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## The Impact of IT Investment on Service Delivery: A Case Study of Ladoke Akintola University

<sup>1</sup>Adewoye J, <sup>2</sup>Ayo, C. K, <sup>2</sup> Oni, A. A, and <sup>2</sup>Adebiyi A. A

<sup>1</sup>Department of Management Sciences, Ladoke Akintola University of Technology,  
Ogbomoso, Nigeria.

<sup>2</sup>Department of Computer and Information Sciences, Covenant University,  
Ota, Nigeria.

**Corresponding Author: Adewoye, J**

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### Abstract

*The past decade witnessed an extensive use of Information and Communications Technology (ICT) in all forms of work all over the world. It has given birth to contemporary e-Business, e-Health, e-Government and e-Education to mention but a few. This paper aims at investigating the level of investment in ICT in Ladoke Akintola University of Technology (LAUTECH), Ogbomoso, the level of usage, its impact on service delivery as well as the inhibiting factors against its use. Survey instrument was used in this study and the collected data analysed based on such issues as availability of ICTs, Organizational Readiness (OR) and Organizational Support (OS) amongst others. Findings revealed that investment on IT has positive impact on services delivery through ICT tool deployment for teaching, examination processing, student registration and assignment.*

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**Keywords: ICT, e-Education, service delivery, investment and technology**

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### INTRODUCTION

Services represent substantial part of business output and investments. In providing these services Information Technology (IT) is employed to facilitate the services, which represents a substantial portion of corporate spending. The objective of such investments is to create business value. But in order for any investment to have a positive impact on business value, additional revenues need to be created or overall costs reduced. Thus, when evaluating investments in services that have potential contributions to the improvement of business performance, the interactions of costs among the various business processes and activities need to be considered (Roztocki and Weistroffer, 2008).

Investment in information technology can have dramatic effects on both the internal and external operations of a business organization as well as academic institutions. Internally, improved IT systems can enhance and strengthen organizational infrastructure and capacity by increasing employees' efficiency; service coordination; information sharing between departments, financial record keeping and tracking of an organization's production and impact. Externally, information technology solutions can fundamentally transform business organization service delivery (Allison, 2010).

University administrators around the world are expanding their investment in information technology (IT), specifically the web technology and Internet in carrying out activities such as teaching, student

registration and exam processing (Yang, 2008; Ting, 2005; Chen & Paul, 2003; Huang et al, 2004). Likewise, lecturers and students are using the Internet as medium of communication. Lecturers are being requested to make their teaching materials available online on institution's websites for students' accessibility. Students are encouraged to communicate with instructors, or with one another, via email (Chenug and Huang, 2005).

Therefore, the impact of IT investments on service delivery and business value is an important issue for researchers, resource managers and other stakeholders. IT business value and service delivery include productivity enhancement, profitability improvement, improved work relations, competitive advantage and efficient use of resources at both intermediate level and organizational level (Prasad 2008; Melville et al., 2004; Devaraj 2003; and Kohli 2003). While institutions invest substantially in IT resources both in developing and developed countries, much attention has not been given to the understanding of how IT creates value in business in developing countries. Many of the findings from developed countries have a limited value to stakeholders in developing countries (Prasad 2008). The topic of the payoffs of IT investments in the developing countries is an important issue for business managers and academics researchers. It has been observed that very little research is reported about the impact of IT investments on business value and service delivery in organizations (Roztocki et al.,

2004). An understanding of the contribution of IT investments to business value and service delivery in developing countries will provide investors more confidence and direction in their IT investments (Prasad 2008).

The main objective of this paper is to evaluate the impact of IT investments on service delivery in academic institutions in Nigeria. The study used LAUTECH as a case study. The study identifies the impact of availability of IT facilities on academic and administrative activities such as lecture delivery and examination processing. The study also tries to investigate how internet facility has contributed to online interaction within the university community, and lastly, it examines the inhibiting factors of ICT development. The research question and hypothesis are as stated below:

#### **Research Questions**

1. Is there any impact of IT investments on service delivery by staff of LAUTECH?
2. Does LAUTECH investments in IT have any impact on service delivery to its staff?

