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Service System Innovation and Competitiveness In an Emerging Market: The Moderating Role of Managerial Competencies

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Abstract: This study empirically examines the correlation between service system innovation and competitiveness in Nigeria, an emerging market, by focusing on the country's mobile telecommunications sector. The moderating effect of managerial competencies was also tested. Due to the contribution of the telecommunications sector to the economic well-being of Nigeria and the world's economy at large, the sector witnesses a high level of competition among its players, resulting in unsustainable price wars, negatively impacting the telecommunication firms and their ability to invest in service improvements. Thus, there is a need for a study into the factors affecting competitiveness in the telecommunications sector. A cross sectional survey was used because the study explored the relationships between service system innovation, managerial competencies and competitiveness. The study used a survey instrument, which was sent to 450 respondents using Google Forms, out of which 230 responded. The 230 returned copies represented a 51.1 percent return rate, which satisfied the minimum required return rate for a cross sectional study. The study's hypotheses were tested using the partial least squares structural equation model (PLS-SEM). The finding revealed that service system innovation (idea development, service development and commercialization) enhances the competitiveness of mobile telecommunication firms. Thus, an increase in idea development, service development and commercialization is essential for a competitive advantage. Also, managerial competencies were found to significantly moderate the relationship between service system innovation and competitiveness. The study provides a new insight into how service system innovation affects the competitiveness of telecommunications companies, particularly in emerging markets, with Nigeria as the focal point. It also shows the role managerial competencies play in the telecommunications sector. This study offers proof of the traits of service system innovation, managerial competencies, and competitiveness in the telecommunications sector. It also developed and tested a scale for measuring these variables, which future studies could adopt.

Keywords: service system innovation, idea development, service development, commercialization, competitiveness, and managerial competencies
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Introduction

The telecommunications industry is a critical and indispensable sector in any economy or country (Makgopa, 2021). In Nigeria, the telecommunications sector contributes immensely to the economic well-being of the country (Adi, 2015; Anyebe, & Zubairu, 2019), albeit the sector witnesses a lot of volatility, as can be seen in the high level of competition among the major players (Nekmahmud, & Rahman, 2018). Despite the efforts by these firms, many fail to achieve a competitive advantage in their operations, in terms of the cost and quality of their services. With respect to the quality of service, most firms fail to meet the expectations of their stakeholders. Moreover, recently the quality of the services offered by the telecommunication firms seems to be dwindling. For instance, most mobile line subscribers often experience high rates of drop calls, while data services and the network are poor in most localities (Adegoke, Babalola & Balogun, 2008; Agu, Acha & Anyanwu, 2013; Uesoo, 2021). Also, subscribers complain about not being able to use the internet services even after data subscription (Kiyea, 2014; Ibekwe, et al., 2019; Ekah & Iloke, 2022). Other manifestations of the poor quality of the services include clients being charged for calls that did not connect and frequent network congestion (Abdulkareem, et al., 2020; Ekah & Iloke, 2022). Furthermore, the operating costs of telecommunications companies increased from N319.9 billion in 2019 to N327 billion (2.2 percent increase) in 2020. Having observed the problems with the telecommunications firms in Nigeria, especially as they pertain to the low level of competitiveness, in terms of cost and the quality of the services offered, could it be that the poor quality and high cost of services are due to a lack of service system innovation among the telecommunications firms in the country? This calls for serious attention to be paid to service system innovation by the mobile telecommunications firms.

In today's chaotic business environment, service system innovation is attracting enormous attention among service firms, especially mobile telecommunications firms, as they are confronted with intense pressures from their stakeholders, who include mobile line subscribers, industrial clients, financial institutions, government institutions and regulators (Perano, Casali, & Abbate, 2018; Anyebe, & Zubairu, 2019; Ezenwakwelu, Akpan, & Ogbogu-Asogwa, 2021). Service system innovation is important for mobile telecommunication firms because it helps the firms to withstand the sustained pressure from the environment (Ying, Hassan & Ahmad, 2019), and contributes to the general health and effectiveness of the service firms (Weerawardena & McColl-Kennedy, 2002).

Service system innovation is a gradual process that is decomposed into idea development, service development and commercialization (Mahmood, Mohd, Rahman, Yusniza & Norhamidi, 2014). It has been argued that the idea development dimension of service system innovation supports the achievement of organizational goals by providing

potentially useful ideas aimed at solving service problems, or providing ways to explore new opportunities (Alexe, Alexe, & Militaru, 2014). Moreover, without new ideas, an organization stagnates, abates and finally is ousted by competitors who have novel and better ideas (Khaled & Hadia, 2014). Scholars also agree that the service development facet provides a competitive edge for firms (e.g. Weerawardena & McColl-Kennedy, 2002). Lastly, the commercialization capability is known to be critical for firms in highly competitive markets, such as the telecommunications market, because it emphasizes the improvement in the relationship with customers, leveraging technology and marketing, reading markets to pursuit innovation, gaining a market-oriented vision and value (Ha, 2010), and represents the capacity to industrialize innovation.

