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Assessment of Relationship between E- Leadership and Virtual Team Productivity in E-Business Firms in South East, Nigeria

Dr. Okechuku, Elizabeth Uzoamaka[1] and Dr. Nebo, Gerald Nwora[2]

[1]Department of Business Administration, Enugu State University of Science and Technology (ESUT), Enugu
uzolizzy@yahoo.com
[2]Department of Marketing, Enugu State University of Science and Technology, Enugu
geraldnebo@yahoo.com

Abstract: *This study seeks to assess the relationship between e-leadership and team productivity in e-business firms in South East, Nigeria. The specific objectives of the study were to examine the relationship between modern ICT adoption and team productivity and the relationship between virtual communication skill and team productivity in e-business firms in South East, Nigeria. Four selected e-business firms in South East, Nigeria were used for the study. Sample size of 213 employees from the four e-business firms was selected. Primary data was used for the study. Data were collected using questionnaire which was structured on a four point likert scale. The data collected were analyzed using Pearson's correlation and simple linear regression, at 5% probability level of significance. The findings revealed that there was a positive significant relationship between modern ICT adoption and team productivity (r =.716, P<0.05) and there was a significant relationship between team communication skill and team productivity(r = 882, P<0.05). The study recommended that the management of e-leadership firms' needs to build effective leadership parameters between managers and employees and establish a periodical training program on latest information and communication technologies.*

Keywords: E-Business firms, Team Productivity, Virtual Teams, Virtual Leadership.

1.1 Introduction

The work environments of many organizations have changed drastically. Nowadays organizations have moved away from working with employees who are in their visual proximity to working with people around the globe (Jong, Schalk, & Curseu, 2008). The business activities have become more global and competitive as compared to the past. This is happening due to faster pace of advancement in information and communication technologies, which rendered the jobs more dynamic and multidimensional (Mehtab, Rehman, Ishfaq & Jamil, 2018). In order to respond to such changes quickly, organizations are improving their organizational structures, systems, methods and processes to become more adaptive and flexible.

Many organizations have responded to their dynamic environments by introducing virtual teams in their organizations. Zigurs (2013) defines virtual teams as a collection of individuals, dispersed from each other geographically or organizationally but connected by information technology to accomplish assigned goals. Virtual teams are growing in popularity especially now there is covid-19 pandemic (Cascio, 2020). Additionally, the rapid development of new communication technologies such as the internet has accelerated this trend so that today, most of the larger organization employs virtual teams to some degree. Virtual teams represent one such organizational form, one that could revolutionize the workplace and provide organizations with unprecedented level of flexibility and responsiveness (Powell, Piccoli, & Ives 2004). Gassmann & Zedtwitz (2003) opine that virtual teams are formed to facilitate transnational innovation processes. Virtual leadership and network structure is formed and used to advance communication and coordination, and promote the mutual sharing of inter-organizational resources and competencies.

Due to advancement in technology, organizations are heavily relying on virtual teams for accomplishment of organizational goals and objectives. It is a greater challenge to lead such teams. With ongoing globalization and communication technologies, virtual teams have become popular and practicable anywhere in the world (Nastase & Roja, 2013). To be competitive, organizations develop their capacities, capabilities and unique potential, and develop relationships with other organizations to have access to knowledge, information, skills and resources.

With the emergence of these new forms of organization, their leaders need to develop new leadership styles to coordinate resources more efficiently, which often are geographically distributed, sometimes at the global level. The emergence of virtual organizations led to the identification of new styles of leadership, according to the new virtual context in which managers and people operate (Nastase & Roja, 2013). The interaction between geographically distributed organizations employees is achieved mainly through new technologies, and access to information is ubiquitous. Mobile services and telecommunications software now provides intelligent platforms through which managers can coordinate organizational activities and processes.

