AKKAYA science publishing

International Journal of Economics and Management Vol. 1 Issue **(1)** pp 19 - 25, 2019

The Effect of Information Technology on Organizational Agility and Productivity in Telecommunication Industry of Libya

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Abstract
Considering that productivity has a critical effect on the economic development of a country, it is regarded as the basis upon which an economy's prosperity is hinged, which in turn affects national growth. Economic growth is also hinged on information technology as a veritable resource for companies and organization for their processes. Despite several studies on the impact of information technology investment as it relates to organization growth, it still remains a debate if IT investments has a significant effect on better productivity and business efficiencies. Libya is a country where the IT`s potential is limited in terms of reach and usage, as data shows that amongst the MENA regional countries, Libya has the least internet penetration rate only behind Algeria, Iraq and Yemen. This study investigates the effect of information technology on the productivity and organizational agility of telecommunication companies in Libya. The study took a survey of sample size of 364 respondents from telecommunication industries in Libya, using a four-point experience scale (4-Excellent). The questionnaires were divided into three parts, with each section highlighting the IT incorporation in the companies based on companies' IT infrastructures and Personnel usage, the organization productivity in terms of market profits and lead, and the organization agility. Results show that the effect of information technology on organizational agility is quite significant. The study goes to show that the competitiveness of the telecommunication industry in Libya is heavily hinged on the growth and integration of Information technology.
Keywords: Information Technology, Productivity, Investments, Libya, Economics Growth

1. Introduction

The movement towards globalization recently which is ongoing has made data innovation a standout amongst the most critical components in attaining customer surveys in markets as well as in improving quality. The influence of IT on the growth of an economy, productivity, employment, work organization and level of competition have been exposed by several recent studies. (Satti, 2012)

Dedrick et al, (2013) projected that productivity at the organizational level is influenced by the level of competition, leading other organizations to intensify the development of their productivity. However, increment in productivity does not necessarily connote increased profitability. Competition may cause lower prices, thus eroding improvement in margins. Consumers who eventually get more value added for the price paid becomes the beneficiaries. This pattern is termed 'CONSUMER SURPLUS'. Rationalization as a result of minimal human involvement has been achieved by IT implementation. Automation is what these areas of IT are called. The ease of acquiring information has been increased and enhanced. Accessing, analysing, storing and communicating information can result to pure rationalization. These aspects were explained by Zuboff to be informational. The employees are empowered and enriched with quality decisions and performances under the aspect of information. The third type of effects is Transformational; this covers the changes detected in process innovation and transformation. Another one is based on the relevance of increment in value due to better technology, which is viewed by consumers. IT is believed to be a productive resource to promote the growth of the economy, profitability and furthermore consumer loyalty. It has a noteworthy part to pull up the nature of correspondence administrations. IT in the correspondence administrations can be productively rewarding when the different parts of the companies put in use the proper successful business process Reengineering BPR. Fornell and Reichheld (1987, 1990) discussed that the survival of telecommunications service providers most times depends on its capacity to provide and adapt to changes in customer requirements, in addition to the changes that can occur in regulation and technology.

Process redesigning is the starter step in Business process re-engineering (BPR); it results in changes in areas of a business organization, which will comprise of features of a job, measures of performance, the reward system and structure of the organization. Moreover, change in the perception of corporate management on technology is facilitated by BPR. Also it fills in as an elective channel through which IT arrangements are surveyed and picked (Soliman, 2017).

The increase of new work technique depended on creation strategies starts from the development of profitability. At the point when another innovation of IT was presented in business life, the pull up of production rate was

believed to occur. As regards this, Solow (2011) stated that computer age is evident in every place, with the exemption of data on productivity. A condition, Horzella (2011) articulated that was later described as the productivity paradox. Studies that were done on firm-level in the assembling and administration segment have demonstrated that IT ventures contribute positively towards profitability. The aims of the research is to look into the effect of IT on productivity in major industrial organizations in Libya and investigate the productivity measurement models.

2. Conceptual Framework

The conceptual framework of this study focuses on the IT, productivity, Organization agility and BPR and the presumed relationship between them. It summarizes the main concepts that will be used this research. Reference develops an accurate framework to know the effect of IT on productivity and organization agility and evaluate BPR factors at major Libyan Industries.

The work of Gilchrist et al, (2014) and also prior researches have stated the impacts of IT as automating, informing and Change. Labor capital has been directly substituted for by automating impacts. For instance, the usage of a computer-based, information system in a retail store, by a cashier reduces transaction time greatly. The effect is the place a data framework supplies data that gives the leaders the opportunity to choose all the more successfully. In addition to the above example, information that was retrieved especially from the store-based system enables the business firm to decide effectively on inventories. This may improve the total factor productivity rate at the firm level. To attain substantially higher levels of productivity, the firm re-work a process; it could be a productive one. Hence, results in Transformed impacts. The firm may also redesign their supply chain by making use of a chain of supply of the management system, of which the store system is a central element.

