achieve higher frontiers which are achievable only by having the right information. Studies have shown that one of the world's most important resources is information since it is needed to solve problems and make decisions affecting both the present and the future. There is enough evidence to explain that the degree of success enjoyed by an organisation and its members depends largely on how well information is managed. Information as a resource of organisations has been defined differently by different authors. The view of O' Brien & Marakas (2008) and Laudon & Laudon (2010) is that, information is data that have been processed into a form that is meaningful and useful to the recipient and has a real or perceived value and can cause a change in decision making. Robek, Brown, and Stephens (1995) describe it as any intelligence, which can be communicated in either graphic form or alphanumeric character, which include records, documents, data and files created and maintained by organisations. As a vital resource, information plays very important roles in the life of every organisation and therefore its management has attracted the attention of practitioners and academics as well.

Enterprise information is the collection and management of information from one or more sources and the distribution of that information to those who have right to it (Robertson, 2005). The management as used in this context means the organization of and control over the structure, the processes and the delivery of information. Henczel, (2000) and Ravi, (2011) consider information management as the systematic imaginative and responsible management of information in order to create and use information that will contribute strategically to the achievement of an organisation's goals and make sure that groups and individuals have efficient access to and make effective use of the information they need to do their work and to develop themselves. Information management is theorized to involve a continuous cycle of closely related activities such as identification of informational needs, acquisition and creation of information, analysis and interpretation of information, organisation and storage of information, information access and dissemination and information use (Henczel, 2000; Robertson, 2005; Ravi, 2011). Identification of informational needs involves realization of the pivotal roles of information in the achievement of organisational goals and strategically plan for it. Maceviciute and Wilson (2002) define information management to include developing and implementing information policy and strategy; data creation and management; processing, storage and information delivery; and information usage. Ravi (2011) indicates that effective information management combines technological innovations and intelligent processes to deliver cost effective information compliance and data protection. This suggests using the information technology and other accessories to create, organize, store, process and distribute information to those who have to use them for the achievement of organisational objectives.

An Infrastructure is the basic and usually permanent framework which supports a superstructure and is supported by a substructure (Business Dictionary, 2017). While Information Infrastructures are characterized by openness to numbers and types of users (no fixed notion of 'user'), interconnections of numerous modules/systems (i.e. multiplicity of purposes, agendas, strategies), dynamically evolving portfolios of (an ecosystem of) systems and shaped by an installed base of existing systems and practices (thus restricting the scope of design, as traditionally conceived). Information Infrastructures are also typically stretched across space and time: they are shaped and used across many different locales and endure over long periods (decades rather than years) Monteiro and others (2013: 576). Pironti (2006) described "information Infrastructure includes all of the people, processes, procedures, tools, facilities, and technology which supports the creation, use, transport, storage, and destruction of information". Hence,operational definition of the term Enterprises Information infrastructureis operationally refers to all of the basic physical and non-physical structures that support information technology in the organization while linked to the national and global Information Infrastructure collectively. In other words Information infrastructure is heterogeneously built on existing smaller systems that are independent but as brought together into a larger unit, they take on different information technologies to form the same logical functions which could be implemented in many ways in an ecologies of infrastructures layered upon each other as hardware and software components producing a super-convergence route for numerous information nodes exchanges worldwide with the internet as its de facto base. As such the concept Enterprise Information Infrastructure may not have a universal definition or description, but it is rather characterized by super-structured heterogeneous elements which inspired the formation of the conceptual framework for this work.

2. Research Questions

The following research questions guided the conduct of this study:

i. To what extent Human Infrastructure supports Innovation in the Civil Aviation Industry in the South-South of Nigeria?
ii. To what extent Human Infrastructure enhances Service Delivery in the Civil Aviation Industry in the South-South of Nigeria?
iii. To what extent Last Mile Infrastructure enhances Innovationin the Civil Aviation Industry in the South-South of Nigeria?
iv. To what extent Last Mile Infrastructure enhances Service Delivery in the Civil Aviation industry in the south-south of Nigeria?

