

VALUE CO-CREATION PRACTICES AND PERFORMANCE OF TECHNOLOGY ENTERPRISES IN NIGERIA

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ABSTRACT

This article contributes to the industrial literature on the empirical analysis of the influence of value co-creation practices on the performance (sales turnover) of technology enterprises in Nigeria. A quantitative analysis based on a sample of 318 technology enterprises using purposive and snowball sampling techniques was carried out across the country with a record of 67% response rate. The results of the study indicated that only 53% of the enterprises had involved in value co-creation. The influence factors for value co-creation practices among technology enterprises are customers' cooperation and participation ($\beta = 0.206$, $\rho \leq 0.01$), technological drive ($\beta = 0.351$, $\rho \leq 0.01$); and firm's resources ($\beta = 0.705$, $\rho \leq 0.01$). The competitive growth of the technology enterprises was influenced by 78.6% of the factors considered in this study (R2-value of 0.786). Moreover, the value co-creation practices positively and significantly ($F = 105.580$, $\rho \leq 0.01$) influenced the sales turnover levels of the selected enterprises. From the analyses, the paper concluded that the value co-creation practices of the enterprises improved their performance and benefit their customers. This study not only enriches and expands research on value co-creation practices of technology enterprises but also has practical significance on sustainable development of industrial sector in Nigeria.

Key words: Value Co-Creation, Practices, Technology Enterprises, Industrial Development, Performance

INTRODUCTION

Technology enterprises are high-potential, knowledge-intensive with innovative skills for profitable opportunities and rapid growth. In both developed and developing economies, technology enterprises are normally founded by highly-educated and skilled entrepreneurs who are driven by sustainable economic progress. These knowledge-based enterprises exploit technological innovations which are important to all economies irrespective of the levels of development. This form of enterprises involves design, development, production, engineering and commercialisation of innovative products, processes and services. The enterprises ensure that economies remain dynamic, balanced, innovative and competitive for inclusive and sustainable development of nations (Oladele et al., 2022). Technology enterprises also remain a major sources of government funds for the provision of social amenities. Technology enterprises range from agro-based firms such as crop processing, feed-milling/formulation, fish production and processing. Art and culture enterprises are another form of technology-based enterprises which include AutoCAD design, digital printing/multimedia publishing, photoshop services, fashion designing, leatherworks (shoe and bag making), knitting, interior decorations, screen printing, digital photography and graphics. Another form of technology enterprises is known as metal construction which include metal fabrication, machining, welding and vehicle diagnosis. Technology enterprises are also formed in information and communication technologies (ICTs)

which are software development, digital marketing, website designing, software engineering and networking, hardware engineering, computer embedded system as well as internet-of-thing. Other category of technology enterprises is the processing and manufacturing of food, table water, paint, bioethanol, soap, detergent and cream, renewable energy, waste recycling; and glass blowing. All the categories of technology enterprises are required for food security, health care, communication skills as well as consumers' shelter prominent for sustainable development in a nation.

In recent years, technology enterprises have increased in number due to various factors such as technological drive, firms' resources as well as customers' involvements and contributions entrenched in value co-creation practices. Value co-creation also known as company-customer interactions is the firms' practices of collaborating with stakeholders especially the customers for designing, developing and deploying of the company's products and services. In the global industrial competitiveness, industries are changing from firm-level into customer-level to review marketing approaches in order to favourably compete as well as optimise their profits. Value co-creation practices are the acts of collaborative innovations with other experts such as customers, business partners, suppliers, researchers, competitors through which new products, processes, services, solutions and concepts are developed for improvement of economic performance. Customers play crucial roles in value co-creation for producing value, innovation and improved services usually driven by market competitions and the balance between resources and cost. The success of value co-creation depends largely on number of experienced stakeholders in the practices usually driven by customers' experiences and evaluations. The propensity for value co-creation practices and innovations among technology enterprises is usually driven by market competition which has guided individuals to exhibit their entrepreneurial potentials in collaborative and innovative conducts. Value co-creation practices have also attracted the attentions of scholars. Consequently, this paper examines the value co-creation practices among technology enterprises in Nigeria. This is with a view to making policy suggestions that can assist technology entrepreneurs to build their enterprises for improved customer-focused products and services, reduction of unemployment level for enhanced sustainable development in Nigeria. Other parts of the paper are organised as follows. Section two reviewed related literature about value co-creation, technology enterprises, factors influencing value co-creation viz customers' cooperation and participation, technological drive; and firms' resources. A conceptual framework on how value co-creation practices can affect competitive growth of enterprises is also presented in section two. In section three, the study presented the methodology adopted with survey research design used to achieve the objective of the study. Section four presented the results and discussions of the study. Sections five presented the conclusion while recommendations for improved performance of the enterprises is presented in section six.

LITERATURE REVIEW

Value co-creation

Value co-creation is an emerging business pattern that explains how customers can be involved as active participants in the design and development of products, services, and experiences (Hamidi et al., 2020). The involvement of customers in creating products and services is usually accomplished through innovation as they relate to use, value in the use as well as the notion that value can be determined only by the customers (Hamidi et al., 2020). In other words, value co-creation involves the interactive process in which an organization and customers work together to produce new products and services. Ma et al. (2019) stressed that value co-creation help firms to innovate and produce new products and processes as well as render new services that satisfy their customers. The goal of collaborative value co-creation is to promote the culture of sharing ideas to improve production of goods that generates value for customers (Raja & Yazdanifard, 2014; Dziewanowska & Kacprzak, 2020). Value co-creation involves external participations in the ideation and development processes for new ideas and business operations. The new idea creations can generate competitive advantage for firms over their competitors through development of products and services that address the demands of the customers.

The implementation of value co-creation has many implications on various functions in a firm, production methods, new product development, competitive advantage, marketing as well as customers' satisfaction (Payne et al., 2008; Yeboah et al., 2013). Value co-creation examines and harnesses information from customers and other key stakeholders in firms' production line to produce products and services that would better suit the needs of customers. Value co-creation therefore, brings about development of new products and services in a quicker, significant and innovative approach than old practices as the firms are willing to work with external stakeholders to reap new values from the collaboration with customers (Kim & Hall, 2019; Torfing & Sorensen, 2019; Jukić et al., 2019; Wiścicka-Fernando et al., 2019). Value co-creation has been identified as a factor for the future of new product and service development for companies to survive in the current unstable market (Maduka, 2016). The competitive market, competitive environment and shorter periods of competitive advantage product life cycles have made innovation through value co-creation a requirement for a firm to be successful. Innovation through value co-creation is crucial for firm's success in the current globalized market. The innovation generated through value co-creation could reduce the costs of production in the long run for the development and innovation of firms' products and services. Value co-creation as a form of marketing strategy for mutual firm-customer value is influenced by a number of factors.