#### **Hypothesis**

H<sub>0</sub>: There is no significance difference in IT investments on service delivery by staff of LAUTECH.

H<sub>1</sub>: There is significance difference in IT investments on service delivery by staff of LAUTECH.

The rest of this paper is organized as follows: Section 2 presents a review of related works. Section 3 describes the research framework and research methodology adopted in this study, section 4 presents analysis of the data obtained, while section 5 presents discussion and gives a brief conclusion.

#### **REVIEW OF RELATED WORKS**

There are quite some research efforts on IT investments on service delivery. However, understanding IT investments' contribution to business value and service delivery has been challenging and perhaps more challenging in developing countries due to generally less predictable changes in social, political, and economics infrastructure (Roztocki and Weistroffer, 2004). Findings in the work of Ziadi and Knufie (2006) that examined the impact of ICT on organizations in Tunisia revealed that the Tunisian companies are not yet completely committed to the revolution of the information technology. This lack of initiative is primarily explained by the fact that these new technologies require investments, including development of human resources, which Tunisian companies do not feel ready to provide.

Also, Prasad (2008) conducted a study of intangible benefits of IT investments in Fiji. The findings

indicated that for businesses in developing countries, their IT investments provide intangible benefits, especially at the process level and this contributes to business value. In a similar research effort, Roztocki and Weistroffer (2004) presented a framework for evaluating IT investments by integrating the value chain model with activity-based costing in emerging economies, where the primary motivation of the many investments is an improvement of cost structure. Furthermore, in the work of Roztocki and Weistroffer (2008), a value chain analysis framework was presented for evaluating investments for services. They argued that in order to achieve reliable cost estimation, the framework employs a costing system, which integrates activity-based costing with economic value-added performance measure.

Oliver (2002) emphasised the impact of ICTs on educational practice in higher education, as a tool with the capacity to transform education from a teacher directed enterprise to more of student-centred models. He also argued that the use of ICT in higher education settings could enhance knowledge creation through increased use of ICT among students. Markel (2001) also discuss the use of ICT tools as a means of fostering interaction and knowledge creation among students through the use of online discussion forums. Yang (2008) examined the impact of ICT on higher education among tertiary teachers and students. The study also explored the issues that emerged from the implementation of ICT in higher education institutions, in the University of Tasmania. His finding revealed that ICT tools employed in learning and teaching can be both advantageous and disadvantageous.

#### **RESEARCH FRAMEWORK**

Literature reveals various information systems (IS) theories for evaluating usage and antecedent factors of technology. Some of these include: Technology-Organization-Environment Framework (Tornatzky and Fleisher 1990), Technology Acceptance Model (TAM) (Davis et al., 1989), the IT Diffusion Process Model (Straub, 1994), Diffusion of Innovation theory (Rogers, 1995) to mention but a few. Technology-Organization-Environment Framework which describes the process by which an organisation adopts and implements technological innovations has been influenced by the technological context, the organizational context, and the environmental context (Tornatzky and Fleisher 1990). The technological context is the internal and external technologies that are relevant to the organisation e.g equipment and processes. The organizational context refers to the characteristics and resources of the organisation such as the firm's size, degree of centralization, degree of formalization, managerial structure, human resources, amount of slack resources, and linkages among employees. The environmental context includes the size and structure of the industry, the competitors, the