Service system innovation has been studied in relation to competitiveness (Alter, 2008). However, most of the studies examining the relationship between service system innovation and competitiveness have been in western countries, such as the USA (Suciu, & Borza, 2010; Reguia, 2014), and in Asian countries (Noorani, 2014). Thus, there seems to be a paucity of literature examining these two variables in the Nigerian context. More so, research focusing on service system innovation and competitiveness in the telecommunications sector is rare, especially in emerging economies such as Nigeria. Even when service innovation is discussed, it is usually not from a system perspective (Steven, 2008). Based on this gap in the literature, this study examines the relationship between service system innovation and the competitiveness of mobile telecommunications firms in Nigeria. Furthermore, it investigates the role of managerial competencies in the relationship between service system innovation and competitiveness.

Literature Review and Hypotheses Development

Theoretical Background

This study draws its theoretical backing from the dynamic capabilities theory (DCT) as proposed by Teece, Pisano and Shuen (1997). The capability-based approach of competitive strategy underpins the concepts of service system innovation, managerial competencies and competitiveness. According to the DCT, an organization's competitive advantage comes from its capacity to effectively leverage or utilize company assets (Teece, Pisano & Shuen, 1997), rather than accruing a stock of resources, such as physical, human, or knowledge assets (Amit & Schoemaker, 1993; Akpan, Johnny, & Sylva, 2022). Superior competitiveness, according to the dynamic capabilities theory, comes from the firm's capacity to deploy valuable assets in its operations. In fact, the ability to innovate is amongst the most important capabilities used by organizations to deliver exceptional value to consumers, and achieve a competitive edge (Lawson & Samson, 2001).

The dynamic capabilities theory is a key baseline theory for service system innovation and organizational competitiveness (Ezenwakwelu, et al., 2021). The theory suggests that an organization must be able to adapt to changes in the environment, seize new opportunities, and transform its resources and capabilities to maintain a competitive advantage (Akpan, et al., 2022; Teece, 2018).

The dynamic capabilities theory identifies three key types of capabilities that are critical for organizations to innovate effectively: sensing capabilities, seizing capabilities, and transforming capabilities (Ezenwakwelu, et al., 2021). Sensing capabilities involve an organization's ability to identify changes in the environment, such as shifts in customer needs or emerging technologies. Seizing capabilities involve an organization's ability to take advantage of new opportunities and leverage its resources to create value for its customers. Transforming capabilities involve an organization's ability to reconfigure its resources and capabilities to meet new challenges and pursue new opportunities.

In the context of service system innovation, the dynamic capabilities theory suggests that organizations must be able to sense changes in their customers' needs and preferences, seize new opportunities to create value through service innovation, and transform their service delivery systems to meet new demands and challenges (Akpan, et al., 2022). This enables organizations to maintain a competitive advantage by continuously adapting to changes in the environment and creating value for customers. Organizations that prioritize service system innovation and develop dynamic capabilities can benefit from increased competitiveness, service delivery, service quality and cost minimization (Alves, et al., 2017). By continuously adapting to changes in the environment, organizations can stay ahead of the competition and maintain their market position (Ezenwakwelu, et al., 2021).

A telecommunication firm that develops new sensing capabilities, to identify emerging technologies, seizing capabilities to invest in new products and services, and transforming capabilities to integrate these products and services into its existing systems, can maintain its competitiveness and market position. The dynamic capabilities theory provides a valuable framework for organizations to develop and maintain a culture of innovation and adaptability, enabling them to respond to changes in the environment and maintain a competitive advantage through service system innovation (Ezenwakwelu, et al., 2021).

Service System Innovation

Services are acts performed by one entity for another, including the provision of resources that another entity will use (Lovelock, Vandermerwe, Lewis, & Fernie, 2016). Traditionally, it is quite difficult to define services. The challenge arises from the belief that many

inputs and outputs are intangible, making the process of creating and delivering services to clients difficult to understand. It is a lot easier to define products since their inputs are mostly tangible and they pass through a defined manufacturing process. However, defining services can be elusive and controversial. However, a service, according to Lovelock et al. (2016), is an act or performance provided by one person to another. Services are economic activities that produce value and offer advantages for consumers at certain times and locations, in order to effect a desired change in – or on behalf of – the service receiver (Omar, Nazri, Alam & Ahmad, 2016). According to Lusch and Nambisan (2015), service system innovation is the process of "the rebundling of resources that create novel resources that are beneficial to some actors in a given context." (p. 161). It is a mix of technological innovation, business model innovation, socio-organizational advancement, and market innovation to improve current or develop new service value offerings (offerings or experiences) and service systems (Campbell & Park, 2016; Akpan, Al-Faryan & Iromaka, 2022). In addition, service system innovation refers to the enhancement of service systems.

Competitiveness

Organizational competitiveness is a complex and multifaceted concept that involves various factors such as innovation, operational efficiency, strategic management, and employee skills and knowledge (Zuñiga-Collazos, Castillo-Palacio, Padilla-Delgado, 2019). Organizations that are able to excel in these areas are more likely to be successful and maintain a competitive advantage in their industry or market (Camison & Fores, 2015).

Organizational competitiveness is the ability of an organization to create and sustain a competitive advantage in its industry or market. It is a critical factor for success in today's rapidly changing business environment (Zhu & Cheung, 2017). As asserted by Campbell and Park (2016), a company's competitiveness is its economic strength in the global marketplace, where goods, services, individuals, and inventions flow freely regardless of geographical barriers. In today's volatile business environment, every business strives to achieve a competitive advantage. A company's competitive edge is its capacity to manufacture and deliver high-quality goods and services at a low cost (Ying, Hassan, & Ahmad, 2019).

