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ABSTRACT

In an increasingly competitive environment, little is acknowledged on how competitiveness in different industries is driven by their technology resource strategy and the plan that guides the growth and exploitation of technological resources. The aim of this study is to examine the relationship between technology resource strategy and competitiveness in Nigerian telecommunication industry. The methodology used for this was review of related literature on the concepts of technology resource strategy and competitiveness. It has been established within the literature reviewed that the three dimensions of tangible and intangible technology resource strategy (manpower, machine and method) and competitiveness are significantly related. In this study, proposed model has been developed to explore the relationship between technology resource and competitiveness. However, the model needs to be elaborated and developed through systematic research. This study has helped to strengthen the body of knowledge on technology resource and competitiveness in telecommunication industry. Also, it has a strong impact as a contribution to strengthening the decision making at the corporate level and developing strategies of technological resources to improve competitive advantage of telecommunication industry. It was recommended that telecommunication industry should establish and improve on existing technology resource strategy in order to sustain and improve its competitive advantage.

Keywords: Technology resource, Competitiveness, Nigerian telecommunication industry.

1.0 INTRODUCTION

With the recent competitive business environment, it is necessary for organization to strategically manage its technology resource and related skills. The generation of new ideas and knowledge embodied, physical equipment and people to constitute the intangible and tangible resource is vital for competitive advantage (Mantulak et al., 2016; Navarro, Romero, Bauza, & Granadillo, 2006; Siemann, 2017). Better deployment of technology resources entails the need to promote and/or develop organizational capacities that allow for the use of certain knowledge, abilities, skills, and expertise by personnel in order to step up the efficiency of the machines and/or equipment with which they work, identified as distinctive elements that contribute significantly to the production performance of the organization. (Mantulak et al., 2016) Significance of technology strategy is exposed to few organizations like telecommunication industry (Ahmad, Ahmad & Nyager, 2009). Consequently, it is necessary to design strategic position for managing technology resource within the set of functional areas of an organization. The main technology are taken for dispensation in most industries, as firms are struggling on the basis of supplementary technologies (Ahmed, Hassan, & Yussuf, 2013). Organizations are subject to internal factors that may comprise of obstacles that will hamper competitiveness and technological progress (Mantulak et al., 2016). Therefore, it is necessary for an organization to implement a well-planned

process for taking strategic decisions on technological resource.

In telecommunication industry, constraints on competitiveness are characterised improper strategy to manage technology resources and their associated skills for better adaptation between employees and their tools/equipment. They tend to solve technological problems locally through adaptation of parts, or building their own machines, technical and human skills and poor relationship with partners in business and focused more on the short-term resource like financing resource, management processes, daily production and service issues, etc. Several past studies such as that of Ahmad, Hassan, & Yusuf (2013); Mantulak et al., (2016); ZevallosVallejos, (2007); and Sietmann (2017) acknowledged the significant relationship between technology strategy and competitiveness. In this recent world that is globalize, the significance of telecommunication industry cannot be over emphasised (Ahmad, Ahmad & Nyager, 2009). Research has shown in Nigeria that investment has positively impacted the economy in the aspect of tele-density; inspiration of associated industries; corporate social investments; technological development; manpower development; increase the productive capacity of the economy employment generation in telecommunication industry (Ahmad, et al., 2009; Elegbeleye, 2005; Okoruwa, 2007). Some years ago, through the economic theory, positive correlation was established between economic growth and telecommunications

penetration (Nxele & Aran, 2005). Keeping this discussion in mind, the aim of this study is to answer the research question; how technology resource is related with firm competitiveness? To find answer to this research question, the study examines relationship between technology resource strategy and competitiveness in telecommunication industry. More specifically, the study examines the relationship between the three dimensions of tangible and intangible technology resource strategy in line with traditional management (machine, manpower and methods) and competitiveness in Nigerian telecommunication industry for new better perception of technology resource strategy. On the basis of the reviewed literature, a conceptual framework has been developed between the technology resource strategy dimensions and firm competitiveness.