3. Literature Review

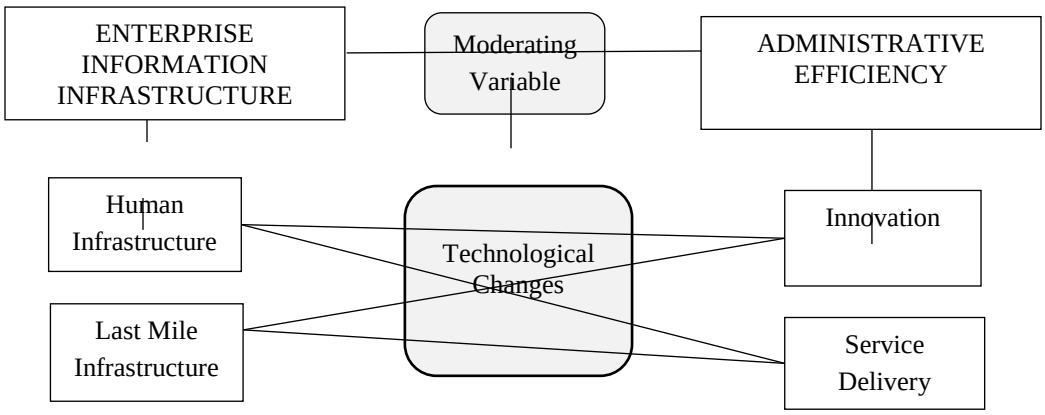
Etymologically, the concept Information Infrastructure (II)" was introduced in the early 1990s, first as a political initiative by Gore 1993 and Bangemann, 1994 subsequently. The coinage changed the Information Technology concepts from organizational focus to a more robust look of infrastructure as a national and global brand of Information infrastructure; a new interdependent and interconnected information superstructure for innumerous enterprises in the world over. The last decade of course, has presented an interesting phase in the study of the business-technical dimension of information infrastructure. Actor network theory tends to stand out when trying to highlight the importance of the interplay of the technologies with humans within a business-technical context. The researcher thinks Actor network theory (ANT) simply provides the descriptive framework for analyzing the facts associated with global information infrastructure as the supportive base for enterprise information infrastructure thrive. This study, therefore reams with the theoretical framework of ANT which was established, expanded, and reexamined by social scientists and sociologists (Callon, 1986; Fenwick & Edwards 2010, Sayes 2014). The Actor-Network Theory refers to at least two or multiple entities which mutually affect each other, either directly or indirectly. The focus is on how different elements form and shape each other to form a whole. It is a relationship often treated as an act of translation between elements or forces. A Translation that looks into how individual artifacts, interact, whether they connect with one another to formulate networks, and how these things shift through their interconnection (Fenwick & Edwards, 2010).

In a more common sense, the user's actions of an information system, inputs information that must first be converted into a computer language before it can be processed with and by the syntaxes, technical pieces of software applications either by the algorithms or artificial intelligence or programs for processing data to information as the case may be. To achieve the desired outcome or output from the system, the data must be reduced to the machine language of that system before undergoing refinement and changes before coming out as an information. This processing phase of technology usage eliminates the influence of the user in action within the information infrastructure. It is the action of the user and machine elements impacting each other in a circle of the network structure which is referred to as the "actor-world", while that of the humans input and the machine languages are referred to the "actors" who bring the process of interaction, selecting, differencing and shaping to form output which is referred to as the "acts transition". This situation can be understood as a constantly changing web of forces which is liable to restructure itself if one of its parts changes, breaks down or becomes defective. The principle of radical symmetry also

underlines that the actor is never alone while acting. Action in this sense is always interaction (Sayes 2014).

And so, this work emphasis the interconnection and interplay as the main dynamics that shapes and defines the new state of information infrastructure for the enterprise. The relational dimension of information infrastructure which is studied as the outcome of the existing intricacy and interdependences among various technologies and applications (Hanseth, 2004b) have resulted in organizational agents adopting and using these technologies and applications inter-reliantly. The speed of technological evolution from Information Technology into information super infrastructure came through five generations as follows: the mainframe era, the personal computer era, the client/server era, the enterprise computing era, and the cloud and mobile computing era (infrastructure). Bygstad (2010) argues that the notion of information infrastructure, as opposed to the traditional "information system", offers two distinct advantages. First, it changes the object of study from a single, stand-alone, application within an organization to large scale socio-technical networks of interrelated technical and social entities. Second, it offers a new perspective on how such networks are developed and evolve which brings to attention the conceptual components for the study thus;