Organizational competitiveness has been studied extensively in the literature, and there are various factors that have been identified as contributing to it (Kotler & Armstrong, 2013; Campbell & Park, 2016; Zuñiga-Collazos, et al., 2019). One key factor in organizational competitiveness is innovation (Berumen, 2006). Organizations that are able to develop and introduce new products, services, and business models that create value for customers are more likely to be successful and maintain a competitive advantage (Berumen, 2006). Another factor in organizational competitiveness is operational efficiency.

Organizations that are able to produce goods or deliver services more efficiently and at a lower cost than their competitors are more likely to be successful (Eisenhardt & Martin, 2000).

Strategic management is also an important factor in organizational competitiveness. Organizations that are able to develop and execute effective strategies to achieve their goals and objectives are more likely to be successful (Zuñiga-Collazos, et al., 2019). Employee skills and knowledge are also key factors in organizational competitiveness. Organizations that invest in the training and development of their employees are more likely to have a skilled and knowledgeable workforce that can drive innovation and operational efficiency.

The Nigerian telecommunications industry is a highly competitive sector, with a number of players vying for market share (Ezenwakwelu, et al., 2021). The industry has experienced significant growth over the past decade, with mobile phone penetration increasing from less than 10 percent in 2005 to over 70 percent in 2020, according to data from the Nigerian Communications Commission. The sector is also undergoing a rapid transformation, with the emergence of new technologies such as 4G and 5G networks, and the increasing demand for data services. Organizational competitiveness is a critical factor for success in the Nigerian telecommunications industry. Telecommunications companies that are able to innovate, provide high-quality network coverage and services, offer excellent customer service, manage costs effectively, and build a strong brand image are more likely to be successful in this highly competitive market.

Idea Development and Competitiveness

The activity of carefully gathering business ideas, with the goal of identifying essential concepts with impacts that provide both concrete and intangible advantages for an organization, is known as idea development. Idea creation is a systematic method of producing, recording, debating, enhancing, organizing, assessing, and prioritizing useful insights or creative thinking that would not have surfaced otherwise through conventional procedures (Alexe, et al., 2014). Several studies uphold that idea development is central to the achievement of a competitive advantage. Specifically, Roberts and Amit (2003) investigated the effect of innovative activities, such as idea management and service development, on competitive advantage in the Australian banking sector, and found that idea management contributes positively to the competitiveness of the banking sector. Thus, it is hypothesized that:

H_1: There is a significant relationship between idea development and competitiveness.

Service Development and Competitiveness

The end-to-end process of creating and releasing a new service to be offered to customers is service development. Market research, service planning, customer experience, marketing, operations, and the introduction of a new service are typical examples of service development (Spacey, 2017). In the service sector, innovation in the form of service development refers to a certain form of change in service characteristics, or the introduction of new service characteristics (Gallouj & Weinstein, 1997). This helps to overcome the materialistic and technological bias that has plagued much of the research into service innovation (Gallouj & Savona, 2009).

Roberts and Amit (2003) found that service development positively and significantly influences the competitive advantage of commercial banks in Australia. This is in agreement with the findings of Weerawardena and McColl-Kennedy (2002), who found that new service development propels the competitive advantage. In line with the above review, it is hypothesized that:

H_2: There is a significant relationship between service development and competitiveness.

Commercialization and Competitiveness

Commercialization includes all innovative activities in the marketing of ideas elicited from research and development (R&D), service development through ripened ideas, prototype processes and the development of new processes. This includes steps to improve the existing service processes using innovative technologies, and sales and marketing by developing new products and services (Li, 2012; Seo, Kim & Choi, 2015). Studies have shown that commercialization is positively correlated with competitiveness (Friedrichsen, Zarea, Tayebi, & Abad, 2017). Also, Seo, Kim and Choi (2015) observed that Korean SMEs with high commercialization capabilities continuously perform better than all their contemporaries. Hence, it was hypothesized that:

H_3: There is a significant relationship between commercialization and competitiveness.

Managerial Competencies, Service System Innovation and Competitiveness

Managerial competencies refer to a combination of knowledge, skills and other attitudes possessed by management that are required to carry out a successful business (Hawi, Alkhodary & Hashem, 2015). Asumeng (2014) asserted that this knowledge and skills are the behavioral attitudes that most frequently predict success, and every business that is think-

ing strategically and pursuing prosperity should take this behavior into consideration. Therefore, managerial competencies are critical for effective leadership and management.

Managerial competencies, such as strategic thinking, are needed by managers to be able to think strategically, envision long-term goals and plan ways to achieve them (Bhardwaj, 2013). This involves being able to analyze complex situations, identify opportunities and threats, and make decisions that are aligned with the organization's goals. Managers need to have a broad range of knowledge, skills, and abilities to succeed in today's complex and dynamic business environment (Hawi, et al., 2015). By developing and mastering these competencies, managers can drive service system innovation and organizational competitiveness.