2.0 LITERATURE REVIEW

2.1 Nigerian Telecommunication Industry

At independence in 1960, the total number of telephone lines was only 18,724 for a population estimated at about 40 million between 1960 and 1985, the provision of telecommunication services in the country was also inadequate because of the capital expenditure needed (Akpoyomare, Patrick, Salome & Victor 2014; Kovacs, 2013). As a result of that quality of both the internal and external telecommunication services was unsatisfactory and unsatisfactory situation had to do with equipment obsolescence, unreliable and congested lines, expensive service delivery and customer unfriendly services

(Akpoyomare, *et al.*, 2014). In 1992, announcement was made known to public on the Nigerian Communication Commission Degree (NCCD) (Akpoyomare, *et al.*, 2014). This degree turns out to be the primary legislation in leading the telecommunication industry (Oyejide, & Bankole, 2013; Alumni & Cornelius, 2013). This commission has been powered to issue license to any private telecoms operation in the country. Therefore, this commission was given the responsibility to oversee the affairs of telecommunication industry in Nigeria and prepare policies that will guide and improve the technical standard of telecomm servers. The NCC mobile license providers in 1996 after each of them have paid a fixed licensed fee for the kind of service they offered to the society (Alumni & Cornelius, 2013). The telecoms provider was ranged between the periods of 5-10 year duration of the license (Ndukwe, 2013). After that another keen interest was shown by the government, especially in the area of Nigeria telecommunication industry liberalization ((Alumni & Cornelius, 2013, Aid, 2015). The complete liberalization process Telecommunication industry therefore leads to intense competition among telecoms providers in terms technology resource in the sector till date.

2.2 Technology Resources

It is fitting to re-state that strategic management in an organization is based on the overall use of tools to strengthen their internal capacities, to improve the competitive advantage, to meet the requirements of the environment and to

reflect on a future, (Gimbert, 2010; Pérez & Carlos, 2016). Also Caicedo (2008), Fierro and Gutiérrez (2009) and Leon and Valenzuela (2014), stressed the existence of the set of positive aspects industries that indicate they are endowed with dynamic structural and organizational factors behind a broad range of technology innovation and management activities that are crucial for production and service processes. All organizations must plan the use of their technology resources, grading them by significance in the technology adaptation, acquisition, and/or generation process to define the technology course to be followed over the medium and long terms (Gutiérrez, Rebolledo, Ibarra, & Henneberry, 2008). This shows that it is essential to develop an organizational culture efficiently, which ensures the industry will stay at a technological level that is favourable for its business, modified to its own capabilities, as well as client demands. Therefore, Industries should bear in mind when analyzing the conditions that describe specific strategic options in decisions related to in-house technology development the resources available and its ability to acquire and/or generate other new resources for its competitiveness (Martín-Rojas, García-Morales & Mihi-Ramírez, 2011).

From the management point of view, organizational resources generally consist of a set of tangible and intangible resource firm has for meeting the objective of the organization (Hill & Jones, 2011; Sáez de Viteri Arranz, 2000; Ventura, 2008). Resource is any means that may be rated as a management strength or weakness (Pérez

& Carlos, 2016). For (Mantulak et al., 2016), resources are the production factors controlled by the company for developing strategies that enhance its efficiency and efficacy. From this same standpoint, Nuchera, Serrano, and Morote (2002) established the technologies related to the application of knowledge to the production of specific services and goods. Along the same lines, Sánchez (2005) noted that technology constitutes both knowledge and the outcome of its practical application. Moreover, when stating that in practice everything the company does requires some technology that is contained in both its core and support activities. Meanwhile, (Calantone, 2005) blended the concepts of resources and technology, affirming that technology resources constitute the set of tangible and intangible media available to the company and/or that it can access either internally (individual and collective capabilities and potential) or externally (current or potential stakeholders) for designing, fabricating, and selling its products or services, the use of information, and the management of all the functions that contribute to the materialization of its activities.