The addition put in by information technology compared to output and productivity of an economy has been questioned by IT productivity paradox as a result of marked retardation in productivity growth despite huge and progressive IT investment. The connection between IT capitals and Productivity has been calculated and stated by various research studies over the years. Initially, the findings about the corresponding correlation were inconclusive, but based on recent studies such as that of Harzolla (2011), significant relationship between IT and Productivity have been highlighted and this led to the statement “there is no more productivity paradox”.

Porter and Millar said in the year 1985 that the specific limit of information control is sometimes underscored in the information age where it is associated for high grounds, which also causes relationship to recognize the need of strength units with respect to IT wander. In perspective of past examinations, Chandra and Calderon (2009) imparted information compel as the measure of information that must be gotten and arranged by its regard chain and customers. Exactly when an industry has high information constrain, this suggests its things or organizations expect more undertakings from customers. Besides, a by and large high repeat is recorded by particular ventures in using and invigorating information. Case can be found in the age of fundamental things, for instance, pencils which needs less information stood out from conveying complex things, for instance, satellites which necessities are altogether high. The last thing compose must have its information invigorated every now and again and used on a sweeping scale. Wade and Hulland (2014) and Chen et al. (2013) argued that as a result of the nature of the environment being linked to strategy making, environmental uncertainty must be a potential moderator of IT capability effectiveness. Environmental uncertainty deals with the uncertainty around an organization. According to studies such as Teoand King (2007) and Newkirk and Lederer (2016), environmental uncertainty is of three dimensions namely dynamism, heterogeneity, and hostility. Dynamism has to do with unpredictable changes in the environment and the unpredictable nature of demand for products or services, the unpredictable behaviour of competitors, and the rate of technological change brings about these changes. The dimension of environment uncertainty that deals with the complexity which arises from the diversity of products or services and customer behaviour is what is referred to as Heterogeneity. The degree of competition and the availability of resources in such competitive environment are referred to as Hostility. Galbraith (1974) noted these three environmental uncertainty dimensions indicate that the higher the information processing ability required by organizations, the higher the environmental uncertainty.

The Contingency perspective has discussed that the performance of organizations is incidental on both internal and external constraints, where when internal capabilities fits into the external environment is the optimal. In this study, environmental uncertainty and information intensity are the two variables used as moderators for these reasons:

1. Information power relies upon the business where an association has a place and changes all the more gradually despite the fact that ecological vulnerability may change rapidly. More so, natural uncertainty exists as a transient factor, while data power exists as a long haul component. The comprehension of changes in authoritative readiness depends essentially on these two attributes Information force demonstrates a moderately unsurprising element of the earth which is a perfect supplement for the earth while ecological vulnerability mirrors the flimsiness of the earth
2. As stated by Jaworski (1999), environmental uncertainty has been documented as the primary aspect of the external environment. Environmental uncertainty in this study also entails three dimensions that constitute a relatively comprehensive picture of the environment.

3. These two factors have been expressed as moderators in other relationships.
4. Certain limitations have come up in the process of examining these two factors which affect capability-agility relationships, despite the fact that information intensity and environmental un-certainty are the two major variables in this Contıngency theory. It has been advanced that ecological variables limit the sending of hierarchical capacities.

Experimental confirmation from crafted by Stoel and Muhanna (2009) affirmed that natural variables directed the connection between hierarchical execution and IT ability. The balancing out impact of natural factors in the connection between IT productivity and business nimbleness has been completely inspected. In concurrence with these writing, the two exogenous relevant factors i.e. ecological uncertainty and data power, which are likewise condition related factor can conceivably be required to direct the connection between authoritative readiness and IT ability. Supported by these studies, one can postulate that data force and ecological vulnerability can direct its effect capacity on hierarchical deftness. The essentialness of the capacity to upgrade upper hand i.e. readiness is featured by high data force. In addition, Chen et al. (2013) noted that more dynamic, complex or hostile environments require additional information-processing capability (IT capability) to improve agility. Organizations tend to develop capabilities when the environment is uncertain, with the purpose of using information to a large degree so that they can react to changes in a rapid and more tractable way.

3. Research Method and Hypotheses

This research type is used when it is necessary to show that the value of other variables is determined or affected by one variable. The examination questions demonstrate that this investigation is illustrative. Initially, Literature survey was intended to separate the hypothesis of the connection between IT, Organization nimbleness and profitability and investigate the high interconnection amongst IT and efficiency. There were three theories, which were tried to clarify how IT and the fundamental monetary elements of the businesses are associated.