Factors influencing value co-creation practices among technology enterprises

Several factors influencing value co-creation practices had been well discussed in a large body of research. For instance, (Rehman et al., 2021) enunciated that the customers' involvements in value co-creation practices are majorly measured by customers' loyalties and satisfactions. Yet, there have been dearth of literature on what factors motivate customers to engage in value co-creation practices among operators of technology enterprises which is being discussed in this section of the paper.

Customers' Involvements

Several literatures on customers' co-creation practices have shown that customers' involvements in the process can improve the performance of enterprises (Rehman et al., 2021; Solakis, 2022; Pathak et al., 2022). Customer engagement in value co-creation is one of the components or determinants of customer satisfaction (Zhang et al., 2015). Customers do engage with enterprises to share their experience and knowledge in order to satisfy their own needs and other customers' needs in the marketplace. From both academics and marketing practitioner perspectives, the involvement of customers in co-creation improves the quality of products, increases company sales, and decreases the risk associated with the product (Yen et al., 2020; Rehman et al., 2021). Enterprises can gain competitive advantage based on customer satisfaction on repeated experiences (Oyner & Korelina, 2016). Customers therefore do co-create for values with business organisations when they are ultimately motivated and satisfy their needs. According to (Solakis et al., 2022), customers also co-create with enterprises to drive innovations by kind motives. For value co-creation to exist, customers must be motivated to participate in the creation of new products and development of the enterprises. Such motivation of customers to participate in value co-creation is influenced by a number of factors. According to (Raja & Yazdanifard, 2014), opportunity motivates customers to collaborate with an enterprise to co-create value. Customers do actively engage in processes they perceive to have the major value to them. Moreover, self-seeking motives make customers to co-create for values with a firm where customers are basically self-motivated. The different reasons thought by customers reveal that most customers are self-motivated in value co-creation. This makes the process of co-creation easy to implement as most customers are self-motivated to help co-create. Consequently, the value co-creation process developed during the interaction between customers and firms have the opportunity to be dynamic and organised (Karmarkar & Roels, 2015; Khajeheian & Ebrahimi, 2020). The customer is involved in all stages of service development from the joint problem definition to collaborative problem-solving. Trends in research has therefore, emphasise the roles of customers and service providers in value co-creation (Khajeheian, 2019; Arbatani et al., 2020).

The technological drive/Digital innovation capabilities

Technology has engaged in the creation of innovative products and processes in harnessing customer resources. Emergence of the internet and its role in the rise of social networking sites (Facebook, Twitter, Myspace), customer generated content (videos, news, blogs, reviews, information), creation of freely distributed open-source content (software, massive online open learning) has bridged the distance between customers around the world. The rise of the World Wide Web and access to information has shifted the balance of bargaining power in favour of the customers. It has accelerated the open source and value co-creation movement. Technological advancements have become a driving force for facilitating the collaboration process for value creation (Buonincontri et al., 2017; Lu et al., 2019; Solakis et al., 2022). The infusion of technology into service delivery has delivered better opportunities for enterprises to implicitly engage and co-create experiences with customers (Wirtz et al., 2018).

The technological drive has made knowledge and information sharing much easier than previous (Kothari, 2013; Kumar & Petersen, 2013). Consequently, the number of consumers that do visit social websites for information on products' development has increased making value co-creation activity necessary for market competition (Martínez-Cañas et al., 2016; Ciasullo et

al., 2018; Sharafi et al., 2019; Hamidi et al., 2020). Value co-creation occurs in the form of a complex blend of people, technology, organizations and information through a complex interaction between service providers and customers (Pretorius, 2009; Wollenick, 2012). The technological drive of enterprises can influence their growth in new technologies, which provide capability to favourably compete and meet the customers' demands and expectations (Serviere-Munoz et al., 2013; Amadasun & Mutezo, 2022). Technology orientation has been suggested by (Singh et al., 2016); (Tang & Tang, 2016); (Amadasun & Mutezo, 2022) as a critical market strategic option for entrepreneurs based on the intense competition that many small and medium-scale enterprises (SMEs) face in the market environment. (Novani & Kijima, 2012) maintained that, as technology is being transferred, customers are ready to be supportive to share their experience with firms in their production line. Consequently, the production cost for new product development becomes lowered as the cost of obtaining new information becomes significantly reduced by innovations gained through value co-creation (Filiari, 2013; Osborne et al., 2016).

Firms' resources in value co-creation

Firm's resources are broadly divided into human capital, technological assets and marketing resources. The resources of the firm in form of physical and non-physical assets are designed, owned and controlled by the firm (Amit & Shoemaker, 2016; Ojo et al., 2023). The conversion of these assets into useful products and services involves technology applications, organizational culture and norms as well as value co-creation. Human capital includes the knowledge and skills possessed by individuals which are eventually transferred to business performance (Choi & Chang, 2020). Studies on entrepreneurship have revealed that human capital have positive effect on entrepreneurial and intrapreneurial performances of individuals (Dimov & Shepherd, 2005; Dada et al., 2021). Enterprises that possess higher human capital are better positioned to build resources and capabilities (Sisodia et al., 2021). Ruíz et al. (2017) posited that the degree to which a firm can develop and maintain her human capital affect the level of performance and value creation of the firm. Moreover, human capital increases employees' capabilities to exploit and discover business opportunities, which helps organization to identify and acquire useful beneficial resources (Ruíz et al., 2017). A range of skills which are required for innovation are basic, digital literacy as well as technical. Indeed, the knowledge economy have recognised some critical skills as intellectual capital valuable for entrepreneurial, innovative and value co-creation behaviours of individuals for business competitive advantage (Dada, 2019). Human capital contributes to the innovative and competitive performance of firms. Human capital remains the driving force for initiating business ideas, mobilizing human, financial and physical resources for establishing and expanding enterprises and creating jobs. Companies through value co-creation behaviours develop innovative new products and services in an increasingly complex world (Allen et al., 2009). Tangible resources of companies may complement customer capacities and skills through training and education and thus foastering value co-creation practices (Alves, 2013; Alves et al., 2016).