macroeconomic context, and the regulatory environment (Tornatzky and Fleisher 1990). Straub extended the TAM by adding a social pressure (SP) and information richness (IR) into the model to examine the productivity benefits of the use of E-mail and fax in Japan and United States (Straub, 1994). In this model titled “IT Diffusion Process Phases”, productivity benefits are considered to be the result of information technology use, which is based on two antecedent variables - SP and IR in addition to the TAM variables – Perceived usefulness and perceived ease of use. Cheung and Huang (2005) proposed a framework for assessing Internet usage in university education. The framework investigates the impact of Internet on learning and job prospect considering organisational and individual factor, perception and attitude, and Internet usage (Cheung and Huang, 2005). The research framework adopted for this study as shown in figure 1 integrates theoretical perspective from the study of Straub (1994), Tornatzky and Fleisher (1990), and Cheung and Huang (2005). The framework takes into account organisational factors and IT usage as factors influencing IT investment on service delivery such as management support, institutional goal power supply, improved funding and security. The first variable takes into account organisational context. Previous research demonstrates that organisational support, information technology (IT) support, IT skills are important factors that influence usage, and the impact of use and also considered as antecedents for Internet use (Anandarajan et al., 1998; Cheung and Huang, 2005). The second variable describes various aspects of Internet usage by the university staff, including the frequency and intensity of Internet use (Cheung and Huang, 2005; Tornatzky and Fleisher, 1990). The third variable examines the impact of the use of IT on service delivery according to Straub’s model (Straub, 1994) and interaction with students.

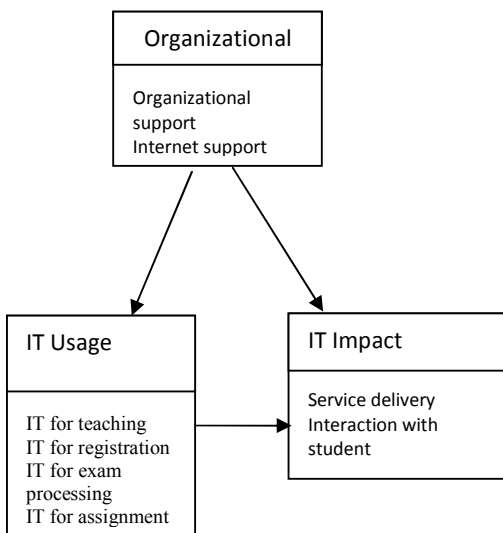


Figure 1: The Research Framework

## RESEARCH METHODOLOGY

The research design used in this work is descriptive and inferential. Questionnaire was designed with comprehensive information to evaluate the impact of IT investment on Service Delivery. The research was conducted in LAUTECH, Oyo State, Nigeria. LAUTECH is one of the government owned universities that has a notable use of IT tools for both academic and administrative use. The research population constitutes the academic and administrative staff of the institution. The questionnaire was administered to the staff of the institution in order to capture their opinion on the research questions. This is because the required information can only be obtained from the staff of the institution.

The questionnaire was titled “*Impact of IT Investment on Service Delivery in LAUTECH*”. It consists of two sections namely section one and section two with relevant questions to the required data. Section one contains eight (8) questions aimed at collecting staff demographic data and other information on IT facilities expected to be provided by the management of the Institution. Section two contain thirteen (13) questions to evaluate the extent to which respondents agreed or disagreed with the impact of IT investment on Service Delivery, interaction with student, and factors inhibiting IT deployment in LAUTECH. The respondents were asked to indicate their choice to each question on a likert scales (1- 5) with possible response from 1 = Strongly Agree (SA), 2 = Agree (A), 3 = Neutral (N), 4 = Disagree (D) to 5 = Strongly Disagree (SD). All the questions added up to twenty-one (21). To determine the reliability and validation of the research instrument, the service of an expert was engaged in the field of computing. The expert is a PhD holder with sufficient experience in Management Information System. The comments and suggestions given were integrated in the questionnaire before it was administered. The questionnaire was personally administered by the researcher to the academic and administrative staff of the institution. 150 questionnaires were distributed, 131 were properly filled and retrieved. This means that a response rate of 87.33 per cent was achieved. The data collected was analyzed using the statistical package for social sciences (SPSS) version 15.0. The reliability of data collected was validated using cronbach alpha. The data was also analyzed based on statistical description, correlation, and t-test.