1.2 Statement of the Problem

One of the major challenges of virtual teams is leadership. It is very difficult for a team leader to control directly every team member's activity in different geographical location. Due to this leader considers the delegation principle of management by shifting managerial functions down the hierarchy to the other team members. The virtual leadership is intervened using information technology by focusing the performance and relationship of members to enhance the output; it is highly dependent on the information availability and communication permanence.

Ineffective communication methods and strategies between virtual leaders and team's member may lead to low productivity as they rely maximally on the virtual team leader for instructions. Unavailability of technological tools and lack of ICT skills and knowledge may hinder the performance of the teams.

In the wake of Covid-19 pandemic, organizational leaders are increasing utilizing the internet in hosting meetings and communicating with team members in work places. Therefore, there is the need to evaluate empirically the effects of virtual communications on team members' productivity. The need becomes even more intensified in the South-Eastern region of Nigeria where there is currently apparent gap in existing knowledge in this area judging from previous works we glanced through. With the foregoing, the study assesses the relationship between virtual leadership and team productivity in ever changing business environment in south east, Nigeria.

1.3 Objectives of the study

The broad objective of the study was to Access the Relationship Between Virtual Leadership and Team Productivity in e-Business Firms in South East**,** Nigeria. The specific objectives are to:

- **i.** Assess the relationship between modern information communication technology (ICT) adoption and team productivity in e-Business firms in South East**,** Nigeria.
- **ii.** Identify the relationship between communication skill and team productivity in e-business firms in South East**,** Nigeria.

1.4 Research Questions

- **i.** What are the relationships between modern ICT adoption and team productivity in e-business firms' productivity in South East**,** Nigeria?
- **ii.** To what extent do communication skills relate with team productivity in e-Business firms' productivity in South East**,** Nigeria?

1.5. Research Hypotheses

- **i.** There is a significant relationship between modern ICT adoptions and team productivity in e-Business firms' productivity in South East**,** Nigeria.
- **ii.** Significant relationship exists between communication skills and team productivity in e-Business firms' productivity in South East**,** Nigeria.

REVIEW OF RELATED LITERATURE

2.1 Virtual Team

Zigurs (2013) opines that virtual teams are collection of individuals, dispersed from each other geographically or organizationally but connected by modern information technology to accomplish assigned goals. Gassmann & Zedtwitz, (2003) define virtual team as a group of people and sub-teams who interact through interdependent tasks guided by common purpose and work across links strengthened by information, communication, and transport technologies. Virtual teams can be members of the same organization, or it may include members of different organizations. These teams are characterized by flattened structures or horizontal and geographically distributed human resources which offer a lot of advantages and challenges. Communication is one of the key variables that bring virtual teams together in an organization.

Virtual teams are comprised of members who are located in more than one physical location. This team trait has fostered extensive use of a variety of forms of computer-mediated communication that enable geographically dispersed members to coordinate their individual efforts and inputs (Peters & Manz, 2007). Virtual teams work across boundaries of time and space by utilizing up to date computer-driven technologies.

Virtual teams are scattered work teams whose members are geographically dispersed and coordinate their work primarily with electronic information and communication technologies via e-mail, video-conferencing (zoom, eztalks, telephone, etc.). Lecoq (2012) explains that a virtual team could also be known as small temporary groups of geographically, organizationally and/or time dispersed knowledge workers who coordinate their work predominantly with electronic information and communication

technologies in order to accomplish one or more organization tasks. Members of virtual teams communicate electronically and may never meet face-to-face. Virtual teams are formed to overcome geographical or temporal separations (Cascio & Shurygailo, 2003).

2.1.2 Concept of E-Leadership

Leadership in virtual teams has been called virtual leadership or e-leadership. Avolio & Kahai (2003) define e-leadership as a social influence process mediated by advanced information technologies to produce changes in attitudes, feelings, thinking, behaviour, and/or performance of individuals, groups, and/or organizations.