Technology Entrepreneurship

Technology entrepreneurship is a form of enterprise creation through introduction of a new technology in the form of a product, process or service (Dada et al., 2010; Dada, 2021). The importance of technology entrepreneurship on sustainable development has made the subject to

be attracted to industrial players, policy makers as well as the researchers (Mosey et al., 2017). Technology entrepreneurship is the interface between technological innovation and entrepreneurship (Beckman et al., 2012; Siyanbola, 2013; Dada et al., 2021). This form of entrepreneurship occurred as one of the most important way for competitive advantage in the common marketplace. The transition to new and knowledge-based economies in the 21st century was created by technology entrepreneurs (Dada, 2021, 2023). The development of new or improved products, processes or business systems through technology entrepreneurship and innovation can help the industrial sector to better satisfy consumer needs and explore new markets and competitions essential for firm survival. At the firm level, technology entrepreneurs contribute to technology development, market orientation, cost reduction and quality improvement for effective national and international markets. They create wealth, job opportunities and enhances prosperity of a nation through High Growth Firms (HGFs). As affirmed by (Du et al., 2013), (Mason & Brown, 2014), HGFs do not only directly create jobs, but also have important spill-over effects that are beneficial to the growth of other firms in the same locality to form industrial cluster. A technopreneur is therefore an important agent of innovation growth and technical progress who develops and utilize the technical and enterprise skills to create and grow potential enterprises (Dada et al., 2021). Technology entrepreneurs have the relevant skill set and can easily identify business opportunities. They possess characteristics such as innovativeness, risk-taking, creativity and personal exploits. These activities advance industrialisation and technological development of a nation by ensuring that the country produces a critical mass of well qualified technology entrepreneurs to spur national development through knowledge economy. Knowledge economy is a system of consumption and production that is based on intellectual capital and intangible assets such as proprietary technology. Intellectual capital or intangible assets are the soft skills and competencies that can be deployed to solving real problems. Knowledge economy does transform our employment landscapes by creating more technological enterprises for sustainable employment creations. The knowledge economy presents the current generation of young men and women with vast opportunities that is transforming the way things are done and has proven to be the way of the future (Dada, 2023).

The 21st Century Critical Skills and Technological Entrepreneurial Engagements

In the global economy, technological enterprises are developed from entrepreneurial and innovative skills through entrepreneurial propensity. Entrepreneurial skills are the knowledge and abilities to identify customer's needs, technical or market opportunities and exploit such opportunities. The world is changing rapidly towards 21st century digital era and many studies have been conducted on what knowledge and skills are required the most in a society especially young generations of the 21st century. The impact of entrepreneurial and 21st century critical skills have been recognised as one of the crucial factors that support younger generations (the genzers) to understand and foster entrepreneurial behaviours (Wang & Wong, 2004; Dada, 2021). The economic success in the 21st century requires creativity, innovation, communication, critical thinking, digital citizenship, information fluency and other importance of 21st century skills. The 21st century critical skills could help develop youths and unemployed graduates to acquire new skills and opportunity that would help them to create jobs and be self-reliant for possibility of becoming technological entrepreneurs. Technological entrepreneurs are persons with creative and innovative skills for technology enterprises that assure sustainable wealth creation and economic returns in a nation (Dada, 2019; Ghezzi et al., 2020; Dada et al., 2021).

The 21st century skills are more than technological literacy instead, they include proficiency in critical thinking, problem solving, communication and team work.

A consensus among scholars, business practitioners as well as policy makers is that 21st century critical skills especially among young people stimulate technology-based enterprises for growth and development as antidote to economic challenges in both developed and developing nations. Moreover, the success of economies requires the employment and effective use of critical mass of skilled individuals (Dada & Asaolu, 2023).

In the developing countries such as Nigeria, studies such as (Siyanbola et al., 2012); (Dada et al., 2021); (Obamuyi et al., 2022) had revealed that young entrepreneurs face challenges when searching for opportunities that can be turned into business opportunities. For young people, the shortages can be explained by the lack of 21st century critical skills. This may be due to less attentions being paid to 21st century critical skills among young generations despite many attempts to formulate tangible policies and programmes to support employment generation in the country (Dada, 2019). Effective youth entrepreneurial and critical skills in the 21st century can prepare the Genzers to become enterprising individuals or entrepreneurial thinkers who can contribute to sustainable economic development. Growing the productive engagements of people with creativity and innovation, critical thinking and problem solving as well as communication skills in the societies is crucial to a nation's growth and development. Entrepreneurial performance involves acceleration, generation, dissemination and application of creative and innovative ideas especially among the young people. In a study by (Dada, 2019) titled "Critical skills for 21st century: technological entrepreneurial and innovative conducts of fresh graduates in Lagos State, Nigeria", the outcome revealed that the nature of engaged technological enterprises by the responding young graduates in Lagos State were graphics design (78.12%), software development (72.91%), digital printing/multimedia publishing (68.46%), autoCAD design (67.22%), 3D – printing (62.78%) as well as food manufacturing (62.61%). Other graduates' enterprise engagements were aquaculture (60.82%), engineering fabrication (58.79%), photoshop services (56.26%), wood processing/furniture (56.05%), leather/footwear (54.93%), technology gadget rentals (51.47%), automobile engineering services (49.83%), soaps and detergent (48.64%), renewable energy production (42.61%), paints manufacturing (39.82%) and waste recycling (38.17%).

In sum, the high level of technology entrepreneurial engagements is germane to lessening the effect of unemployment on economic prosperity. Technological enterprises which create new enterprises through exploitation of technological discoveries of innovative entrepreneurs are major sources of sustainable economic development. To therefore obtain benefits of technological enterprise development, firms at micro, small, medium and large scales have to increase their attentions towards the 21st century critical skills which are tools to develop entrepreneurial skills and encourage entrepreneurial culture and attitude towards innovation and creation of new firms in Nigeria.