Conceptual Framework



Source: Research 2018

3.1. Human Infrastructure

The first real descriptions of Information infrastructure never focused on humans as part of the technology components of IT infrastructure (e.g. Earl 1989, Turnbull 1991). Despite the fact that the human component of IT Infrastructure was known and should have being recognized (Mckay and others 1989), it was indeed not until the mid-1990s that it was actually emphasized. Broadbent and others (1996) emphasized the necessity of human component of IT infrastructure in providing the planning, design, construction and operational capability need for viable IT infrastructure. And that the human IT infrastructure binds the IT components into a reliable set of shared IT Infrastructure services. Human Infrastructure here refers to the large number of people in IT businesses and professionals who develop applications and services for the creation of information in the enterprise and the IT environment. Human information infrastructure includes the

knowledge, skills, policies, standards and experiences required for building the technology components to the necessary services required Mckay and Brockway (1989).

In all it is human infrastructure flexibility that lends information infrastructure the strength and allows it meet demands quickly. Humans and Information processing technology have reached a very high creative collaboration level such as artificial intelligence, sensor technology, network technology, simulation, robotics, human-machine interface etc. to solving the organizational problem. Hence, in the last few years studies have shown the changes in society and human behavioural patterns in the use of Information Infrastructure in homes and enterprise environments in the USA, South East Asia (Singapore, Malaysia) and Japan. The trend is that the homes and organizations are moving towards encompassing virtual space as they do with physical space with the driving forces from converging and embedded technologies in the internet (Bradley, Linda et al 2000, Bradley, L. and Bradley, G. 2001, Bradley L. 2005, Danielsson 2007).

Last Mile Infrastructures (Critical Information Infrastructures)

Today, it is becoming increasingly important to enhance communication networks and information systems, some of which are more essential than others and are therefore called critical information infrastructures (CII). The energy supply and the communication systems can be regarded as crucial since the rest of the infrastructures depend on them in order to function properly. From the 1970s to date, the critical infrastructures have progressively converged and become the bedrock of information structures such as the public telephone network, the Internet, terrestrial and satellite wireless networks for a variety of information management, communications, and control functions. The last mile infrastructure is used in the telecommunications and internet industries to refer to the final leg of the national information infrastructure networks that deliver telecommunication services to retail end-users which include enterprises. More specifically, the Last Mile refers to the final leg of also the energy, internet and telecommunications networks delivering services of connectivity to retail customers, which is the part that essentially reaches the enterprises such as; Cable Modem services, which enables high-speed Internet access using the same cable television infrastructure, including coaxial cables, that delivers cable TV programming. Enterprises can access the Internet without disrupting cable TV service and other Wireless Services Electric Power Line; is referred to as the energy supply over Poles and Power Lines," providing power connectivity to a whole lot of consumers and enterprise simultaneously.

Information Infrastructures considered critical are those information-based facilities, networks and assets, which if damaged would have a serious impact on the well-being of citizens, proper functioning of governments, organizations and industries or other adverse effects. The Critical Information Infrastructure (CII) are “those computer resources, in that the incapacitation or destruction of which, shall have debilitating impact on national security, economy, public health or safety" (Information Technology Act, 2000). Nigeria develop a critical mass of IT proficient and globally competitive manpower to ensure that every Nigerian is empowered with information technologies and ensure that IT resources are readily available to promote national development. Ajayi (2003) and Olatokun (2006). It is therefore widely accepted that there is a strong correlation between socio-economic development and the availability of electricity in a country (B. Garba, and others (2018) and so the nature of supply of electricity in this country is derailing the potency of information infrastructure both at the national and organizational level collectively.