## DATA ANALYSIS AND PRESENTATION OF RESULT

### Demographic Profile and Internet Usage

Table 1 shows that 60.3% of the respondents were male while 39.7% were female which shows that there are more males that participated than female. The degree of participation of the staff of the

institution shows 77.1% administrative staff and 22.9% academic staff participation in the survey. The result indicates that virtually all the staff (98.5%) of the institution are computer literate and only 1.5% are not computer literate. This clearly shows that the staff have adequate knowledge of the subject being researched on and their opinions can be relied upon. 91.6% of the respondents are familiar with the Internet while 8.4% are not familiar with the Internet. Lastly, the table shows the frequency of Internet access by the staff of the institution. Areas of IT use in service delivery as indicated by the respondent include: lecture delivery, examination processing, and student registration.

Table 1: Demographic Profile and Internet Usage

Gender		
	Freq	Percent
Female	52	39.7
Male	79	60.3
Total	131	100
Type of Appointment		
	Freq	Percent
Academic	30	22.9
Administrative	101	77.1
Total	131	100
Computer Literate		
	Freq	Percent
No	2	1.5
Yes	129	98.5
Total	131	100
Familiar with Internet		
	Freq	Percent
No	11	8.4
Yes	120	91.6
Total	131	100
Frequency of Internet Access		
	Freq	Percent
Not at all	12	9.7
Fairly Often	38	30.6
Very Often	28	22.6
Always	46	37.1
No response	7	5.3
Total	124	100

**Level of IT facility deployed for Academic and Administrative use**

Figure 2: is a chart indicating respondents' claim the adequacy of IT facilities deployed for teaching,

examination processing, student registration and assignment in the institution. The respondents agree (A) to the fact there is adequate IT facilities deployed for registration in the institution. This percentage represents 33.0% agreed, 17.6% strongly agreed while those that disagree (D) is 12.3%, 17% strongly disagree (SD), and 21.0% are neutral (N). The respondents strongly disagree (SD) to the fact there is adequate IT facilities deployed for teaching in the institution. This percentage represents 27.3% strongly disagree (SD), 24.4.0% disagree (A) while those that strongly agree (SA) is 6.2%, 22.3% agree (A) that the facilities are adequate and 19.2% are neutral. For examination processing, the highest percentage of 33.3% (i.e. 43 respondents) agree (A) to the claim that there are adequate IT facilities deployed for examination processing in the institution, 6.9% strongly agree (SA), 27% are neutral (N) while 23.3 disagree (D) and 26.3% of the respondents are neutral (N). The respondents disagree (D) to the fact there is adequate IT facilities deployed for class assignments in the institution. This percentage represents 28.4% disagree (A), 23.6% strongly disagree (SD), while those that agree (A) is 17.5%, 4.5% strongly agree and 26.0% are neutral.

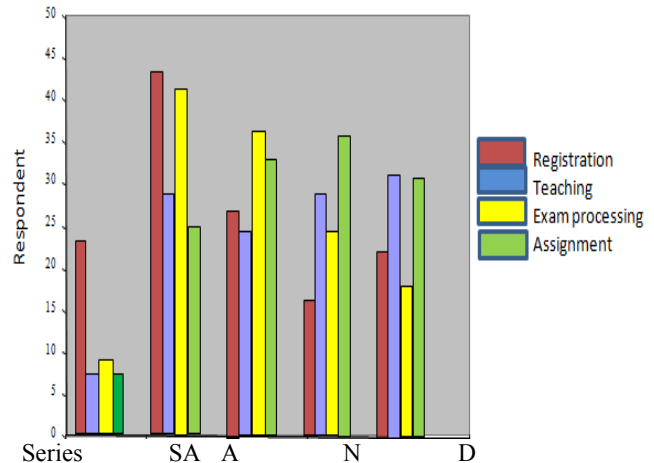


Figure 2: Staff assessment of IT facilities deployed for registration, teaching, exam processing and assignment.