Electronic-leaders (e- leaders) have much in common with their traditional counterparts such as establishing organizational goals, strategies, and policies and develop monitoring systems for multiple purposes for keeping track of employees' motivation and performance to their organizational fiscal bottom line (Jong, Schalk & Curseu, 2008). Effective e- leaders should be able to perform numerous and conflicting behaviours simultaneously to manage their present situation and such complexity may be especially important as the on-going multimodal reality of virtual organizations creates important differences in how they create, maintain and communicate with the virtual employees they lead (Kayworth & Leidner, 2012). Jarvenpaa & Leidner (1999) commend that while communication for traditional managers tends to use one channel at a time, virtual leaders must be capable to convey information via multiple channels such as email, zoom, eztalks and other voice over internet protocol (VOIP) methods. E-leaders engage and guide their virtual members toward the attainment of specific goals through consistent communication, relationship building and the development of trust, which contribute to maximizing the management of the human capital.

Literatures on human resources show that the construct for measuring these e-leadership are many. These includes include: modern information communication technology (ICT) adoption, virtual communication skills, virtual task-orientation**,** virtual fostering of team goals and virtual role modelling. However, this study focused on the first two variables which are modern ICT and virtual communication skills. Past studies show that there is a significant relationship between e-leadership and virtual team productivity (Mohd, 2015; Jones, 2016)

2.1.3 Modern Information Communication Technology (ICT)

Modern Information Communication Technology (ICT) includes a wide range of technologies, including computers and software learning tools, networking systems and protocols, hand-held digital devices, digital cameras and camcorders, and other technologies, including those not yet developed, for accessing, managing, creating, and communicating information. Information technology (IT) is the use of computers to store, retrieve, transmit, and manipulate information (Daintith, 2009). IT has to do with computer applications, on which nearly every work environment is dependent (Niya, 2018). Information technology systems come in the shape of many technologically advanced devices which help deliver essential information to managers and thus they use this information to make crucial decision regarding the operations of their organization.

2.1.4 Information Communication Technology (ICT) Tools

Many ICT tools are in used presently. Examples of Information Technology are Software and support for office automation systems such as internet, Phones, Podcast , computer, User, and PCs. Data networks and all associated communications equipment such as servers, bridges, routers, hubs & wiring. Some of the Information Technology are presented below:

(a) Internet: Internet is regarded as the global system of interconnected computer networks that make use of Internet protocol suite (TCP/IP) to communicate between devices and networks. The Internet carries a vast range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and file sharing. The Internet is a world-wide dissemination capability, a mechanism for information broadcasting, and a medium for cooperation and interaction between persons and their computers no matter the geographic location and time.

(b) Phones: are devices used to call and send texts. The mobile phone is a portable wireless handled device that can make and receive calls over a radio frequency link while the user is moving within a telephone service area.

(c) Podcast: A podcast is an periodic series of spoken word digital audio files that a user can download to a personal device for easy listening or recording of audio discussion on a specific subject (Virgillito, 2019).

(d) Computer: A computer is a programmable device that are used to store and process information. Vangie (2020) opines that the two principal characteristics of a computer are: (i) it responds to a specific set of instructions in a well-defined manner and (ii) it executes a recorded list of instructions.

2.1.5 Virtual Communication Skill

Virtual communication is defined as a method of communication that uses technology like audio and video to converse with individuals who are not physically present in front of us. While communication skills are capabilities individual uses when giving

and receiving different kinds of information. For example, communicating ideas, feelings or what's happening around you. Communication skills encompass listening, speaking, observing and empathizing. Communication covers all activities that an individual does when one wants to make a transformation in someone else's mind. Nowadays virtual communication is used in nearly every work of life; within family, friends, and organizations. Communication is a process that contains expressing, listening and understanding (Banerji & Dayal, 2015). Price (2017) defines organizational communication as the degree to which information about the job is transmitted by an organization to its members and among members of the organization. Ayatse (2015) observes that communication is needed to establish and disseminate the goals of the enterprise.