4. Research Methodology

This study adopted the Descriptive Survey Design. The population of this study comprises of 80 senior staff of Port Harcourt, Asaba, Margret Ekpo and Akwa – Ibom International Airports at Rivers State, Delta State, Cross Rivers State and Akwa – Ibom State of Nigeria simultaneously. The categories of staff are Management Staff. The sample size of this research was calculated from the total population using the Taro Yamane formula (Yamane, 1973) which have a 95% confidence rating for finite population. The samples size calculated and used for this study is sixty-seven (67) management staff of the Civil Aviation industry in the South – South of Nigeria. The hypotheses were tested using the Product Moment Correlation Coefficient with the aid of Statistical Package for Social Sciences.

5. Results and Discussions

To empirically evaluate the relationship between the predictor and criterion variables (enterprise information infrastructure and administrative efficiency), the Pearson's Product Moment Correlation Co-efficient will be used to analysed the data. It is a parametric technique which gives a measure of the strength of association between two variables Hussey and Hussey (1997). The multivariate analysis which examines the moderating effect on the relationship between the predictor and criterion variables is tested using the partial correlation techniques at a 95% confidence interval and a 0.05 level of significance. The analysis is carried out using (SPSS) (version 20) software.

Table 1: Correlation Analysis (Human Infrastructure and Innovation)

Correlations

		Human Infrastructure	Innovation
Human Infrastructure	Pearson Correlation	1	0.924**
	Sig. (2-tailed)		0.000
	N	55	55
Innovation	Pearson Correlation	0.924**	1
	Sig. (2-tailed)	0.000	
	N	55	55

** Correlation is significant at the 0.01 level (2-tailed)
Source: (SPSS Output, 2018)

The illustration above revealed that the Pearson Correlation on the relationship between Human Infrastructure and Innovation is(r = 0.924**), based on the categorization in the Table 4.4, the evaluation is moderate, indicating that a moderate relationship exists between Human Infrastructure and Innovation. It is a positive correlation coefficient, implying a positive relationship exist between them i.e. improvement in Innovation is the outcome of progressive know how of the Human Infrastructure.

6. Hypotheses Testing

Decision Rule

The null hypotheses should be rejected and conclude a significant relationship if the probability value (PV) < (0.05) Significance Level. The null hypotheses should be accepted and conclude an insignificant relationship if the probability value (PV) > (0.05) Significance Level.

Hypothesis 1

$H_{01:}$ There is no significant relationship between Human Infrastructure and Innovation.
As shown above, PV is (0.000), this value is < (0.05) significance level, therefore the null hypothesis was rejected and the researchers conclude that a significant relationship exists between Human Infrastructure and Innovation.

Table 2: Correlation Analysis (Human Infrastructure and Service Delivery)

Correlations

		Human Infrastructure	Service Delivery
Human Infrastructure	Pearson Correlation	1	0.818**
	Sig. (2-tailed)		0.000
	N	55	55
Service Delivery	Pearson Correlation	0.818**	1
	Sig. (2-tailed)	0.000	
	N	55	55

** Correlation is significant at the 0.01 level (2-tailed)
Source: (SPSS Output, 2018)

Table 2. shows that the Pearson Correlation on the relationship between Human Infrastructure and Service Delivery is(r = 0.818**), this value is moderate, implying that a moderate relationship exists between Human Infrastructure and Service Delivery. The positive sign of correlation coefficient means that a positive relationship exist between them. That is to say, Human Infrastructure know how brings efficient service delivery.

Hypothesis 2

H_{02}: There is no significant relationship between Human Infrastructure and Service Delivery.
As shown above, PV is (0.000), this value is < (0.05) significance level, therefore the null hypothesis was rejected and the researchers conclude that a significant relationship exists between Human Infrastructure and Service Delivery.

Table 3: Correlation Analysis (Last Mile Infrastructure and Innovation**)**

Correlations

		Last Mile Infrastructure	Innovation
Last Mile Infrastructure	Pearson Correlation	1	0.963**
	Sig. (2-tailed)		0.000
	N	55	55
Innovation	Pearson Correlation	0.963**	1
	Sig. (2-tailed)	0.000	
	N	55	55

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

Source: (SPSS Output, 2018)

The Table above revealed that the Pearson Correlation on the relationship Last Mile Infrastructure and Innovation is(r = 0.963**), based on the categorization in the Table 5, the evaluation is moderate, indicating that a moderate relationship exists between Last Mile Infrastructure and Innovation. It is a positive correlation coefficient, implying a positive relationship exist between them i.e. that Innovative practice improves Last Mile Infrastructure services.