According to Pérez & Carlos, (2016) Technological resources are categorized into tangible and intangible; the tangible resource are: the main carriage, different types of machines, transport systems, products, etc, while the intangible are further classified as: knowledge and individual and collective skills, individual organizational routines, mastery of certain specific technologies, adaptation of machinery and / or equipment to improve

production efficiency. Consequently Technology resource can be classified into three (3) elements: machine (tools, structures and equipment), manpower (skills, expertise and knowledge) and method (relationship within and between manpower and machines in the process of performing both back office and frontline activities)(Ahmad et al., 2013). Technology resources are most at a time seen as either main or supplementary technology resource based on their competitive magnitude(Ahmad et al., 2013). Critical technology resources can be seen as former whose has directly devastating shock on industries as a result of absence/failure, in some instances, foremost to instant distraction of deeds. Therefore, Supplementary Technologies, on the other hand, are technologies that permit firms to do better than other rivalry firms and normally develop their performance towards competitiveness. When the competitive position is poor and does not automatically result to instant distraction of organizational activities it refers to absence/failure of supplementary technologies (Ahmad & Ahmad, 2006).

Technology resource are seen as tangible and intangible; between tangible are: the main carriage, different types of cutting machines, chipper, transport systems products, planer, moulder, team fungicide bath, conveyors wood waste, living sharpening tool room (Pérez & Carlos, 2016), and between the intangibles were identified: knowledge and individual and collective skills, individual organizational routines, mastery of certain specific technologies, adaptation of machinery and

/ or equipment to improve production efficiency, responsiveness to customer needs, through innovations, practices linked to environmental management and occupational safety (Pérez & Carlos, 2016). Based on the matters presented, agreement is reached with Castells and Pasola (2005) when they argued that technological assets analyses should not be a minor activity, as they underpin diagnoses of the current status, serving as of foundation for technology development strategies, as well as with (Mantulak et al., 2016), who believed that ongoing sustained enrichment of technological assets is achieved through introducing an organizational culture that buttresses creative thought and consequently the appearance of innovations.

Nevertheless, (Pérez & Carlos, 2016) warned about a management gap in coping with demands from the surrounding environment, facing the challenges of technological turbulence and establishing innovative development strategies, as senior management does not generally make good use of the expertise and creative flair of employees, with little interest in lowering internal and external barriers that block the efficient use of the available technological media. Consequently, it is vital that corporate directives use management tools that ensure comprehensive, overall definition of tangible and intangible technological media, while identifying internal and external hurdles hampering more effective use thereof (Mantulak et al., 2016). As expressed, it is vital to stress that the efficient use of technology resources may

be achieved only through effective strategic management, which builds up corporate technology assets in a comprehensive, integrated manner. Along these lines, Pérez & Carlos, (2016) noted that the leader of the business organization must ensure true technology resource management based on the deployment of six key functions: optimize, enrich, safeguard, inventory, assess, and oversee. The elements of Technology resource are machine (tools, infrastructure and equipment), manpower (technical skills, managerial skill expertise and knowledge) and method is the ability of an organization to perform its activities through the association between manpower and machines (Ahmad et al., 2013). According to Sietmann, (2017) Technological resources covers nine aspects; the first aspect is the origin of the assets, whether it is dependent or independent in its development process. Dependent means that firm totally depends on the external third party asset while independent means that firm has their own asset to develop its technology and both of this method has its own pros and cons (Jolly, 2012). The second criterion includes relatedness to core business which is defined by the relationship between the contributions of technologies implementation toward the company's core business. Applying appropriate technology to the core business is really important since it will directly give high impact on the production efficiency, improve the stability of production, raise the equipment operation rate, reduce consumption of products, and improve the utilization of waste materials (Zhang & Liu 2015).