Enterprises' Performance

Globally, enterprise performance has been widely discussed in the literature. The performance of a firm is how well such a firm does in its business environment by the firm's ability to create adequate outcomes and actions (Abdullahi et al., 2021). The measurement of performance of the micro, small and micro enterprises are needed for tracking, forecasting and controlling important variable that will meet her objectives. Usually, enterprises' performance is measured by financial and non-financial. Financial measures of performance have been the most

predominant method of assessing firm's performance. Indicators such as sales turnover, sales growth, market share as well as profitability are used for measuring the performance of enterprises (Nosková, 2021). In this paper, enterprise's performance is measured with sales turnover. Sales turnover can reveal the enterprises' valuables in form of inventory profitability which can help to determine informed financial decisions of enterprises. Sales turnover can also, aids enterprises to trail revenue growth trends in customers' demand, sales policies as well as appropriate approaches to advance profitability.

Sales turnover which is the monetary value of all goods or services sold over a period of time has been used to measure the industrial performance by many scholars. For instance, (Elsayed, 2015); (Atnafu et al., 2018); (Hashed & Shaik, 2022); (Truong, 2023); and (Alnaim & Kouaib, 2023) examined the relationship between inventory performance and firms' financial performance and reported positive relationship between inventory performance and enterprises' financial performance. Moreover, (Yousaf & Dehning, 2023) studied the effects of sales surprise on inventory turnover among 341 Czech manufacturing and construction firms. The study revealed that sales surprise is important for achieving the inventory performance among industrial actors. The outcomes of the study can assist the enterprises' administration to project and enhance their sales surprise in both the construction and manufacturing sectors of Czech economy.

Conceptual Framework

Marketing involves digital research, customers' interactivity, events, experiences, persons, places, organizations, information and ideas. Every company needs its own marketing strategy because every business offers a different product or service. The organization's marketing task is to determine the needs, wants and interests of target markets and to achieve the desired results more effectively and efficiently than competitors, in a way that preserves or enhances the consumer's or society's well-being. Indeed, the process appears to be self-sustaining which prompted us to propose that a maxim of marketing is that 'the act of consumption changes the consumers. In other words, each new experience increases and extends the consumer's expectations and creates an opportunity for a new supplier to win their patronage by developing something new and better than existing solutions to the consumers need.

Figure 1 describes the conceptual framework of this study and indicates the four selected industries and factors that affect the enterprises' value co-creation practices for competitive growth of enterprises in Nigeria. The Framework designates the selected industries for this study to include information and communication technologies, technology services, creative designs and manufacturing production. The framework also shows that the factors that affect value co-creation of actors of the selected industries are customers' cooperation and participation in value co-creation, technological drive-in value co-creation; and the firms' available resources for value co-creation. The co-creation practices of the entrepreneurs can offer competitive growth in form of market share, market turnover as well as profitability.

METHODOLOGY

Descriptive research design was used to achieve the objectives of the study. The variables of value co-creation are customers' cooperation and participation, technological drive and the firms' available resources that influence the competitive growth of the enterprises. A survey was conducted on 380 technology entrepreneurs in three geo-political zones (Northwest, Southeast

and Southwest) of Nigeria. The study however, considered enterprises that are classified as Information and communication technologies (digital marketing, software development, AutoCAD design, CCTV camera management, cryptocurrency, electrical fencing installations), Technology services (graphics design, electrical installation, automobile engineering services, photoshop services, engineering fabrication, aluminum fabrication, security electronic installations and gate automation services) see figure 1.

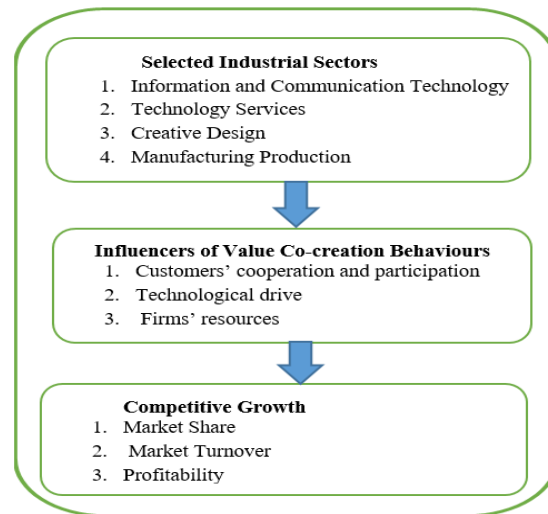


Figure 1
CONCEPTUAL FRAMEWORK ON SELECTED VARIABLES FOR VALUE CO-CREATION PRACTICES ON ENTERPRISES' PERFORMANCE

Creative designs (fashion designing, leatherworks) and Manufacturing (food manufacturing, solar energy/panel production, textile production, paints production, bio-plastic production and waste recycling). The sample was selected using stratified random sampling technique on the representative enterprises from each of the three selected zones. The sample size recorded a reliability level of 95% from the total of 380 respondents with 256 validated samples (a response rate of 67%). This response rate was considered adequate for analysis because it was greater than 50% response rate (Osano & Languitone, 2016). Data were elicited from the respondents through the use of a set of questionnaire and personal interviews on selected technology entrepreneurs in the study area. The Statistical Package for Social Science (SPSS) version 25 was used to analyse the data. Both descriptive and inferential statistics were employed for data analysis. The descriptive statistics like frequency analysis and percentages were first used to provide precision for the data. The descriptive statistical analysis was followed by the inferential statistics such as regression analysis and analysis of variance (ANOVA).

RESULTS AND DISCUSSION

This section discusses the demographical characteristics of the respondents of various categories of enterprises. This is followed by the results of analysis of data in line with the study's objective, where descriptive and inferential statistics were employed. Table 1 shows the number of questionnaire administered, retrieved and percentage retrieved by the three selected geo-political zones in Nigeria. The Table revealed that the highest (53.5%) proportion of

retrieved questionnaire was from Southwest zone due to the highest number of technology enterprise operators found in the zone. About 30.0% of the retrieved questionnaire were from the Southwest zone while the remaining retrieved questionnaire (17.4%) was retrieved from Northwest zone of Nigeria.

State	Questionnaire Administered	Questionnaire Retrieved	Percentage Retrieved
Southwest	151	114	53.5
Southeast	94	62	29.1
Northwest	73	37	17.4
Total	318	213	100
Percentage Retrieved by State			

Classification of Technology Enterprises by Operations

The classification of technology enterprises by operations is as shown in Table 2. The Table shows that the highest (35.7%) number of respondents operate in Information and Communication Technology (ICT) industry. The ICT industrial operators involved in enterprises such as Digital marketing, Software development, AutoCAD design, CCTV camera installations and maintenance, cryptocurrency and Electric fencing.