Team communication is the dissemination of information which is related to the daily performance of team's job and also imperative if the team is expected to be an effective team member. It connotes a consideration of team members by team leaders as a vital resource (Buchanan & Doyle, 2016). Communication is the transfer of information from a sender to a receiver, with the message being understood by the receiver.

Tools used in Virtual Communication

People have derived diverse communication practices to express and understand each other. Previous studies show that the most used communication tools in e-business firms currently are:

(a) **Zoom Meetings**: Zoom is a cloud-based video conferencing service individuals can use to virtually meet with one another. It may be by either video or audio only or both while conducting live chats; and it lets individuals record those sessions or later. Teams members can join these meetings vie webcam or phone.

(b) **Google Meet**: Google meet, previously referred to Google Hangouts Meet, is Google's enterprise video conferencing software use by individuals to communicate. Steven (2019) opines that it is built to let several people join the same virtual meeting, and speak or share video with each other from anywhere with internet access.

(c) **eztalks meet**: it allows people to start or join free video conferencing calls on their mobile device. It allows its users to connect with more 100 participants at once. Teams can send meeting invitation to their members and bring them on business meeting within couple of seconds. One can host or join online meetings, or share documents and records videos. The quality of communication is sustained through the ultra-high definition of audio and video along with an instant messaging facility.

(d) **Bluejeans**: BlueJeans deliver a first-class video conferencing experience that is optimized for the mobile workforce. It helps make every meeting more productive regardless of where the participants are located (Selvalatha; 2020).

2.1.6 Team Productivity

Team productivity is normally looked at in terms of outcomes. It is a rating system used by most corporations to determine the abilities and output of the teams. However, it can also be looked at in terms of behaviour (Armstrong 2009). Kinicki & Kreitner (2007) state that team productivity is measured against the performance standards set by the organization such as effective reporting, team service delivery, customer satisfaction, team responsiveness, and team customer complaint handling. Each of these variables are briefly explained below.

Effective Reporting: Effective reporting is the results obtained by reviewing the report data and making changes to improve performance of the team or individual. A consistent measurement and reporting procedure creates an environment of achievement and success that benefits the entire organization. (Kelly; 2020).

(a) **Service delivery**: Service delivery can be defined as any contact with the public administration during which customers or enterprises seek or provide data, handle their affairs or fulfil their duties. These services should be delivered in an effective, predictable, reliable and customer-friendly manner. As a result of rapid expansion of the use of information and communication technologies, electronic service delivery becomes an effective means to reduce costs, both in time and money, for the customer as well as the organization.

(b) **Customers' satisfaction:** Customer satisfaction is a measurement that determines how happy customers are with a company's products, services, and capabilities. It is a kind of measure of how products or services provided by a company meet customer expectations. Customer satisfaction is one of the most important indicators of consumer purchase intentions and loyalty (Lucjan; 2020).

(c) **Responsiveness:** this is defined by Cambridge dictionary as the quality of having a reaction to something or someone, especially a quick or positive reaction. It is referred to as the specific ability of a system or functional unit to complete assigned tasks within a given time (Weik, 2000). It could be also referred to the ability of an artificial intelligence organization to understand and carry out its jobs in a timely fashion.

(d) **Customer complaint handling:** This an effective response to overt and covert expressions of customer dissatisfaction over service failures. It is an effort made by the organizational leaders and his team to resolve customers' problems as they arise. The goal of complaint management is to strengthen customer loyalty as well as quality assurance.

2.3 Theoretical Framework

2.3.1 Transformation Leadership Theory

Transformational leadership theory was propounded by James MacGregor Burns in 1978. It is a theory of leadership where a leader works with teams to identify needed change, creating a vision to guide the change through inspiration, and executing the change in tandem with committed members of a team (Odumeru & Ogbonna; 2013). Transformational leadership is an approach to leadership that centers on how leaders can create valuable and positive change in their followers.