Third criterion under technological resources also includes the experience accumulated by a firm in the certain technological field. When a firm have an experience and broad knowledge in the specific field is considered as important aspect in order to handle the technology because it will directly reflect the level efficiency of using the technological resources. The fourth criterion is about the pattern owned by the firm (Sietmann, 2017). A firm that patented their new technology is considered as a stronger firm as they can put obstacles toward others firm from access the resource for producing the technology. Firms are considered to gain competitive advantage since their invention on new technology has been patented. The fifth criterion of technological resource is the value of laboratories and equipment owned by a firm that emphasize about the expertise of R&D staff and its effectiveness in doing research.

Mulero, García and Rodríguez (2016) emphasises that having and R&D employee that has large expertise and know-how on certain aspect would lead to having a valuable outcome. The sixth and seventh criteria highlight about the selection either applied research or fundamental research that will be more expensive to develop a technology (OECD, 2005; Jolly, 2012) while the eighth criterion which is the development of team competencies. This is considered as most crucial part since it will show the successful of a technology (Jolly, 2012; Sietmann, 2017). Lastly is diffusion of technological knowledge in the firm. A

firm must have a knowledge and capacity on handling technology. Lin and Tang (2016) supported that knowledge is very important to improve intellectual capital to gain effectiveness in organizational performance. Therefore, the nine aspects can be summarised into manpower, machine and method.

Technology is related to the application of knowledge to perform organizational activities in terms of production of goods and service (Mantulak et al., 2016). Technology resources constitute the set of tangible and intangible media available to the company and/or that it can access either internally resource or externally resource for designing, fabricating, and selling its products or services, the use of information, and the management of all the functions that contribute to the materialization of its activities. Therefore, for the purposes of this study, internal technology resource strategies are considered.

2.3 Technology Strategy

In most cases, organizations must devise a strategy for its technological resources, in line with its corporate strategy as competitive strategy, according to possess one or more businesses (Castells & Valls, 2005). Technology strategy can be seen as organizational approach to the improvement and utilization of technology (Pérez & Carlos, 2016). Moreover, Suarez Hernandez (2003) and Castells and Valls (2005) emphasize the need to develop a technology plan that translated into actions, orientations and main concern for technology strategy, and also exploits the

use of technological heritage of the firm in line with its strategic objectives. Therefore, technology plan largely represents the set of actions to be executed in a given time frame, to ensure the required capacity for change in the organization to maximize the enjoyment of its technological heritage (Pérez & Carlos, 2016). Therefore, it is fundamental to assign strategic status to technology resources in the functional structure of industries as they form the cornerstone underpinning development strategies.

2.4 Competitiveness

Competitiveness is used in highly varied ways and is itself multiple dimensions (Alumni & Cornelius, 2013). Competitiveness by definition measures the relative performance of an organization but there are often deviating in meaning (Sölvell, 2015). The world is often used to assert that a firm can cut cost, improve quality, delivery service, flexibility, customer focus and know-how (Alumni & Cornelius, 2013). Therefore, competition is generally seen as the ability of a firm to offer product and service more effectively and efficiently than the rivalry firms (stiger, 2008). Competitiveness therefore, can be seen as the ability of industries in the surroundings to struggle at home and abroad markets while simultaneously organization market share improvement. Country wealth and citizens standards of living improve (Huggins. Izushi., Prokop, & Thompson., 2014) or as the set of firms, policy and factors that confirm the organizations' efficiency levels in a constituency (Sala-I-Martin ., 2014). Sölvell (2015) affirm that competitiveness for firms as the still advantages and uses

the term attractiveness as particular location advantages (Akpınar, Özge, & Mermercioglu, 2017). In the content of this study competitiveness will be reviewed in terms quality, cost, delivery/provision, customer focus, known-how and the flexibility.