Enterprise Operation	Number	Percentage
Information and Communication Technology	76	35.7
Technology Services	63	29.6
Manufacturing	49	23
Creative Designs	25	11.7
Total	213	100

Further analysis revealed that the 29.6% of the respondents were into Technology services such as graphics design, electrical installations, automobile engineering services, photoshop services, engineering fabrications, aluminum fabrications, security electronic installations; and gate automation. The respondents who claimed to be involved in manufacturing were 23.0% and include food manufacturing, solar energy/panel production, textile production, paints production, bio-plastic production as well as waste recycling. Moreover, 11.7% of the respondents claimed to be involved in creative design forms of enterprises which are fashion designing and leatherworks.

Influencing Factors of Value Co-Creation Practices of Technology Enterprises

The influencing factors of value co-creation practices of technology enterprises in Nigeria was carried out in two phases. In the first phase, the Spearman correlation analysis was adopted to analyse and establish the association between dependent factor of co-creation

practices of technology enterprises and independent factors of customers’ cooperation and participation, technological drive; and firms’ resources (Table 3). The result of the analysis indicated that positive association exist among the following factors viz. customers’ cooperation and participation; and technological drive ($r=0.57$; $\rho\leq 0.05$), customers’ cooperation and participation; and Firms’ resources ($r=0.75$; $\rho\leq 0.01$) as well as customers’ cooperation and participation; and co-creation practices ($r=0.83$; $\rho\leq 0.01$). Moreover, a positive association occurred between technological drive and firms’ resources ($r=0.62$; $\rho\leq 0.05$) as well as firms’ resources and co-creation practices ($r=0.72$; $\rho\leq 0.01$). However, the results indicated no significant association between the technological drive and co-creation practices ($r=0.11$; $\rho>0.05$). The analysis indicated high correlations between the independent variables of customers’ cooperation and participation, technological drive, firms’ resources and co-creation practices of the technology entrepreneurs. This probably explains that the entrepreneurs understand the importance these independent variables and co-creation practices of the technology enterprises in Nigeria.

Table 3
SPEARMAN CORRELATION ANALYSIS OF FACTORS THAT INFLUENCE THE VALUE CO-CREATION PRACTICES OF TECHNOLOGY ENTERPRISES IN NIGERIA

Variable	Customers’ Cooperation and Participation	Technological Drive	Firms’ Resources	Co-creation Practices
Customers’ Cooperation and Participation (CCP)	1			
Technological Drive (TED)	0.54*	1		
Firms’ Resources (FIRE)	0.75**	0.62*	1	
Co-creation Practices	0.83**	0.11	0.72**	1

N=213, Customers’ Cooperation and Participation, Technological Drive, Firms’ Resources and Co-creation Practices

**Correlation at 1% level of significant (2-tailed)

*Correlation at 5% level of significant (2-tailed)

In the second phase, multiple regression analysis was used to determine the effect of independent variables on the co-creation practices of the selected technology enterprises in Nigeria. The regression model is:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \epsilon \text{ ----- (1)}$$

Where,

- Y = Dependent variable, that is, co-creation practices of the Technology Enterprises
- X1 - X3 = Independent factors, which are customers’ cooperation and participation;
 - technological drive and firms’ resources
- $\beta_1 - \beta_3$ = Model coefficients or parameters of the independent factors
- ϵ = Error term

Table 4 presents the regression analysis results that determined the regression coefficients (β) that each of the three factors (customers' cooperation and participation; technological drive and firms' resources) contribute to the regression equation. The coefficients in Table 4 summarize the results of all the three independent factors entered into the equation. The significant (p -value) column indicated that all the three factors statistically significant contribute to the co-creation practices of the technology enterprises. In a standardised co-efficient form, these are customers' cooperation and participation ($\beta = 0.206$, $p \leq 0.01$), technological drive ($\beta = 0.351$, $p \leq 0.01$); and firms' resources ($\beta = 0.705$, $p \leq 0.01$). The findings indicate that co-creation practices significantly enhance co-creation practices of technology enterprises in Nigeria. This could be in the form of competitive advantage, market niche advantage; and innovative capacity for dynamic operations and competitive growth. This analysis revealed that entrepreneurs in Nigeria are likely to pursue the practical and dynamic entrepreneurial practice inherent in co-creation strategies to deliver superior values to customers, which influence competitive capability and technological performance. The technology drives significant and positive effect on co-creation practices of enterprise operators is consistent with the view of Tang and Tang (2016) and Singh et al. (2016). The analysis further indicates that the influence of these three factors will impact enterprise value-creating innovation and market-driven business. Equation 2 indicates how well each of the three independent variables contributes to the regression outputs and the substitution of the equation 1 with the variables in a standardised coefficient form:

$$Y = 0.682 + 0.206CCP + 0.351TED + 0.705 FIRE \text{ ----- (2)}$$

Variable	Unstandardised Co-efficient β -Value	Std. error	Standardised Co-efficient	t-value	Significance (p -value)
Constant	0.794	0.307	0.682	6.451	0
Customers' Cooperation and Participation (CCP)	0.259	0.403	0.206	4.109	0.003
Technological Drive (TED)	0.38	0.228	0.351	2.113	0.001
Firm's Resources (FIRE)	0.83	0.109	0.705	6.507	0

To further establish variance of the dependent factor by the three independent variables in this study, the results from the multiple regression analysis is shown in Tables 5. The regression analysis outputs in Table 5 reveals that R-value is 0.864 and R²-value is 0.786. This means that the co-creation behaviours of the technology enterprises were influenced by 78.6% of the independent factors considered in this study. R² test was used to investigate the fitness of the model. If R²-value is above 13.8%, it is considered large (Tesfay, 2016). The R²-value of this model is 0.786 (78.6%) indicates that the variation in the dependent variable is explained by the independent variables included in the model. Hence, the model can be said to be valid and reliable. The outputs of regression analysis in Table 4 also show that the adjusted R²-value is 0.725. The results indicate that the model explains 72.5% of the variance in co-creation practices

of technology entrepreneurs. The three independent factors predict the co-creation practices of technology enterprises in Nigeria (adjusted R² = 0.725) which explains 72.5% of the variance in the practices of the technology entrepreneurs in the study area see table 5.