**Level of IT deployed for office use and online interaction with students**

Figure 3 presents the respondents assessment of the level of IT facilities deployed for office. From the figure, 24.2% strongly agree (SA), and 28.2% agree (A) to this claim there is adequate Internet facilities in their offices. 15.2% disagree (D) and 18.3% strongly disagree to this claim while 13.7% are neutral. Likewise, for online interaction with students, the highest percentage of 31.2% indicates that the respondents agree (A) to the claim that there are adequate online interactions with students of the institution. Only 9.2% strongly agree to this claim

while 16.4% strongly disagree (SD), 14.5% disagree and 28.1% of the respondents are neutral (N).

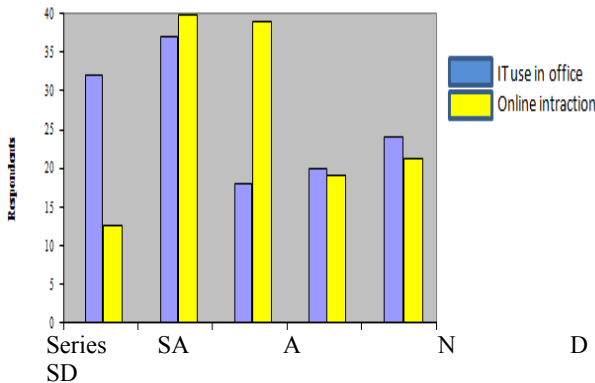


Figure 3. Respondents' assessment of Internet facility in their offices and online interaction with students.

**Test of Research Questions**

The correlation analysis was carried out to examine the relationship between the research variables. Descriptive statistics for the study's principal constructs are shown in Table 2. The results of the correlation analysis (Table 3) showed that there is significant correlation 1% significant level between IT usage and service delivery, IT usage and online interaction, and organizational factor on the impact of IT investment on service delivery.

Table 2: Descriptive Statistics

	Mean	Std. Deviation	N
Ser_delivry	2.7939	.97442	131
ITUsage	3.1775	.94842	131
OrgFactor	2.7309	.77249	131
Online_Stud	2.9847	1.21519	131

**Research Question and Hypothesis Testing**

Table 3: Correlation Matrix

		Online_Stud	Ser_delivry	ITUsage	OrgFactor
Online_Stud	Pearson Correlation	1	.296(**)	.448(**)	.297(**)
	Sig. (1-tailed)		.000	.000	.000
	N	131	131	131	131
Ser_delivry	Pearson Correlation	.296(**)	1	.446(**)	.386(**)
	Sig. (1-tailed)	.000		.000	.000
	N	131	131	131	131
ITUsage	Pearson Correlation	.448(**)	.446(**)	1	.475(**)
	Sig. (1-tailed)	.000	.000		.000
	N	131	131	131	131
OrgFactor	Pearson Correlation	.297(**)	.386(**)	.475(**)	1
	Sig. (1-tailed)	.000	.000	.000	
	N	131	131	131	131

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

**Hypothesis Testing**

However, the focus of this research is to evaluate the impact of IT investment on service delivery in LAUTECH. Hence, the two variables namely: IT investment in LAUTECH is high and there is efficient service delivery in LAUTECH was evaluated based on the responses of the respondents. The research revealed that the highest percentage of the respondents were neutral (N) to IT investment in LAUTECH is high as shown in figure 4 mainly because they lack adequate information about financial investment in IT facilities in the institution, however 18.7% agree (A) that IT investment in LAUTECH is high. On the other hand, in figure 5, the highest percentages of the respondents 42.8% agree (A) that there is efficient service delivery in LAUTECH. While 21.4% of the respondents disagree (D) to the fact that there is efficient service delivery in LAUTECH.

Again, further analysis revealed a statistically significant relationship between IT investments in

LAUTECH is high and there is efficient service delivery in LAUTECH. A t-test one-sample test between the two variables as indicated in table 4. Therefore, H0 is rejected and H1 is accepted.