Quality associated with performance and expectation, reliability, certification, and environmental concern (Phusavat, Kanchana, 2008). Costs focused on the ability to effectively manage operational cost, and other relevant features such as quality (Zhao, Yeung, & Zhou., 2002). Delivery/provision is related to time-based issues, and dealt with the speed that products/services are delivered or provided. Flexibility represented the ability to deploy and/or re-deploy resources in response to changes in contractual agreements that are primarily initiated by customers. The definition for this term was in line with Lau (Aranda (2003) and Kazan, Ozer, & Cetin (2006). Customer-focus concentrated on understanding and fulfilling customers' needs. It included after-sales follow up, customization, support, customer information, and dependable promise. Know-how dealt with the trends of decreasing products and services life-cycle (Phusavat & Kanchana, 2008).. As a result, the issues on knowledge management, creativity, and skill development were included (Zhao et al., 2002; Blanchard, 2004; Hsu & Turoff, 2007). Therefore, the RBV emphasizes strategic choice, charging the firm's management with the important tasks of identifying, developing and deploying key resources to maximize returns (Fahy, 2000). In summary, the characteristics and types of advantage-

generating resources; and strategic choices by management is the vital elements of the resource-based view in regard sustainable competitive advantage and superior performance.

2.5 Underpinning Theory

This study is anchor on Resource-based theory. The foundations of the resource-based view (RBV) of the firm can be found in the work by Penrose in the middle of the century (1959) that conceived the firm as an administrative organization and a collection of productive resources, both physical and human. This theory is applied to explain differences in competitiveness and performance within an industry (Song, Droge, Hanvanich, & Calantone, 2005). According to Kraaijenbrink, Spender and Groen (2010), the Resource-Based View is one of the most cited theories in management discipline. The Resource-Based View stresses the internal aspects of a firm and suggests that there is a relationship between firm's competitive strategy and its accumulated resources (Das & Teng, 2000). Material resources, as well as human resources, can provide the firm a variety of services. The same resources can be put to use in different ways, according to the ideas of the firms on how to apply them. In this sense, there is a close relationship between the knowledge that people in the organization detain and the services obtained from the resources, so that firms are really repositories of knowledge. These capacities will traduce in most precise and better well define expectations of the future value of resources, than those presented by other participants in the resource market (Makadok, 2001). Conclusively, an alliance of technology resources and organization is required. Most

organization lacks emphasis on the internal resources such as manpower, machine and method resources within the same organization and the exceptional features and practices that may provide its main source of sustainable competitive advantage.

2.6 Technology Resource Strategy and Competitiveness

In this section, relationships among four dimensions of both tangible, intangible technology resource strategy and competitiveness are discussed. Ahmad et al., (2013) conducted a study on technology resource and competitiveness in Nigerian Broadcasting Industry affirmed the manpower has significant impact on the competitiveness on a firm. Human resources contribute significantly to the performance of the firm. Human resources of an industry are the root cause of any technological development and automation (Shee & Pathak, 2005). These are the transporters of technological knowledge and disseminate it to the activities of an organization. The professionals well equipped with sound technical knowledge can contribute significantly to the performance of a firm (Shee & Pathak, 2005). According to Pérez & Carlos, (2016) who conducted a study on strategic management of technology resources in small companies manufacturing: case study in Argentina and indicated that proper management of small manufacturing companies is essential activate to those personal skills that contribute to the strengthening of strategic thinking in decision-making, in order to achieve a conduit to develop an integrated strategic vision that allows linking everyday decision making with the

objectives medium- and long-term business.

Technological features such as technology and R&D process, 'R&D and technology development contribute significantly to the performance intangible aspect of an industry (Shee & Pathak, 2005). The intangible performance of an industry means branding and goodwill, customer loyalty (repeat purchase), customer satisfaction, customer complaints, management credibility, and research/quality leadership (Shee, 2002). There are also other features, such as strategic planning, intangible resources, and implementation process, which are emphasized here for discussion. Method in Nigerian broadcasting industry is the most strategic technology resource driver for competitiveness (Ahmad et al., 2013). Significant positive relationships exist between all categories of IT resources from one side, and competitive advantage of firm from the other side. In another way, the results show no significant relationship between firm's age, type of industry, and the competitive of firms (Abdelkader & Abed, 2016;).