Hypothesis 3

Ho_3: There is no significant relationship between Last Mile Infrastructure and Innovation.

As shown above, PV is (0.000), this value is < (0.05) significance level, therefore the null hypothesis was rejected and the researchers conclude that a significant relationship exists between Last Mile Infrastructure and Innovation.

Table 4: Correlation Analysis (Last Mile Infrastructure and Service Delivery**)**

Correlations

		Last Mile Infrastructure	Service Delivery
Last Mile Infrastructure	Pearson Correlation	1	0.954**
	Sig. (2-tailed)		0.000
	N	55	55
Service Delivery	Pearson Correlation	0.954**	1
	Sig. (2-tailed)	0.000	
	N	55	55

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

Source: (SPSS Output, 2018)

The Table above revealed that the Pearson Correlation on the relationship Last Mile Infrastructure and Service Delivery is(r = 0.954**), based on the categorization in the Table 5, the evaluation is moderate, indicating that a moderate relationship exists between Last Mile Infrastructure and Service Delivery. It is a positive correlation coefficient, implying a positive relationship exist between them i.e. that improved Last Mile Infrastructure services lead efficient Service Delivery.

Hypothesis 4

$H0_4$: There is no significant relationship between Last Mile Infrastructure and Service Delivery. As shown above, PV is (0.000), this value is < (0.05) significance level, therefore the null hypothesis was rejected and the researchers conclude that a significant relationship exists between Last Mile Infrastructure and Service Delivery.

7. Discussion Of Findings

In testing the relationship between Enterprise Information Infrastructure and Administrative Efficiency (EIIAE), Pearson Product Moment Correlation (PPMC) was used to analyze the relationship between the dimensions of the Independent Variable (Enterprise Information Infrastructure) and measures of the Dependent Variable (Administrative Efficiency). The hypothesis shows that there is significant relationship between Human Infrastructure and Innovation with Pearson Correlation Significant of 0.924, as Human Infrastructure and Service Delivery shows 0.818 as well. Last Mile Infrastructure and Innovation testing shows 0.963 while Last Mile Infrastructure and Service Delivery result shows 0.954. The moderating factor analysis (Technological Changes) is also showing positive result in table 5 using partial correlation. This shows that there is a positive relationship between Enterprise Information Infrastructure (dimensions) and Administrative Efficiency (measures). Therefore, the researchers conclude that a significant relationship exists between Enterprise Information Infrastructure and Administrative Efficiency.

8. Conclusion

Based on the findings of this study, the following are recommended:

There is a significant relationship between Enterprise Information Infrastructure and Administrative Efficiency. There is a relationship between Human Infrastructure know how and Service Delivery. It was also notice that positive relationship exist between Last Mile Infrastructure services and Service Delivery.

Based on the findings of this study, it was concluded that:

Clearly, progressive technological changes has offered a robust 21st century computerized telecommunications networks in the shape of Global Information Infrastructure for a foundational support for Enterprise interdependent Information Infrastructure. This Information technology continues innovation has without doubt changed the cultural capital surrounding administration of the enterprise, it is redefining the knowledge and skills set required for efficient airport operations.

It is therefore, imperative to state that no business in this era can be sustainable without relying on the global Information Infrastructure networks for the conduct of their vital operations. Service Delivery as the case in point is measured these days by efficacy of speed and accuracy of the

information infrastructure a firm possesses. It is therefore concluded that all business strategies and developments must inculcate information infrastructure as the blood wire of its administration if it is to achieve its objectives and goal in today's global stage. And that the era of independent enterprise information has given way Enterprise information infrastructures, a convergence of all global computing.

i. Top managers of civil aviation authorities should strongly support the use of Human Resource Information System (HRIS) and make use of human resource information infrastructure to make strategic decisions. The organizations need to have seamless flow of information between various departments. This means that the organizations need to consider HRIS components when they are developing organization strategy.

ii. As an information driven industry where a communication gap or barrier could be fatal in terms of human lives must strives to avoiding total down time thereby providing business instability and inconsistency in customers' relationship universally.

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