The transformational leadership involves the process of influencing major changes in organizational attitudes in order to achieve the organization's objectives and strategies and can change their cultures based on a new vision and a revision of shared assumptions, values and norms. For transformational leadership style, the followers feels trust, admiration, loyalty, and respect towards the leader and is motivated to do more than originally expected to do and make followers to be more aware of the importance of task outcomes, inducing then to transcend their own self-interest for the sake of the organization.

2.3.2 Actor-Network Theory (ANT)

Actor-Network Theory (ANT) was developed by Michel Callon & Bruno Latour and visitors like John Law in 1980 at the Centre de Sociologie de l'Innovation (CSI) of the École nationale supérieure des mines de Paris. Actor-Network Theory (ANT) explains how people, objects and ideas (actors) work together to form structured entities, or networks. Actors create networks by adapting resources, taking on defined roles, forming interdependent relationships and repeating predetermined behaviors to solve problems or accomplish goals. Actor-Network Theory also proposes that human and non-human factors are equally powerful in the success of technological innovation and scientific knowledge-creation. The theory examines how networks are formed and how these networks contribute significantly to successes. It advocates that no one person or thing is solely responsible for any advancement. Therefore, both an actor and a network are responsible for achieving the outcomes. For Actor-Network Theory, anything can be an actor within a network. It can be a law, a text, a person, an idea, an inanimate object and even another network. Even more interestingly, however, is that each of these elements receives equal consideration and attention in ANT.

2.4 Empirical Review

Hüfken (2011) conducted a research on the influence of transformational leadership and communication using media capabilities on the level of perceived team trust within virtual teams in Tilburg University. The study adopted cross-sectional design and was of quantitative deductive in nature. The hypotheses were tested using hierarchical multiple regression analysis, descriptive analysis such as frequency tables and/or crosstabs, correlation matrix and collinearity diagnostics (Tolerance and VIF) are generated to test on multi collinearity. A quantitative study (survey) was performed in order to test the hypotheses stated about the relationships between leadership, trust and communication. The results of the analysis showed that transformational leadership has a positive influence on perceived team trust. It also revealed that media capabilities transmission velocity and rehears ability have a positively impact on trust.

Mohd (2015) carried out a study on Model of Virtual Leadership, Intra-Team Communication and Job performance among School Leaders in Malaysia. Data collected from 1082 respondents through the online survey and were analyzed by structural equation model (SEM). The findings showed the virtual leadership using mobile technology is significantly contributed to intra-team communication; while the intra-team communication was also positively predicted towards job performance. The findings also demonstrated the intra-team communication had fully-mediated to the relationship between virtual leadership and job performance, where the model with intra-team communication as mediator was fit better than the model without mediator.

3. METHODOLOGY

The study was carried out by the use of survey design. The survey design was employed to draw a sample from the four major e-business firms in South East**,** Nigeria comprising; deposit money banks. MTN, GLO, and Airtel. Primary data was collected from responses of the questionnaire from the four major e-commerce firms in South East**,** Nigeria. A sample size of 213 was drawn from the population at 5% probability level of significance using Stat Trek's Sample Planning Wizard Tool. Out of 213 questionnaire administered, 192 of them were returned, making a response rate of 96%. The questionnaire was designed in four point likert scale ranging from strongly agree (4), agree (3), disagree (2) and strongly disagree (1). The construct for measuring predictor variable, modern ICT, (computers, internet, phones and podcast) and virtual communication (zoom, e-ztalks, goggle meet and bluejeans) were adopted from extant literature. The construct for measuring dependent variable - virtual team productivity (effective reporting, service delivery, customers' satisfaction, responsiveness and complaint management) were gotten from extant literature (Kelly; 2020: Lucjan; 2020: Weik, 2000)

The reliability test was done using Cronbach Alpha test. The result shows 0.924 coefficients indicating a high degree of internal consistency based on Nunnally & Berstein's (1994) benchmark of 0.70 coefficients for ascertaining reliability. Descriptive statistics were presented and analysed using frequency tables. Hypotheses were tested and analysed using Pearson's correlations and simple linear regression analysis tool at 5% probability level of significance.