Also, technology resources can improve efficiency performance but may not enhance financial performance directly (Abdelkader & Abed, 2016). Current study and findings on technology resource attributes and performance in international joint ventures in Malaysia shows strengthens significance in the resource-based view of competitive advantage (Ainuddin, Beamish, Hulland, & Rouse, 2007). Technology strategy significantly explained the difference on competitiveness of industry (Ahmad, et al.,

2009). The most significant driver of competitiveness strengthening the need for skillful manpower and internal infrastructure to hold new acquisitions in technology strategy is training, maintenance & exploitation policy (TMEP)(Ahmad, et al., 2009). Intangible resource and capabilities contributed more greatly to firm performance compared to tangible resource (Kamasak, 2017). Based on the review of selective literature on technology resource strategy issues as related to competitiveness of Nigerian telecommunication industry, the following hypotheses were formulated for the present study:

H0₁: there is no significant relationship between Manpower technology resource strategy and competitiveness.

H0₂: there is no significant relationship

between machine technology resource strategy and competitiveness.

H0₃: there is no significant relationship between method technology resource strategy and competitiveness

2.7 Conceptual Framework

Based on the forgoing review, a model is being proposed. This model explains the relationship among three dimensions of tangible and intangible technology resource strategy and competitiveness. The dimensions are measured with manpower technology resource strategy, machine technology resource strategy and method technology resource strategy towards competitiveness. Therefore, the model on figure 1 has to be empirically tested out for its feasibility.

Technology Resource strategy

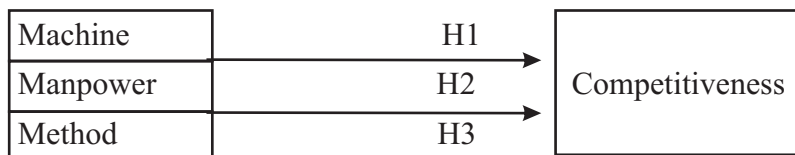


Figure 1: Proposed conceptual model for the study.

Source: Researchers (2019)

3.0 METHODOLOGY

The methodology used for this study was review of related literature on the concepts of technology resource strategy and competitiveness. References are based on databases online such as science direct, Sage, Emerald Web science and Google scholar. The review is limited to Technology resource strategy and competitiveness. References are only taken from journal articles, full text document and books. Consequently, limitation from this study could be due to

limited material from databases. The references are not restricted to Nigerian telecommunication industry taking also into cognition worldwide.

4.0 ANALYSIS AND DISCUSSION OF SELECTED REVIEWED LITERATURE

The table below shows some selected empirical literature that reviewed and analysed:

Table 1: Summary of Selected Reviewed Literature

S/N	Authors, date and Location	Research Title	Variables (IV, MODV, M EDV, DV)	Methods	Findings	Limitation and suggestion for further study
1	Sietmann, (2017)	Technology Assessment Need: Review on Attractiveness and Competitiveness	technology assessment, technology attractiveness, technology competitiveness	Review	Study Variable stated are provided to significant from literature review	Paper with no empirical data.
2	Kamasak, (2017) Turkey	The contribution of tangible and intangible resources, and capabilities to a firm's profitability and market performance	Firm performance, Emerging markets, Capabilities, Resource-based view, Tangible and intangible resources	A cross-sectional survey research design was used in the study. The modified version of Galbreath and Galvin's (2008) resource-performance questionnaire which included a total number of 45 questions was applied on 243 Turkish firms operating in different industries. The data collected were analysed by hierarchical regression analysis.	The findings revealed that IRs and capabilities contributed more greatly to firm performance compared to TRs. However, in contrast to the proposition of resource-based theory that views capabilities as the most important skills that underpin the development and deployment of both TR and IR, capabilities offered rather limited additional explanatory power to the prediction of firm performance only with respect to profitability against the combined effects of TR and IR.	The context-specific nature of firm-level resources. In all research, objective performance measures should be used where possible and available. the cross-sectional nature of the study provides a snapshot about the issue for a specific point in time but gives no indication of the sequence of events, what is captured and not captured with respect to resource and capability effects.