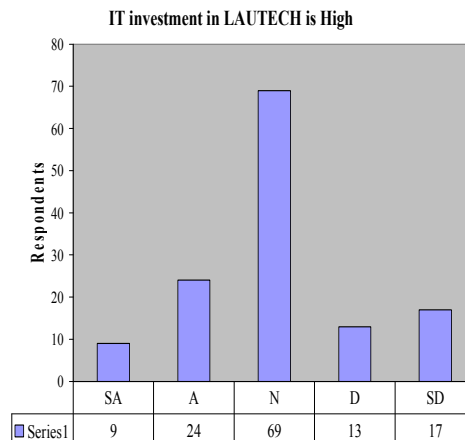
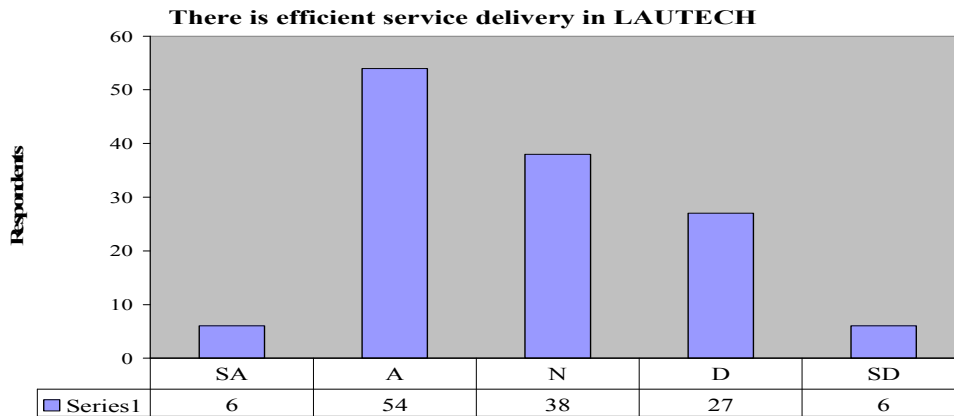


Figure 4: A chart indicating respondents' response to the claim that IT investment in LAUTECH is high.

Figure 4; shows that highest column depicted that the respondents are neutral (N) to the claim that IT investment in LAUTECH is high. This percentage represents 52.0%. 6.9% strongly agree, 18.3% agree, 9.9% disagree (D), and 12.9% strongly disagree (SD).



The highest percentage of 42.8% in figure 5 indicates that the respondents agree (A) to the claim that there is efficient service delivery in LAUTECH, 4.5% strongly agree (SA), 29.1% were neutral (N) while 21.4% of the respondents disagree (D) and 4.5% strongly disagree (SD).

Figure 5: Chart indicating respondents' response to the claim that there is efficient service delivery in LAUTECH

Table 4: A t-test one-sample test between IT investments in LAUTECH is high and there is efficient service delivery in LAUTECH

	Test Value = 0						
	t	df	Sig. (2-tailed)	Mean Difference		95% Confidence Interval of the Difference	
				Lower	Upper	Lower	Upper
High Investment	32.654	127	.000	3.039	2.85	3.22	
Service Delivery	31.495	125	.000	2.786	2.61	2.96	

**DISCUSSION AND CONCLUSION**

This study investigated the impact of IT investment of service delivery. A research framework in figure 1 to find the impact of organizational factor, IT usage on service delivery. For empirical evaluation, Ladoke Akintola University, Oyo State, Nigeria was used as a case study. Questionnaire was used as the research instrument.

In summary, the relationship between factors specified in the research framework was supported. The internet usage for teaching, registration, examination processing, and given of assignment have positive impact on service delivery by the staff. Organizational factors influencing the deployment of IT facilities in the institution among others include management support, fund and power supply. However, findings also revealed that there is efficient service delivery and the availability of Internet in the institution fosters online interaction among staff and students.

Based from evidence emanated from this research study. It can be concluded that the impact of IT investment in LAUTECH is significant to the service delivery in LAUTECH. However, for further studies the opinion of administrative and academic could be analyzed separately since the usage and access of IT might be the same for the two categories of staff.

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