Model	R	R-Square	Adjusted R-Square	Std. error of the estimate
1	0.864	0.786	0.725	0.463001

Dependent variable: Co-creation Practices

Independent variables: Customers' cooperation and participation, technological drive, firms' resources

Analysis of Variance (ANOVA) Statistics on the Effect of Value Co-Creation Practices on Sales Turnover of Technology Enterprises in Nigeria (N=169)

Enterprises across industries have recognize the importance of involving customers to create improved values in practice. Value co-creation has been found to influence the performance (market share, sales turnover, profitability) of enterprises. In this study, Table 6 depicts the Analysis of Variance (ANOVA) F-test analysis, of the effect of value co-creation practices on the sales turnover of technology enterprises in Nigeria. The value of $F = 105.580$, $p \leq 0.01$ shows that the independent variables (Customers' cooperation and participation, technological drive, firms' resources) of co-creation practices have significant effect on the performance (sales turnover) of the selected enterprises. The implication of the ANOVA outputs is that the value co-creation practices have significant influence on the performance of the technological enterprises which indicates that the model is significant. The value co-creation practices allow the enterprises to jointly create products, processes, services as well as experiences with their customers and distributors to open a whole new world of value. Value co-creation has a positive impact in the innovation process which help enterprises to formulate innovation strategies for their business development.

Source	Degree of Freedom (DF)	Sum of Square (SS)	Mean of Square (MS)	F-value	Significant Level
Regression	3	293.71	97.903	105.58	0.0003
Residual	163	82.934	0.509		
Total	169	376.644			

CONCLUSION

This study investigated the influence of co-creation practices on the performance measured by sales turnover of technology enterprises in Nigeria. The study affirmed the usefulness of co-creation approaches to entrepreneurial practices, especially in a highly competitive situation in Nigeria. The study promotes co-creation practice as a strategy to achieve sustained performance of the enterprises. The study concludes that the market-driven strategic factors (customers' cooperation and participation, technological drive, firms' resources) offer a significant potential means to stimulate and enhance co-creation practices and increase the competitive growth in Nigeria. Conclusively, co-creation practices significantly influence the performance of technology enterprises to effectively compete and outwit competition in the competitive environment. Thus, co-creation is very important in nowadays enterprise operations.

RECOMMENDATIONS

This study recommends that entrepreneurs and managers need to involve customers in the creation of value to keep them abreast of the organizational performance to outwit competition. Technology entrepreneurs and enterprise managers can embrace customers' cooperation and participation, technological drive and firms' resources strategies to enable them enhance their performances and satisfy their customers' needs. The adoption of the market-driven strategies would drive the enterprises to operate dynamically and attain significant growth. This study recommends a comprehensive modification of the existing enterprise operational practices and procedures for adoption of co-creation practices for business growth and development. The research recommends that co-creation which has led to more commercial opportunities, is a crucial strategy for any enterprise that wants to deliver true value through innovation for the business, for customers, and the society at large.

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REFERENCES

- Abdullahi, U., Ardo, Y., Hassan, A., & Ibrahim, G. (2021). Assessment of financial and non-financial performance indicators used by small and medium construction firms in Nigeria. *FUTY Journal of the Environment*, 15(2), 48-58.
- Allen, S., Bailetti, T. and Tanev, S. (2009). Co-creation: New Pathways to value. Accessed May 2, 2022
- Alnaim, M., & Kouaib, A. (2023). Inventory Turnover and Firm Profitability: A Saudi Arabian Investigation. *Processes*, 11(3), 716.
- Alves, H. (2013). Co-creation and innovation in public services. *The Service Industries Journal*, 33(7-8), 671-682.
- Alves, H., Ferreira, J. J., & Fernandes, C. I. (2016). Customer's operant resources effects on co-creation activities. *Journal of Innovation & Knowledge*, 1(2), 69-80.
- Amadasun, D. O., & Mutezo, A. T. (2022). Effect of market-driven strategies on the competitive growth of SMEs in Lesotho. *Journal of Innovation and Entrepreneurship*, 11(1), 21.
- Amit, R. and Shoemaker, P. (2016). Firm resources. *The Palgrave Encyclopedia of Strategic Management*, 1-6.
- Arbatani, T. R., Norouzi, E., Omidi, A., & Valero-Pastor, J. M. (2021). Competitive strategies of mobile applications in online taxi services: The cases of Snapp and Tap30 in Iran. *International Journal of Emerging Markets*, 16(1), 113-130.