Managerial competencies are critical for service innovation and organizational competitiveness since they can drive innovation by enabling managers to identify new opportunities, develop new products and services, and improve existing processes (Szczepańska-Woszczyna & Dacko-Pikiewicz, 2014). A manager with strong decision-making skills, for example, can identify gaps in the market and develop new offerings to meet customer needs. Further, managerial competencies can enable organizations to adapt to changing market conditions and customer needs (Mumford et al. 2002). Managers with strong change management skills can lead their teams through transitions, implement new processes, and ensure the organization remains competitive (Szczepańska-Woszczyna & Dacko-Pikiewicz, 2014). In addition, managerial competencies can enable organizations to deliver high-quality customer service by ensuring that managers understand customer needs and have the skills needed to manage customer relationships effectively (Mumford et al. 2002).

Flowing from the above discussion, knowledgeable and experienced managers are better equipped to make critical decisions about which innovative tactics to pursue. This influences the firm's competitiveness, which is in line with the assertion of Boyatzis et al. (2007) that managerial competency is particularly relevant to business organizations because it amplifies the competitive advantage through innovation. Therefore, it was proposed that:

> **H_{4a-c}:** Managerial competencies significantly moderate the relationship between service system innovation and competitiveness.

The research model for this study is shown below in Figure 1.

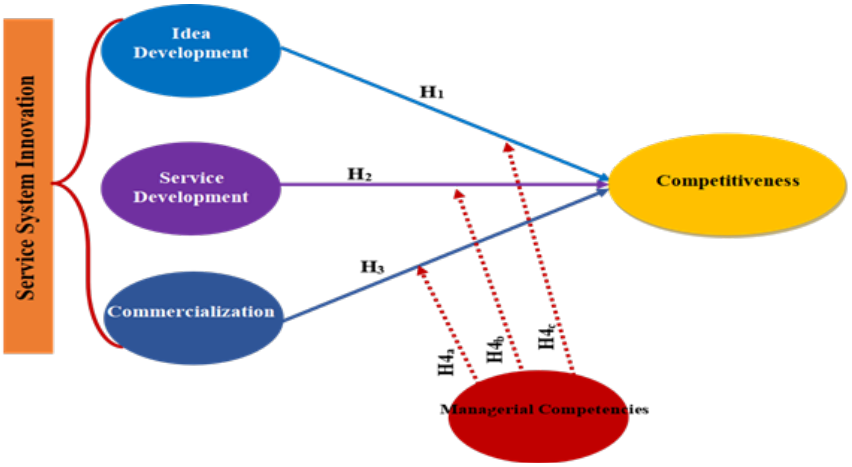

Figure 1. Research Model, 2021.

Methodology

This study adopted a cross-sectional design. This research design was used since the study was concerned with the examination of the relationship between service system innovation and competitiveness, as well as the interactive effect of managerial competencies on service system innovation and competitiveness. Also, this design was adopted since data from the study's respondents were collected at a specific point in time (Onwuegbuzie & Collins, 2007; Lau, 2017).

The management teams and customer service representatives of the four main telecommunications companies in Nigeria made up the study's sample. To get consent to disseminate the survey instrument, these companies' public relations and human resources departments were contacted for permission. Although the request faced significant opposition at first, with some of the branches referring us to their corporate headquarters in Lagos for approval, it was eventually approved after many assurances from us. The survey was distributed to the 451 respondents via Google Forms. A total of 231 people responded, representing a return rate of 51.1 percent. Based on the standards set by Fincham (2008), the return rate was acceptable.

Operational Measures of Variables

Service system innovation was the study's independent variable. Idea development, service development, and commercialization were adopted as dimensions of service system innovation. An 18-item scale was used to describe the three dimensions of service system innovation. These items were adopted from Froehle and Roth (2007), and Mahmood, et al. (2014) and included items such as "we develop both formal and informal methods of evaluating new service ideas; new service initiatives are encouraged and applauded; and

we adopt innovative means to deliver our services to our customers." Competitiveness served as the dependent variable and was measured with eight statement items such as "we offer services that are highly reliable; we offer high quality products to customers; and our service charges are comparatively lower than those of our rivals," which were adopted from Sachitra (2016), and Ismail (2013). Lastly, the moderating variable for this study was managerial competencies and this was measured using seven items such as "management effectively administers relevant tasks and functions." These items were adopted from Paylou and El Sawy (2011). The statement items were modified to fit the mobile telecommunications firms, and anchored on a 5-point Likert scale.

Data Analysis and Results

Descriptive Statistics

The demographic information for the respondents is displayed in Table 1 below. According to their gender characteristics, there were more female respondents. The 125 female respondents and 106 male respondents total 53.9 and 46.1 percent, respectively.

Table 1. Analysis of demographic profiles of respondents

Variable	**Item**	**Frequency**	**Percent**
Gender	Male	106	46.1
	Female	125	53.9
	Total	**231**	**100**
Marital Status	Married	137	59.6
	Single	94	40.4
	Total	**231**	**100**
Age	18-35	102	44.4
	36-50	84	36.5
	51- Above	45	19.1
	Total	**231**	**100**
Years of work experience	0-5	68	29.6
	6-10	122	53.0
	11-15	34	14.3
	16-20	7	3.1
	Total	**231**	**100**
Highest level of educational attainment	0'level	5	2.2
	OND/NCE	44	19.1
	HND/B.Sc	110	47.4
	MBA/M.Sc	69	30.0

	DBA/Ph.D	3	1.3
	Total	**231**	**100**

Source: Field Data, 2021.