3	Mantulak et al., (2016)	Definition Procedure for Strategic Technology Resources in Small Manufacturing Firms: A Case Study	Manufacturing firms; small enterprises; technological resources	Non experimental research project was conducted through a descriptive study.	The progress of the survey also helped bridge the gap between academic theorization and corporate pragmatism, with specific input spurring local and regional development.	Future research projects to explore the impacts caused by the implementation of the procedure on the technology management indicators of small businesses in this sector.
4	Argentina.	Strategic Management Of Technology Resources In Small Companies Manufacturing: Case Study In Argentina	Technological resources; Strategic thinking; Small manufacturing companies.	Literature review and semi-structured questionnaires were used from interviews with entrepreneurs and survey of productive establishments.	As a result a model that supports the mechanics required to take advantage of technological resources strategically exposed from the revitalization of the strategic thinking of entrepreneurs	The case study in the small business segment
5	Abdelkader & Abed, 2016)	The relationship between information technology resources and competitive advantage in a sample of Algerian firms	IT Resources, IT Infrastructure, IT Technical and Managerial Skills, Competitive Advantage.	Using data from 30 Algerian firms and the Pearson Coefficient, the results indicate a significant positive relationship between IT resources and the competitive advantage.	the results show also a significant positive relationship between all categories of IT resources from one side, and competitive advantage of firm from the other side. Finally, the results show no significant relationship between firm's age, type of industry, and the competitive of firms.	limitations like using cross-sectional data, as consequence assessing the causality effects of IT resources and capabilities on competitive advantage of firms. Suggestions; Using longitudinal data, The case study is more suitable for studying a complex phenomena, Using the indirect models that best describe the relationship

6	Adi, (2015). Nigerian	An Evaluation of the Nigerian Telecommunication Industry Competitiveness: Application of Porter's Five Forces Model	Competitiveness, Efficiency, Growth, Telecommunication, Nigeria, Porter, Five Forces	Porter's five forces model of competitiveness to the Nigerian telecommunication industry context,	The study concludes that there is indeed high competitive pressure in the Nigerian telecommunication industry.	The study is limited to Porter's five forces model of competitiveness in telecommunication firm
7	Ahmad et al., (2013). Nigerian	Technology Resource Strategy and Competitiveness in Nigerian Broadcasting Industry	Competitiveness, Broadcasting, Machines, Manpower, Method, Technology Strategy, Nigeria	Against this background and building on a number of relevant theories/literature, scales were developed and statistically validated from 311 valid responses across professionals from Nigerian Broadcasting Industry.	Result indicated technology resource strategy significantly explained the variance on perceived competitiveness. Similarly, the research revealed that despite the importance of external uncontrollable factors, technology-dependent firms can significantly improve their competitiveness by concentrating on the internal controllable factors. Furthermore, beta coefficients indicated that all the Independent variables have unique significant influence on competitiveness in this order: method, machinery and manpower. The finding also supports key theories and literature.	The scales were largely subjected to exploratory factor analysis, hence, same result need to be replicated in other countries and/or industries before we start talking about TRE competitive model.
8	Calantone, (2005)	Marketing And Technology Resource Complementarities : An Analysis Of Their Interaction Effect In Two Environmental Contexts	Marketing, technology resource, Environmental contexts	SEM two- group analyses (with controls)	Results from SEM two-group analyses (with controls) show that both main effects positively impact performance in both environmental contexts..	Research suggests that the synergistic performance impact of complementary capabilities can be substantive in particular environmental contexts: while synergistic rents cannot always be obtained, it is possible to leverage existing resources through complementarity.