- Atnafu, D., & Balda, A. (2018). The impact of inventory management practice on firms' competitiveness and organizational performance: Empirical evidence from micro and small enterprises in Ethiopia. *Cogent Business & Management*, 5(1), 1503219.
- Beckman, C. M., Eisenhardt, K., Kotha, S., Meyer, A., & Rajagopalan, N. (2012). Technology Entrepreneurship. *Strategic Entrepreneurship Journal*, 6 (2): 89–93.
- Buonincontri, P., Marasco, A., & Ramkissoon, H. (2017). Visitors' experience, place attachment and sustainable behaviour at cultural heritage sites: A conceptual framework. *Sustainability*, 9(7), 1112.
- Choi, Y., & Chang, S. (2020). The effect of social entrepreneurs' human capital on and firm performance: The moderating role of specific human capital. *Cogent Business & Management*, 7(1), 1785779.
- Ciasullo, M. V., Troisi, O., & Cosimato, S. (2018). How digital platforms can trigger cultural value co-creation?—A proposed model. *Journal of service science and management*, 11(2), 161-181.
- Dada, A. (2021). Digital Entrepreneurial Behaviour of Millennials in the Fourth Industrial Revolution In Southwest Nigeria: Digital Entrepreneurial Behaviour of Millennials. *African Journal of Science Policy and Innovation Management*, 2(1&2), 41-60.
- Dada, A. D. (2019). Critical Skills for the 21st Century: Technopreneurial and innovation behaviours of fresh graduates in Lagos State, Nigeria. *Readings in technology management (Ed.) in JB Akarakiri*, 1, 270-298.
- Dada, A. D. (2023). Currency Redesign Policy Implementation: Implications for Industrial Performance in Nigeria. *American Journal of Industrial and Business Management*, 13(9), 889-910.
- Dada, A. D. and Asaolu, T. A. (2023). Industrial Extension Support Services and Performance of Small and Medium Scale Enterprises in Nigeria. In The AISPI Biennial Conference. *African Institute for Science Policy and Innovation (AISPI)*, pp. 202-216.
- Dada, A. D., Ali, G. A., Afolabi, O. O., & Siyanbola, W. O. (2010). Innovative approaches to industrial utilisation of cassava in a developing economy. *African Journal of Science, Technology, Innovation and Development*, 2(2), 154-174.
- Dimov, D. P. and Shepherd, D. A. (2005). Human capital theory and venture capital firms: Exploring “home runs” and “strike outs.” *Journal of Business Venturing*, 20(1), 1–21.
- Du, J., Gong, Y. and Temouri, Y. (2013). High Growth Firms and Productivity: Evidence from the UK, NESTA, London.
- Dziewanowska, K., & Kacprzak, A. (2020). Value Co-Creation and Value Co-Destruction—A Case of Online Consumption. *Folia Oeconomica Stetinensia*, 20(2), 82-94.
- Elsayed, K. (2015). Exploring the relationship between efficiency of inventory management and firm performance: an empirical research. *International Journal of Services and Operations Management*, 21(1), 73-86.
- Filieri, R. (2013). Consumer co-creation and new product development: a case study in the food industry. *Marketing Intelligence & Planning*, 31(1), 40-53.
- Ghezzi, A., Cavallo, A., Sanasi, S., & Rangone, A. (2022). Opening up to startup collaborations: open business models and value co-creation in SMEs. *Competitiveness Review: An International Business Journal*, 32(7), 40-61.
- Hamidi, F., & Gharneh, N. S. (2017). Impact of co-creation on innovation capability and firm performance: a structural equation modeling. *AD-minister*, (30), 73-90.
- Hamidi, F., Shams Gharneh, N., & Khajeheian, D. (2019). A conceptual framework for value co-creation in service enterprises (case of tourism agencies). *Sustainability*, 12(1), 213.
- HASHED, A. W. A., & SHAIK, A. R. (2022). The nexus between inventory management and firm performance: A Saudi Arabian perspective. *The Journal of Asian Finance, Economics and Business*, 9(6), 297-302.
- Jesuleye, O. A., Obamuyi, T. M., & Dada, A. D. (2021). Academic Entrepreneurship of Technological Universities and Sustainable Development in Nigeria. *Advances in Research*, 22(1), 49-65.
- Jukić, T., Pevcin, P., Benčina, J., Dečman, M., & Vrbeč, S. (2019). Collaborative innovation in public administration: theoretical background and research trends of co-production and co-creation. *Administrative Sciences*, 9(4), 90.
- Karmarkar, U. S., & Roels, G. (2015). An analytical framework for value co-production in services. *Service Science*, 7(3), 163-180.
- Khajeheian, D. (2017). An introduction to entrepreneurship and innovation in media markets. *Global Media Journal—Canadian Edition*, 10(1), 1-8.
- Khajeheian, D., & Ebrahimi, P. (2021). Media branding and value co-creation: effect of user participation in social media of newsmidia on attitudinal and behavioural loyalty. *European Journal of International Management*, 16(3), 499-528.

- Kim, M. J., & Hall, C. M. (2019). Can co-creation and crowdfunding types predict funder behavior? An extended model of goal-directed behavior. *Sustainability*, 11(24), 7061.
- Kothari, H. C. (2013). Impact of contextual factors on entrepreneurial intention. *International Journal of Engineering and Management Research (IJEMR)*, 3(6), 76-82.
- Kumar, V., & Petersen, J. A. (2005). Using a customer-level marketing strategy to enhance firm performance: a review of theoretical and empirical evidence. *Journal of the Academy of Marketing Science*, 33(4), 504-519.
- Lu, L., Cai, R., & Gursoy, D. (2019). Developing and validating a service robot integration willingness scale. *International Journal of Hospitality Management*, 80, 36-51.
- Ma, Y., Rong, K., Luo, Y., Wang, Y., Mangalagiu, D., & Thornton, T. F. (2019). Value Co-creation for sustainable consumption and production in the sharing economy in China. *Journal of cleaner production*, 208, 1148-1158.
- Maduka, O. B. (2016). Effects of customer value co-creation on customer loyalty in the Nigerian service industry. *International Journal of Business and Management*, 11(12), 77-82.
- Martínez-Cañas, R., Ruiz-Palomino, P., Linuesa-Langreo, J., & Blázquez-Resino, J. J. (2016). Consumer participation in co-creation: an enlightening model of causes and effects based on ethical values and transcendent motives. *Frontiers in psychology*, 7, 793.
- Mason, C., & Brown, R. (2014). Entrepreneurial ecosystems and growth oriented entrepreneurship. Final report to OECD, Paris, 30(1), 77-102.
- Mosey, S., Guerrero, M., & Greenman, A. (2017). Technology entrepreneurship research opportunities: insights from across Europe. *The Journal of Technology Transfer*, 42, 1-9.
- Munoz, L., Vicdan, H., & Saran, A. (2013). Two peas in a pod? Exploring the market orientation, innovation, and dynamism of Mexico and Turkey's entrepreneurial culture. *International Journal of Entrepreneurship*, 17, 77-98.
- Nosková, M. (2021). Enterprise performance indicators and their use for strategic management—empirical evidence in globalized world.,
- Novani, S., & Kijima, K. (2012). Value co-creation by customer-to-customer communication: Social media and face-to-face for case of airline service selection.
- Obamuyi, T. M., Oguntade, A. E., Ogunsuyi, H. O., Dada, A. D., Ayedun, T. A. and Onafadeji, A. O. (2022). Gender Differential in the 21st Century Critical and Entrepreneurial Skills among Young Graduates in Nigeria. *Nigerian Journal of Banking, Finance and Entrepreneurship Management*, 5 (3), 1-9.
- Ojo, A. O., Jesuleye, O. A. and Dada, A. D. (2023). The Propensity of the Youth Corps at Engaging in Technological Enterprises in Southwest, Nigeria. *Journal of Business and Management (IOSR-JBM)*, 25 (1), 21-35
- Oladele M., Ogunjemilua, E.M., Dada, A.D., and Magbagbeola J.A.O. (2022). Analysis of Student Industrial Work Experience on Technological Entrepreneurship Interest in Ekiti State Nigeria. *JABU International Journal of Social and Management Sciences*, 8 (2), 23-42
- Osano, H. M., & Languitane, H. (2016). Factors influencing access to finance by SMEs in Mozambique: case of SMEs in Maputo central business district. *Journal of innovation and entrepreneurship*, 5, 1-16.
- Osborne, S. P., Radnor, Z., & Strokosch, K. (2016). Co-production and the co-creation of value in public services: a suitable case for treatment?. *Public management review*, 18(5), 639-653.
- Oyner, O., & Korelina, A. (2016). The influence of customer engagement in value co-creation on customer satisfaction: Searching for new forms of co-creation in the Russian hotel industry. *Worldwide Hospitality and Tourism Themes*, 8(3), 327-345.
- Pathak, B., Ashok, M., & Leng Tan, Y. (2022). Value co-creation in the B2B context: a conceptual framework and its implications. *The Service Industries Journal*, 42(3-4), 178-205.
- Payne, A. F., Storbacka, K., & Frow, P. (2008). Managing the co-creation of value. *Journal of the academy of marketing science*, 36, 83-96.
- Pretorius, H. (2009). Ceding control to consumers as co-researchers. In Proceedings of the SAMRA Conference, Stellenbosch, South Africa (Vol. 10).
- Raja, A. and Yazdanifard, R. (2014). The Implications of Co-Creation between Businesses and Its Customers on Firms in the Current Market.
- Rehman, I. U., Ahmad, Z., Fetuu, E., & Yusuf, I. (2021). Factors Affecting Customers Engagement In Value Co-Creation: An Exploratory Study. *Webology (ISSN: 1735-188X)*, 18(5).