According to their marital status, 94 (40.4 percent) of the participants were single whereas 137 (59.6 percent) of them were married. As for their work history, the majority (122) of the respondents had worked for their companies for 6 to 10 years (53.0 percent), with 0 to 5 years coming in second (29.6 percent). For the remainder, 14.3 percent of them had worked for 11 to 15 years, with seven (3.1 percent) of the respondents working for 16 to 20 years. For their educational qualifications, 2.2 percent of the respondents attained O'level, 19.1 percent had an ordinary diploma or National Certificate in Education, 47.4 percent had a higher national diploma or bachelor's degree, 30 percent had a master's degree, while 1.3 percent had a doctorate. This reveals that the majority of the respondents were well educated. This might be a result of the rapid technological adoption by telecommunications firms. As a result, only the best candidates are hired (Ezenwakwelu, Akpan, & Ogbogu-Asogwa, 2021).

Model Specification and Assessment using PLS-SEM

The partial least squares - structural equation modeling (PLS-SEM) was deployed to assess the research model. This involved two steps (Ringle et al., 2015). First, the measurement model was examined, and then the structural model was assessed. The conceptual framework of this study is depicted in Figure 2.

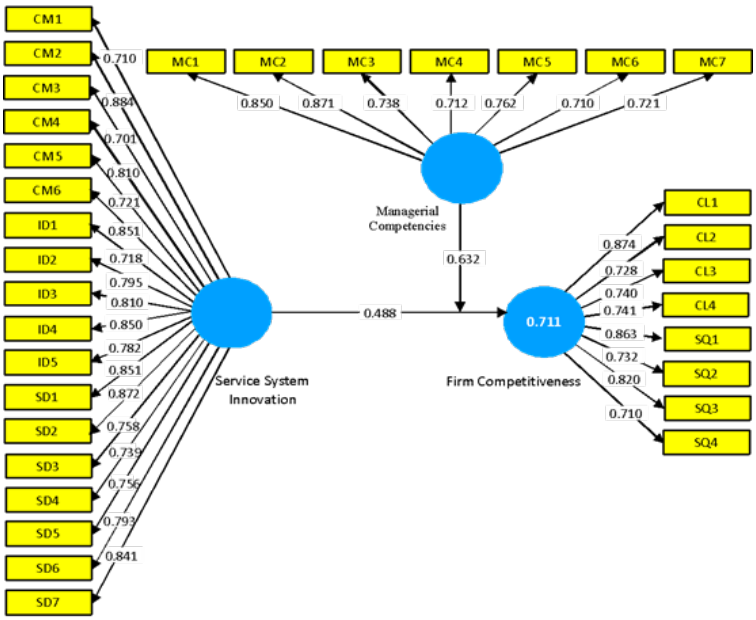

Figure 2. Assessing the Measurement Model

The factor loadings illustrated the correlation between the constructs and their respective latent variables, whereas the inner model displayed the structural relationships between the constructs. The components of the predictor variable were idea development (ID1-ID5), service development (SD1-SD7), and commercialization (CM1-CM6) (service system innovation). The criteria variable was competitiveness (COM1-COM8), and the moderator was managerial competencies (MC1-MC7).

Using factor loadings, indicator reliability, and the average variance extracted, the measurement model illustrated the validity and reliability of the constructs. All of the components for idea development, service development, and commercialization exhibited appropriate levels of factor loadings above 0.70, according to Figure 2. Similarly, factor loadings for managerial competencies and competitiveness were above the acceptable benchmark (Hulland, 1999).

Table 2. Factor Loadings, Reliabilities and AVEs for all the items listed in the new model

Latent Variables	Indicators	Covergent Validity			Internal Consistency/Reliability	
		Loadings >0.70	Indicator Reliability >0.50	AVE >0.50	Composite Reliability (Pc) >0.70	Cronbach Alpha (CA) 0.70-0.90
ID	ID1	0.718	0.516	0.628	0.894	0.771
	ID2	0.795	0.632			
	ID3	0.810	0.656			
	ID4	0.850	0.723			
	ID5	0.782	0.612			
SD	SD1	0.851	0.724	0.645	0.927	0.803
	SD2	0.872	0.760			
	SD3	0.758	0.575			
	SD4	0.739	0.546			
	SD5	0.756	0.572			
	SD6	0.793	0.629			
	SD7	0.841	0.707			
CM	CM1	0.710	0.504	0.599	0.912	0.789
	CM2	0.884	0.781			
	CM3	0.701	0.491			
	CM4	0.810	0.656			
	CM5	0.721	0.520			
	CM6	0.851	0.724			
	CM7	0.718	0.516			
COM	COM1	0.874	0.764			
	COM2	0.728	0.530			
	COM3	0.740	0.548			
	COM4	0.741	0.549			

	COM5	0.863	0.745	0.606	0.924	0.801
	COM6	0.732	0.536			
	COM7	0.820	0.672			
	COM8	0.710	0.504			
MC	MC1	0.850	0.723			
	MC2	0.871	0.759			
	MC3	0.738	0.545			
	MC4	0.712	0.507	0.591	0.910	0.787
	MC5	0.762	0.581			
	MC6	0.710	0.504			
	MC7	0.721	0.520			

Note: *ID=Idea Generation, SD=Service Development, CM=Commercialization, COM=Competitiveness, MC=Managerial Competence.*

Source: SmartPLS 3.2.7 output on research data, 2021.