9	Ahmad, et al., (2009). Nigeria	Technology Strategy and Competitiveness in Developing Nations: Exploratory Evidence from Nigerian Telecommunication Market	Competitiveness, Developing Countries, Nigeria, Technology Strategy, Telecommunication	Principal component factoring and principal factor axis was run on 157 valid responses from Nigerian telecommunication industry to explore and confirmed the unidimensionality of the constructs. In addition, reliability analysis and constructs correlation provides evidence for constructs validity.	Technology strategy significantly explained the variance on organizational competitiveness. Furthermore Beta coefficients indicate training, maintenance & exploitation policy (TMEP) is the most important driver of competitiveness reinforcing the need for skillful manpower and internal infrastructure to accommodate new acquisitions in technology strategy.	Limitations that future research should redress; the sample is biased towards GSM operators, besides the sample size ought to have been larger. Continuous licensing of telephone providers also negates absolute scientific sampling. Finally, scales were largely only subjected to EFA.
10	Shree and Pathak (2005)	Managing People and Technology for Enhancing Competitiveness: Software Industry Perspective	Technology management, software industry, India, global competitiveness	Questionnaire survey was conducted to study the technology and people issues in Indian software industry. linear regression test was carried out	Competitive performance of the firm depends on the technological knowledge of the software professionals.	Continuous training and up gradation of the work force to the latest technological development facilitates sustainable and easy operations. Infosys Technologies and HCL Technologies were examined to explore their technology and people issues as related to their competitiveness globally.

Based on the review of literature related to the relationship between technology resources and competitiveness, machine and manpower technology resources are less significant (Ahmad et al., 2013; Abdelkader & Abed, 2016; Pérez & Carlos, 2016; Shee & Pathak, 2005) while, method technology resources strategy (is deemed to be the more important and significant technology resources strategy in attaining and sustaining competitive advantage position because of their nature, being not only valuable but also hard-to-copy relative to the other types of tangible resources (i.e. physical and financial resources). Also, Training, maintenance & exploitation policy (TMEP) is the most significant driver of competitiveness that buttress and necessitate the skillful manpower and internal infrastructure to accommodate new acquisitions in technology strategy of telecommunication industry (Ahmad, et al., 2009). Therefore, based on conceptual and empirical reviewed literature, there is significant relationship between technology resource strategy and firm competitiveness. Also, technology resource strategy is the fundamental firm capability for attaining and sustaining competitiveness and eventually high performance of an organization.

5.0 SUMMARY AND CONCLUSION

The review above highlights the significance of understanding how certain elements (manpower, machine and method) are really vital in technology resource strategy and can be used as a conceptual guideline for

telecommunication industry in particular to enhance their competitive advantage position and performance through application and manipulation of identified internal technology resource strategy. The study developed a model for exploring the relationship between technology resource strategy (tangible, intangible and human resource) and competitiveness (quality, cost customer focus, flexibility, Known-how) that is helpful for future research in this area. Also, the study has provided new insight viewpoint on telecommunication industry and shifts the development of research form looking at the competitiveness and success factors to all angles which is recognizing factors to get telecommunication stand competitive. Theoretically, the review shows that the elements of three dimensions of tangible and intangible technology resource strategy are found to be important to telecommunication competitiveness. To prove this significant relationship empirical data is required. However, since the model has been proposed on the basis of reviewed literature, it needs to be elaborated and developed through systematic research. This study would help managers to manage their resource better by pursuing appropriate technology resource strategy and proper management of technology resource would benefit the organization. Therefore, the possible limitation related to this paper, is that it is a conceptual paper, there is no data collected to enable generalization to other countries and organizations.

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