- Ruíz, M. D. A., Gutiérrez, J. O., Martínez-Caro, E., and Cegarra-Navarro, J. G. (2017). Linking an unlearning context with firm performance through human capital. *European Research on Management and Business Economics*, 23(1), 16–22.
- Samuel, Y. A., Ernest, K., & Awuah, J. B. (2013). An assessment of entrepreneurship intention among Sunyani Polytechnic Marketing students. *International Review of management and Marketing*, 3(1), 37-49.
- Sharafi farzad, F. A. T. E. M. E. H., Kolli, S., Soltani, T., & Ghanbary, S. (2019). Digital brands and web 3.0 enterprises: Social network analysis and thematic analysis of user activities and behavioral patterns in online retailers. *AD-minister*, (34), 119-138.
- Singh, D., Khamba, J. S., & Nanda, T. (2016). Technology innovation in Indian MSMEs: a case study using SWOT and SAP-LAP analysis. *Productivity*, 57(1), 43.
- Sisodia, G., Jادیyappa, N., & Joseph, A. (2021). The relationship between human capital and firm value: Evidence from Indian firms. *Cogent Economics & Finance*, 9(1), 1954317.
- Siyanbola, W. O. (2013). Policies and actions for promoting technological innovation in industrial production in Nigeria. In A Paper Presented at the 4th Technology Management Forum For Directors of Science And Technology in Nigeria. August (Vol. 26).
- Siyanbola, W. O., Afolabi, O. O., Jesuleye, O. A., Egbetokun, A. A., Dada, A. D., Aderemi, H. O., ... & Rasaq, M. A. (2012). Determinants of entrepreneurial propensity of Nigerian undergraduates: an empirical assessment. *International Journal of Business Environment*, 5(1), 1-29.
- Solakis, K., Katsoni, V., Mahmoud, A. B., & Grigoriou, N. (2022). Factors affecting value co-creation through artificial intelligence in tourism: A general literature review. *Journal of Tourism Futures*.
- Solakis, K., Katsoni, V., Mahmoud, A. B., & Grigoriou, N. (2022). Factors affecting value co-creation through artificial intelligence in tourism: A general literature review. *Journal of Tourism Futures*.
- Tang, Z., & Tang, J. (2016). The impact of competitors–firm power divergence on Chinese SMES’ environmental and financial performance. *Journal of Business Ethics*, 136, 147-165.
- Tesfay, A. W. (2016). A Comprehensive Measure of Business Performance: A Study of the Commercial Banking Industry in Ethiopia (Doctoral dissertation, University of South Africa).
- Torring, J., & Sørensen, E. (2019). Interactive political leadership in theory and practice: How elected politicians may benefit from co-creating public value outcomes. *Administrative Sciences*, 9(3), 51.
- Truong, K. D. (2023). Impact Of Inventory Management On Firm Performance A Case Study Of Listed Manufacturing Firms On Hose. *International Journal of Information, Business and Management*, 15(1), 93-115.
- Vargo, S. L., & Lusch, R. F. (2010). From repeat patronage to value co-creation in service ecosystems: a transcending conceptualization of relationship. *Journal of Business Market Management*, 4, 169-179.
- Vargo, S. L., Maglio, P. P., & Akaka, M. A. (2008). On value and value co-creation: A service systems and service logic perspective. *European Management Journal*, 26(3), 145-152.
- Wang, C. K., & Wong, P. K. (2004). Entrepreneurial interest of university students in Singapore. *Technovation*, 24(2), 163-172.
- Wirtz, J., Patterson, P. G., Kunz, W. H., Gruber, T., Lu, V. N., Paluch, S., & Martins, A. (2018). Brave new world: service robots in the frontline. *Journal of Service Management*, 29(5), 907-931.
- Wiścicka-Fernando, M., Misiak-Kwit, S., & Fernando, K. S. D. (2019). Co-creation as an innovative way to develop an enterprise—cross-country analysis. *Sustainability*, 11(23), 6737.
- Wollenick, N. (2012). Identifying challenges in applying the value co-creation approach in practice:-a case study in the B2B service context.
- Yen, C. H., Teng, H. Y., & Tzeng, J. C. (2020). Innovativeness and customer value co-creation behaviors: Mediating role of customer engagement. *International Journal of Hospitality Management*, 88, 102514.
- Yousaf, M., & Dehning, B. (2023). The effects of sales surprise on inventory turnover: An empirical study. *Cogent Economics & Finance*, 11(2), 2258696.
- Zhang, H., Lu, Y., Wang, B., & Wu, S. (2015). The impacts of technological environments and co-creation experiences on customer participation. *Information & Management*, 52(4), 468-482.

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