Measurements of the study instrument's convergent validity and reliability are shown in Table 2. Cronbach's alpha and composite reliability values were evaluated and the results were adequate. All the values were above the 0.7 acceptable criterion (Nunnally, 1978). Additionally, the indicator reliability (squared values of individual item factor loadings) met the 0.50 level. Additionally, the average variance taken from the data was used to determine the convergent validity (AVE). The convergent validity of the constructs was confirmed by having an AVE value of more than 0.5 for each of the constructs (Bagozzi & Yi, 1988).

Table 3. Discriminant validity - Fornell and Larcker Criterion

	AVE	ID	SD	CM	MC	COM
ID	0.628	**0.792**				
SD	0.645	0.275	**0.803**			
CM	0.599	0.360	0.422	**0.774**		
MC	0.591	0.418	0.334	0.235	**0.769**	
COM	0.606	0.515	0.518	0.392	0.483	**0.778**

Note: *ID=Idea Generation, SD=Service Development, CM=Commercialization, MC=Managerial Competence, COM=Competitiveness. The off-diagonal values are the correlations between latent variables, while the diagonal values (in bold) denote the square root of AVEs.*

Source: SmartPLS 3.2.7 output on research data, 2021.

Table 3 displays the results of the Fornell and Larcker (1981) criterion's assessment of the discriminant validity of the constructs. The discriminant validity of the latent variables was assessed by comparing the correlations of the latent constructs with the square roots of the AVE. This study's research instrument exhibited adequate discriminant valid-

ity, as shown by the square roots of the AVEs being greater than the correlations across the latent variables.

Test of Hypotheses

The hypotheses were tested using path coefficients (β) and the coefficients of determination or predictive accuracy (Geisser, 1975). Lastly, Cohen's f^2 was deployed to calculate the effect size of each path in the model (Cohen, 1988). The impact of an independent latent variable (LV) on a dependent latent variable was determined by the size of the effect. Exogenous LVs with levels of 0.020 to 0.150, 0.150 to 0.350, and over 0.350, respectively, had a small, medium, or significant impact on the endogenous LVs (Cohen, 1988). For the path coefficient, weak, moderate, and strong correlations were defined as path coefficients between 0.10 and 0.029, 0.30 and 0.49, and 0.50 and 1.0, respectively (Cohen, 1988). In a two-tailed test, t values greater than 1.96 were significant, and t values less than 1.96 were non-significant (Hair et al., 2017).

The first three hypotheses are re-stated below:

H_1: There is a significant relationship between idea development and competitiveness.

H_2: There is a significant relationship between service development and competitiveness.

H_3: There is a significant relationship between commercialization and competitiveness.

The results of the testing of hypotheses are shown in Figure 3, and tables 4 and 5 below:

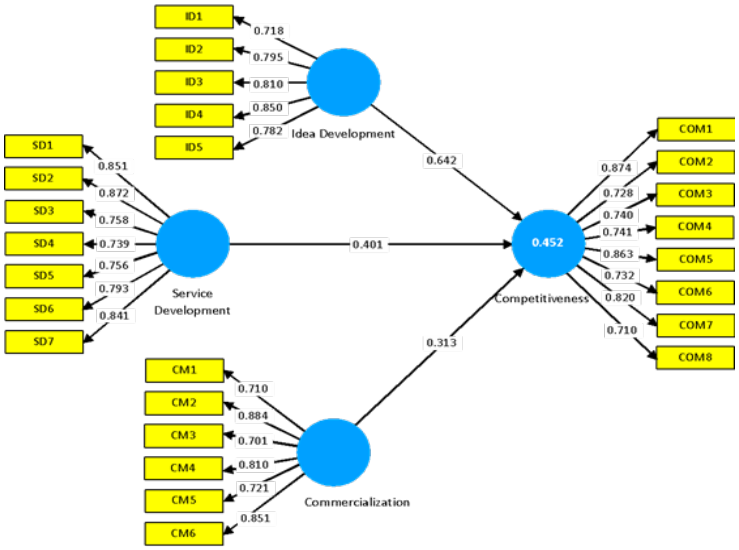

Figure 3. Path coefficient of latent variables (main effects) ID, SD, CM and COM

Table 4. Results of Hypotheses Testing

Hypotheses	Path coefficient	Standard error	T. value	P. value	Decision
ID → COM	0.612	0.087	7.225	0.001	Supported
SD → COM	0.400	0.058	7.765	0.001	Supported
CM → COM	0.310	0.066	6.462	0.000	Supported

Note: *ID=Idea Generation, SD=Service Development, CM=Commercialization, MC=Managerial Competence, COM=Competitiveness. T-Statistics greater than 1.96 at 0.05 level of significance.*

Source: SmartPLS 3.2.7 output on research data, 2021.

Table 4 shows significant relationships between idea development and competitiveness ($\beta = 0.612$; $t = 7.225$; $p < 0.001$), service development and competitiveness ($\beta = 0.400$; $t = 7.765$; $p < 0.001$), and commercialization and competitiveness ($\beta = 0.310$; $t = 6.462$; $p < 0.000$). As a result, the hypotheses were accepted. With values of 0.02, 0.15, and 0.35, Table 5 shows the effect sizes of idea development, service development, and commercialization on competitiveness (endogenous constructs). Small, medium, and large effects were represented by these values, accordingly (Cohen, 1988; Hair et al., 2017).