A quantitative research is used for study. The value of IT capitals and non-IT capitals is connected to the quantitative data in first phase. They were collected and gathered from the telecommunication industries in Libya. During the second phase, the employees and experts of the organizations were been administered the questionnaires and the sample size used in this study is 364. The data and information were collected by different methods. Different documents and records were used in the first phase. All the data was retrieved from the telecommunication industries in Libya.

3.1 Results and Discussions

This section of the study will look at the frequencies of the different demographic variables, and see how they affect the organizational productivity and organizational agility and also the impact of technology on organizational productivity and organizational agility by using correlation and regression analyses.

Table 3.1: The independent Sample T-test for Gender Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Organizational Productivity	Equal variances assumed	41.387	.000	2.871	362	.004	.25613	.08923	.08066	.43160
	Equal variances not assumed			3.363	356.697	.001	.25613	.07616	.10635	.40592
Organizational Agility	Equal variances assumed	2.508	.114	2.002	362	.046	.20014	.09995	.00359	.39668
	Equal variances not assumed			2.067	271.521	.040	.20014	.09682	.00953	.39075

Independent sample t-test

The independent sample t-test is applied in a case where the demographic variable has just two items to the variables. In the case of this study, only gender is qualified as a demographic variable whereby the independent sample t-test can be analysed. If the significant value of the result < 0.05, the study will accept H1; confirming the presence of statistical significance. But on the other hand, if the significant test if there is a statistical significant difference in the means of the different items in value > 0.05, the study will reject H1; thus, confirming the absence of statistical significance

It is of importance to note this study has two dependent variables which are; organizational productivity and organizational agility. Therefore, the result of the independent sample t-test will determine

The Effect of Information Technology on Organizational Agility and Productivity in Telecommunication Industry of Libya the relationship between the gender and both organizational productivity and organizational agility.
From table 3.1 above, the significant value for organizational productivity is 0.01 and that for organizational agility is 0.04. Both values are less than 0.05. This therefore means the study accepts H1; thus, stating there is a statistical significant difference between the different gender categories and organizational productivity as well as organizational agility. This further means male and female employee of the study has a different outcome with respect to productivity and agility.

3.1.2 Correlation analysis

The correlation analysis seeks to verify the direction of influence of information technology on both organizational productivity and organizational agility. The correlation analysis also seeks to verify if the correlation is strong, moderate and/or weak as well as the significance of the correlation. To be able to interpret the correlation analysis, the following hypotheses are brought forth.

3.2 Hypothesis

$1H_0$: Information technology has an indirect impact on organizational productivity
$1H_1$: Information technology has a direct impact on organizational productivity
$2H_0$: Information technology has an indirect impact on organizational agility
$2H_1$: Information technology has a direct impact on organizational agility

Pearson Correlation between Information Technology with respect to organizational productivity and organizational agility

Table 3.14 below presents the result of the Pearson correlation. This table shows a Pearson correlation of 0.787 between information technology and organizational productivity. Also, the 2-tailed significance for this correlation is 0.000. This result is interpreted to mean that information technology has a direct and positive impact on organizational productivity as well as a strong correlation and high significance between both variables (information technology and organizational productivity.
On the other hand, the table also presents the Pearson correlation for both information technology and organizational agility. It reveals a Pearson
The last but not the least analysis of this correlation of 0.633, and a 2-tailed significant result of 0.000. This result also indicates a strong correlation between information technology and organizational agility indicating a positive, strong and direct impact of information technology on organizational agility as well as very significant relationship between both variables. The result of this as well can be seen from Table 3.14 as presented below.

Table 3.14: Pearson Correlation between Information Technology with respect to organizational productivity and organizational agility Correlations

		Information Technology	Organizational Productivity	Organizational Agility
Information Technology	Pearson Correlation	1	.787**	.633**
	Sig. (2-tailed)		.000	.000
	N	364	364	364
Organizational Productivity	Pearson Correlation	.787**	1	.706**
	Sig. (2-tailed)	.000		.000
	N	364	364	364
Organizational Agility	Pearson Correlation	.633**	.706**	1
	Sig. (2-tailed)	.000	.000	
	N	364	364	364

**.

3.2.1 Regression analysis

This analysis just like the correlation analysis looks at the connection between the dependent variable(s) and the dependent variables(s) and with the case of this study, it seeks to support the result derived from the correlation analysis as well as go beyond to confirm if the study has any auto correlation test, a further look at regression model and regression coefficient and determine the strength of the exploratory variable.
The regression analysis is the best applied technique to determine the density and distribution of variance of data. This is achieved with the aid of the scatter plot which forecast the extent to which productivity and agility are distributed. The result is interpreted to depict either dense or moderate, or sparse distribution of the variance.
The next focus of the regression analysis is on the regression model. The reading from the model summary for organizational productivity from table 3.15 below shows that the R square which explains the power of the exploratory variable is given as 0.619 also read as 61.9%. This actually means 61.9% of the factors or elements of organizational productivity have been taken into consideration by this study. This finding can be said to be great for this study as an exploratory power of more than 50% predicts a right representation of the variables.