4.1 Data Analysis

This section presents the data gotten from the questions to enable us analyze the research questions and test the hypotheses formulated. Data were presented using tables and means; while the hypotheses were tested by the use of Pearson's correlation and simple linear regressions.

Table 1: Socio Demographic Characteristics of Respondents

Category	Frequency	Percentage (%)
Gender		
Male	84	44
Female	108	56
Educational Qualification		
OND	34	18
B.Sc/HND	95	50
Masters	58	30
Ph.D	5	3
Position		
Manager	22	12
Staff	115	60
Others	55	27
Experience of work		
<3Years	64	33
4-10Yrs	108	56
11-20Yrs	20	11

Source Field Survey 2020

Table 2: There is a Relationship Between Modern Information Communication Technology (ICT) Adoption and Team Productivity

Variables	SA (4)	A (3)	SD (2)	D (1)	N	$\bar{X}$	Remarks
Computers	108	53	10	21	192	4	Accepted
Internet	151	31	6	4	192	3.7	Accepted
Phones and Podcast	149	39	0	4	192	3.7	Accepted
Written communication	5	4	163	20	192	2	Rejected

Source: Field Survey 2020

In table 2 mean responses from 3.00 and above shows that there is relationship between modern information communication technology (ICT) adoption and team productivity; while mean response below were rejected.

Table 3: There is A Relationship Between Virtual Communication Skills and Team Productivity

Variables	SA (4)	A (3)	SD (2)	D (1)	N	$\bar{X}$	Remarks
Listening	178	12	2	-	192	3.9	Accepted
Speaking	139	45	6	2	192	3.7	Accepted
Empathy	150	38	0	4	192	3.7	Accepted
Responsiveness	168	19	4	1	192	3.8	Accepted
Communication distortion	-	4	163	25	192	1.9	Rejected

Source: Field Survey 2020

In table 3 mean responses from 3.00 and above shows that there is a relationship between virtual communication skills and team productivity; while mean response below were rejected.

Table 4: There is A Relationship between Communication Skills and Team Productivity

Variables	SA (4)	A (3)	SD (2)	D (1)	n	_ X	Remarks
Zoom	184	4	0	2	192	4	Accepted
Google Hangouts	149	35	4	4	192	3.7	Accepted
Bluejeans	160	28	0	4	192	3.8	Accepted
ezTalks Meetings	175	15	2	0	192	3.9	Accepted

Source: Field Survey 2020

In the table 4 mean responses from 3.00 and above shows that there is a relationship between virtual communication skills and team productivity; while mean response below were rejected.

4.2 Test of Hypotheses

Hypothesis One

H_1: A significant relationship exists between modern information technologies and team productivity in e- business firms in Southeast Nigeria.

Table 5: Correlations

		Computers	Internet	Phones_and_Podcast	Team Productivity
Computers	Pearson Correlation	1			
	Sig. (1-tailed)				
	N	192			
Internet	Pearson Correlation	.945**	1		
	Sig. (1-tailed)	.000			
	N	192	192		
Phones_and_Podcast	Pearson Correlation	.839**	.913**	1	
	Sig. (1-tailed)	.000	.000		
	N	192	192	192	
Team Productivity	Pearson Correlation	.615**	.698**	.681**	1
	Sig. (1-tailed)	.000	.000	.000	
	N	192	192	192	192

**. Correlation is significant at the 0.01 level (1-tailed).

Table 5 depicts the correlation of predictive variable and team productivity, the result indicates the presence of positive relationships which did not occur by chance, hence we proceed to confirm the degree of strength of the relationship using regression analysis.