Table 5. Effect sizes (f^2)

Paths	**f^2**	**Effect Size**
ID → COM	0.19	Medium
SD → COM	0.35	Large
CM → COM	0.16	Medium

Note: *ID=Idea Generation, SD=Service Development, CM=Commercialization, MC=Managerial Competence, COM=Competitiveness. Effect size (f^2) of 0.02 = small; 0.15 = medium, while 0.35 = large effect.*

Table 5 demonstrates that, with an f value of 0.35, service development had the largest impact on the competitiveness of mobile telecommunications companies. With a score of 0.19, idea development had a moderate impact on competitiveness, whereas commercialization had the least significance, but still had a moderate impact.

Test of Hypothesis Four

H_4: Managerial competencies significantly moderate the relationship between service system innovation and competitiveness.

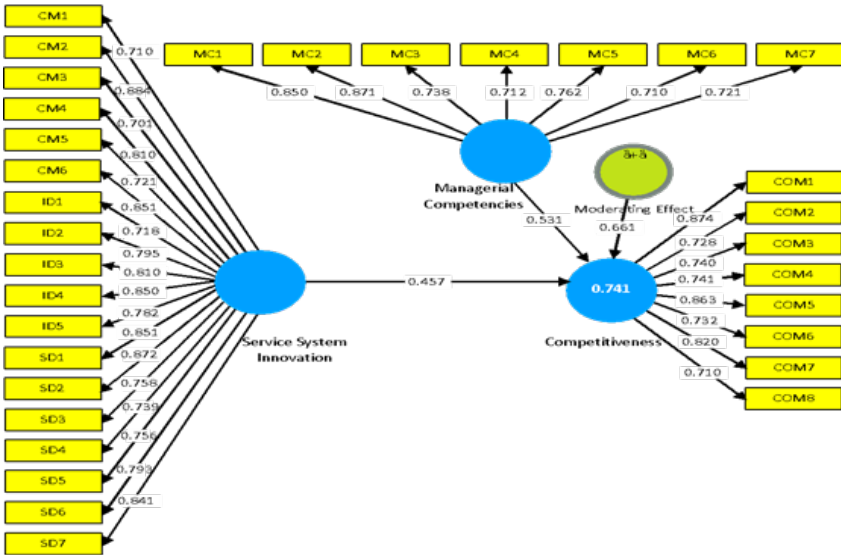

Figure 4. Test of Hypothesis Four

Table 6. Moderating Effect of Managerial Competencies

Paths	B		t-values	P. Values	Decision
SSI -> COM	0.477		8.725	0.000	Supported
MC -> COM	0.534		10.255	0.002	Supported
Mod. Eff. 1 -> COM	0.641		13.141	0.000	Supported

Note: *ID=Idea Generation, SD=Service Development, CM=Commercialization, MC=Managerial Competence, COM=Competitiveness. T-Statistics greater than 1.96 at 0.05 level of significance.*

Source: SmartPLS 3.2.7 Output, 2021.

Figure 4 and Table 6 show the moderating effect of managerial competencies on the relationship between service system innovation and competitiveness. Based on the guidelines of Hair et al. (2017), the managerial competencies moderating variable was linked structurally to the dependent variable, competitiveness. An observation of Table 6 shows a positive significant relationship between service system innovation and competitiveness ($\beta = 0.457$, $t = 8.625$, p-value < 0.05). However, the introduction of managerial competencies, "the moderating effect 1 –> Comp," boosted the relationship ($\beta = 0.662$, $t = 11.241$, $p < 0.05$). Hence, the null hypothesis that managerial competencies do not significantly moderate the relationship between service system innovation and competitiveness was rejected, and its alternative accepted.

Discussions, Conclusion and Recommendation

This study adopted a cross sectional design to examine the empirical link between service system innovation and the competitiveness of mobile telecommunications firms in

Nigeria. The study also considered the moderating role of managerial competencies on the correlation between service system innovation and competitiveness. Data were collected from 230 participants from four mobile telecommunications firms in Nigeria. The main finding of this study is that higher levels of service system innovation are associated with an improvement in the competitiveness of the mobile telecommunications firms in Nigeria. Specifically: (1) an increase in idea development is associated with the improved competitiveness of telecommunications firms in Nigeria; (2) when telecommunications firms develop new services, they become more competitive; (3) an increase in commercialization translates to an improvement in the competitiveness of telecommunications firms in Nigeria; (4) managerial competencies positively moderate the relationship between service system innovation and competitiveness.

The finding that service system innovation promotes competitiveness is consistent with the submission of Littunen, Tohmo, and Storhammar (2021) among others. Specifically, Alexe, Alexe and Militaru (2014) found that idea development is important in the achievement of organizational goals through the provision of useful ideas, solving service problems, and opening new opportunities, thus ensuring the achievement of a competitive edge. The finding is also in tandem with the findings of Khaled and Hadia (2014), who asserted that, without new ideas, an organization stagnates, abates and finally is ousted by competitors who have novel and better ideas. Similarly, Weerawardena and McColl-Kennedy (2002) established that the provision of novel and improved services gives organizations a competitive advantage. Lastly, Ha (2010) submits that commercialization capability is critical for firms in highly competitive markets, such as the telecommunications market, since it emphasizes the improvement of relationships with customers, and the adoption of better technology.