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International Journal of Economics and Management Vol. 1 Issue **(1)** pp 19 - 25, 2019

Table 3.15:Model Regression for Organizational Productivity

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.787[a]	.619	.618	.50383	.619	587.382	1	362	.000	1.266

a. Predictors: (Constant), Information Technology
b. Dependent Variable: Organizational Productivity

The reading from the model summary for organizational agility from table 3.16 below shows that the R square which explains the power of the exploratory variable is given as 0.401 also read as 40.1%. This actually means 40.1% of the factors or elements of organizational productivity have been taken into consideration by this study.

Table 3.16: Model Regression for Organizational Agility Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.633[a]	.401	.400	.70315	.401	242.597	1	362	.000	2.145

a. Predictors: (Constant), Information Technology
b. Dependent Variable: Organizational Agility

Table 3.17:Coefficient of Organizational Productivity

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-1.007E-013	.026		.000	1.000	-.052	.052
	Information Technology	.906	.037	.787	24.236	.000	.833	.980

a. Dependent Variable: Organizational Productivity

The Coefficient of the regression analysis helps to clarify the correlation analysis. This study revealed from the correlation result that information technology has a positive, strong and significant impact on organizational productivity. From the table above, the value of Beta read from the standardized coefficients which is a prediction of the direction of information technology and organization productivity is 0.787. This therefore concludes from both correlation and regression analysis, information technology has a positive, direct, and significant impact on organizational productivity.

The unstandardized coefficient on the other hand predicts the regression line. Reading from the B value of the unstandardized coefficient reveals a constant value of -1.007E-013 as well as the value of information technology to be 0.906. Both values give the regression line equation. $Y= \alpha + \beta x_i + \beta x_{ii} + \beta x_{iii} + \beta x_{iv} + X_t$

Y = Dependent variable or explanatory variable, α = constant value
β = coefficient of the independent variables or exploratory variable.
x_i= Independent variables X_t = error term.

Organizational productivity = -1.007 E-013 + 0.906 Information Technology.

Table 3.18: Coefficient of Organizational Agility coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.003E-013	.037		.000	1.000	-.072	.072
	Information Technology	.813	.052	.633	15.576	.000	.710	.915

a. Dependent Variable: Organizational Agility

The Coefficient of the regression analysis helps to clarify the correlation analysis. This study revealed from the correlation result that information technology has an affirmative, direct, strong and significant impact on organizational agility. From the table above, the value of Beta read from the standardized coefficients which is a prediction of the direction of information technology and organization agility is 0.633. This therefore concludes from both correlation and regression analysis, information technology has a positive, direct, and significant impact on organizational agility.

An unstandardized coefficient on the other hand predicts the regression line. Reading from the B value of the unstandardized coefficient reveals a constant value of 1.003E-013as well as the value of information technology to be .813. Both values give the regression line equation.

$Y= \alpha + \beta x_i + \beta x_{ii} + \beta x_{iii} + \beta x_{iv} + X_t$

Y = Dependent variable or explanatory variable, α = constant value

β = coefficient of the independent variables or exploratory variable.

x_i= Independent variables X_t = error term.

Organizational agility= 1.003E-013+ 0.813 Information Technology.

Summary and Conclusion

This research investigates the relationship between Information technology and Organizational capability in Telecommunication industries in Libya. From literature survey, it was shown that Information technology has a huge bearing on significant growth of organization.

The results gotten from this study shows consistency with earlier investigations that represented its positive essentialness on Organizational spryness. From the correlation tests, it was deduced that there is a huge and solid connection between Information and organizational productivity, i.e. an increase in information technology incorporation in the organization will goodly affect efficiency and authoritative agility. This is in the sense that, as we are in the computer age, and most organization are delving into IT, this helps to improve some areas like rapid awareness, advertisement, ease of transactions, and better competitive edge. Also, for start-ups, within the first and second year, the tests have shown that IT can help improve productivity and organizational agility.

The regression test which is a form or way of predicting or forecasting the effect of Information technology on productivity, and organizational agility, the result shows that more investments in IT, can help businesses grow in terms of productivity and agility. This can help Libya as a country, to compete alongside other countries and also have a better chance at increasing the economy, helping businesses to move towards international standards. It is recommended that Libya should have a wider and solid platform for Information technology for IT, as this can help converse more and create more awareness for business and even for clients outside the country. In terms of organizational agility, Information technology reduces work stress, and gets through a larger audience or range of customers. So, it is safe to say that an increase in IT should also give an increase in productivity, and organizational agility. And help increase the economy of Libya within a shorter period of time than expected.

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