Regression Analysis

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.716[a]	.513	.505	.29133

a. Predictors: (Constant), Phones_and_Podcast, Computers, Internet

Table 7: ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.

1	Regression	16.776	3	5.592	65.887	.000[b]
	Residual	15.956	188	.085		
	Total	32.732	191			

a. Dependent Variable: Team productivity
b. Predictors: (Constant), Phones_and_Podcast, Computers, Internet

Table 8: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.269	.050		25.464	.000
	Computers	2.07	.053		2.325	.000
	Internet	.275	.068	.852	4.019	.000
	Phones_and_Podcast	.291	.069	.856	4.668	.000

a. Dependent Variable: Team Productivity

The results of regression analysis presented in table 6 shows a significant R= 0.716, this implies that multiple regression coefficients between the predictors and the criterion was 71.6%, while R^2 of 0.513 implies that predicting variables under the study were able to account or explain 51.13% variance in the dependent variable. The results also shows adjusted R^2 of 0.505 which implies team productivity were able to explain 50.05% variation in the performance.

The significant F-.test displayed in table 7 (65.887, $p<0.05$) signifies the overall significant prediction of independent variables to the dependent variable, this further implies that, p value of 0.000 has a model fitness in regressing the effect of modern ICT on team productivity in e-business firm in Southeast Nigeria.

In evaluating the model based on the regression result in table 8, computers as a predictive variable on team productivity with (β_1= 2.07, t_1=2.325, $p<0.05$) has a positive and significant effect on team productivity in e-business firm in Southeast Nigeria.

Based on the regression result in table 8, internet, android phones and podcast as the predicting variable on team productivity with (β_2=0.275, t_2=4.019, and β_3=0.291, t_3=4.668, $p_2<0.05$, $p_3>0.05$) respectively, indicate that both have positive and significant effect on team productivity in e-business in Southeast Nigeria.

From the analysis above we accept that there is a significant relationship between modern ICT adoption and team productivity in e-business firms in Southeast Nigeria.

Hypothesis Two

H_1: Significant relationship exists between virtual communications skills and team productivity in the e- business in southeast, Nigeria.

Table 9: Correlation Analysis of the Relationship Between Virtual Communication Skills and Virtual Team Productivity.

Table 9: Correlations

		Zoom	Google_hangout	ezTalks_meeting	Bluejeans	Team Productivity
Zoom	Pearson Correlation	1				
	Sig. (1-tailed)					
	N	192				
Google_hangout	Pearson Correlation	.775**	1			
	Sig. (1-tailed)	.000				
	N	192	192			
ezTalks_meeting	Pearson Correlation	.836**	.788**	1		
	Sig. (1-tailed)	.000	.000			
	N	192	192	192		

Bluejeans	Pearson Correlation	.863**	.709**	.937**	1	
	Sig. (1-tailed)	.000	.000	.000		
	N	192	192	192	192	
Team Productivity	Pearson Correlation	.725**	.633**	.778**	.868**	1
	Sig. (1-tailed)	.000	.000	.000	.000	
	N	192	192	192	192	192

**. Correlation is significant at the 0.01 level (1-tailed).

Table 9 depicts the correlation of predictive variable and team productivity, the result indicates the presence of positive relationships which did not occur by chance, hence we proceed to confirm the degree of strength of the relationship using regression analysis

Regression Analysis

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.882[a]	.777	.773	.19735

a. Predictors: (Constant), Bluejeans, Google_hangout, Zoom, ezTalks meeting

Table 11: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.449	4	6.362	163.351	.000
	Residual	7.283	187	.039		
	Total	32.732	191			

a. Dependent Variable: Team Productivity
b. Predictors: (Constant), Bluejeans, Google_hangout, Zoom, ezTalks_meeting