Moreover, managerial competencies were found to significantly improve the relationship between service system innovation and competitiveness. This finding resonates with Boyatzis et al. (2007), who submit that managerial competency is particularly relevant to a business organization because it amplifies the competitive advantage facet of organizational performance.

Overall, the study emphasizes that managers ought to put in place mechanisms to develop and commercialize ideas and services, in order to harvest higher levels of competitiveness. Moreover, the study pinpoints to managers of telecommunications firms that they stand to gain a more competitive edge providing they grow managerial competencies alongside service system innovations.

Thus, the study recommends that the mobile telecommunications firms should adopt several sources for generating novel ideas and utilize such ideas to develop better quality services. Also, the mobile telecommunications firms should encourage employees

to suggest new ways of satisfying their customers. Similarly, mobile telecommunications firms should frequently analyze the market in order to know the expectations of their customers and adopt innovative means of satisfying the needs of the customers. Lastly, there should be continuous developmental programs for all employees, especially those at the managerial level.

Limitations and Suggestions for Further Studies

The study was not without a few limitations. First, the study focused only on mobile telecommunications firms. However, it is advised that subsequent studies should concentrate on other sectors of the economy, such as banking and manufacturing, since these sectors are highly competitive with frequent changes to the technology they employ, hence making service system innovation the key to their success. Secondly, data were collected from 230 participants. However, a bootstrap approach was used to reduce the influence of the small sample size (with a bootstrap sample of 5,000). Despite this, it is suggested that future studies should expand and increase the size of the sample.

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Appendix

Section A

Personal Data:

1. Name of organisation…….
2. Gender: Male ☐ Female ☐
3. Age: 20-35 Years ☐ 36-50 Years ☐ 51 Years and above ☐
4. Marital status: Single ☐ Married ☐
5. Educational Qualification: WAEC-OND ☐ HND/B.Sc ☐
   M.Sc and above ☐
6. Position in the organisation ……
7. Work Experience 0-10 Years ☐ 11-20 Years ☐ 21- 30 years ☐
   31-50 Years ☐ 51 Years and above ☐

Section B

Service System Innovation (SSI) Construct

This questionnaire is desired to gather information on the level of service system innovation in your firm. Kindly, indicate the extent to which you agree or disagree that the statement reflects the situation in your organisation.

(5 = Strongly agree, 4 = Agree, 3 = Undecided, 2 = Disagree, 1 = Strongly disagree)

SERVICE SYSTEM INNOVATION						
	Idea Generation	**1**	**2**	**3**	**4**	**5**
1	We cultivate and utilize a variety of sources for new ideas					
2	We develop both formal and informal methods of generating innovative service ideas					
3	We develop both formal and informal methods of evaluating new service ideas					
4	We establish and maintain good communication with suppliers, partners, and customers as potential sources of new ideas and enhanced market insight					
5	We encourage the sharing of ideas and knowledge across functional boundaries within the organisation					
	Service Development	**1**	**2**	**3**	**4**	**5**
1	We actively consider ideas and suggestions from employees for new service and improvements of old services					
2	New services initiatives are encouraged and applauded					
3	Our staff members are motivated to support the firm's new service development efforts					
4	Our functional areas or departments are involved in developing new services					

5	The IT systems used by those developing new services are compatible and reliable					
6	We maintain back-office and administrative IT systems that support the firm's new service development efforts					
7	Our employees are able to work effectively in cross-functional teams to design new services					
	Commercialization	**1**	**2**	**3**	**4**	**5**
1	We frequently conduct market analysis to know changes in customers' needs					
2	We adopt innovative means to deliver our services to our customers					
3	We strongly adhere to our commercialization schedule and commitment to formal post-launch reviews					
4	We use joint venturing and other novel marketing methods to commercialize our innovations					
5	We effectively monitoring our environment to know the trending marketing strategies					
6	Our delivery time is dependable					

Section C

Organisational Competitiveness (CA) Construct

Please tick one choice for each of the following statements as it is applicable to your organisation.

(5 = Strongly agree, 4 = Agree, 3 = Undecided, 2 = Disagree, 1 = Strongly disagree)

	Organisational Competitiveness	**1**	**2**	**3**	**4**	**5**
1	Our subscription charges are low in comparison to our competitors					
2	Our service charges are comparatively lower than our rivals					
3	Our total service cost has reduced over the past three years					
4	Our firm has the ability to compete against the major competitors based on low price.					
5	Our firm complete services are based on quality specified					
6	We offer services that are highly reliable					
7	We offer services that are very flexible					
8	We offer high quality services to customers					

Section D

Managerial Competencies (MC) Construct

Please tick one choice for each of the following statements as it is applicable to your organisation.

(1 = strongly disagree, 2 = disagree, 3 = nor disagree nor agree, 4 =agree, 5 = strongly agree)

	Managerial Competencies	**1**	**2**	**3**	**4**	**5**
1	Managers and other personnel have useful skills					
2	Managers and other personnel have skills that cover specific needs					
3	Managers are frequently trained to enhance their skills					
4	Skills are acquired to learn the various systems uses					
5	Our managers have the required skills to effectively monitor the progress of the organisation					
6	Management effectively administers relevant tasks and functions					
7	Our managers are actively involved in activities at all organisational level					