Table 12 : Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.968	.041	-.178	23.639	.000
	Zoom	.057	.025	.208	2.307	.022
	Google meet	.092	.028	.459	3.298	.001
	ezTalks_meeting	.123	.031	1.304	4.001	.000
	Bluejeans	.351	.031		11.365	.000

a. Dependent Variable: Team Productivity

The results of regression analysis presented in table 10 shows a significant R= 0.882, this implies that multiple regression coefficients between the predictors and the criterion was 88.2%, while R^2 of 0.777 implies that predicting variables under the study were able to account or explain 77.7% variance in the dependent variable. The results also shows adjusted R^2 of 0.773 which implies organizational productivity were able to explain 77.3% variation in the performance.

The significant F.test displayed in table 11 (163.351, $p<0.05$) signifies that the overall significant prediction of independent variables to the dependent variable, this further implies that p value of 0.000 has a model fitness in regressing the effect of virtual communication and team productivity in e business firms in Southeast Nigeria.

In evaluating the model based on the regression result in table 12, zoom and eztalks meeting as a predictive variable on team productivity with (β_1= 0.057, t_1=2.307, and β_3= 0.123 t_3=4.001, $p<0.05$), the result shows that zoom and eztalks has a positive and significant effect on team productivity in e-business firm in Southeast Nigeria.

Based on the regression result in table 12, Google hangout and Bluejeans as the predicting variable on team productivity with (β_2=0.092, t_2=3.298, and β_4=0.351, t_4=11.365, p<0.05) respectively, it indicate that Google hangout and Bluejeans has positive and significant effect on team productivity in e-business firms in Southeast Nigeria.

Hence the result shows that hypothesis two is to be accepted at 5% level of significance and we therefore conclude that there is a significant relationship that exists between the virtual communication skills and team productivity in business environment in southeast Nigeria.

4.3 Discussion of Findings

4.3.1 Modern ICT Adoption and Team Productivity in selected e-business firms in South East, Nigeria

The result of analysis of research question revealed that 81% of the participants agreed that there is a positive relationship between Modern ICT adoptions and Team Productivity. The test of hypothesis one using Pearson product moment correlation coefficient to assess the nature of relationship between Modern ICT adoption and Team Productivity in selected e-business firms in South East, Nigeria, led to the rejection of the null hypothesis and the acceptance of the alternate hypothesis. It was found out that there is a positive relationship between Modern ICT adoption and Team Productivity (r =.716, P<0.05). Mohd (2015) supports the finding which states that virtual leadership using mobile technology increase Job Performance among School Leaders in Malaysia.

4.3.2 Communication Skill and Team Productivity in selected e-business firms in South East, Nigeria

The findings revealed that there was a positive significant relationship between communication skill and Team Productivity(r = 882, P<0.05). The result of test of hypothesis two using Pearson product moment correlation coefficient led to the rejection of the null hypothesis and the acceptance of the alternate hypothesis. Jones (2016) supports the findings which demonstrate that intra-team communication had fully mediated the relationship between virtual leadership and job performance.

5.1 Summary of findings

1. It was found out that there is a positive relationship between Modern ICT adoption and Team Productivity (r =.716, P<0.05).
2. It was revealed that there is a positive relationship between communication skill and team productivity (r =.882, P<0.05).

5.2 Conclusions

From the findings, we conclude that there is positive and significant relationship between e-leadership and virtual team productivity in e-business firms in Southeast, Nigeria.

5.3 Recommendations

i. In order to strengthen the commitment and productivity of employees in e-business firms, leaders of e-business firms need to build an effective relationship through adoption modern ICT with their subordinates. Team leader should monitor closely the tools and the latest technology and change par time so as to be able to gain competitive advantage in this ever changing, dynamic and turbulent global world.

ii. The management of e-business firms in south-east Nigeria should institute the performance management system, information-access capabilities to develop the necessary ICT skills like virtual communication skills; e-mail management skills, electronic presentation skills and video conferencing of both virtual leader and team members should be developed.

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