

# THE ROLE OF IT IN ENHANCING PRODUCTIVITY AT HIGHER EDUCATION INSTITUTIONS FROM STAFF AND STUDENTS' PERSPECTIVE - EVIDENCE FROM OMAN

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## ABSTRACT

The main goal of this research is to assess the factors affect the overall role of information technology to increase productivity of higher education institutes from staff and students' perspective, as there is a strong need to involve other stakeholders such as employees and students besides top management in these institutes in overall assessment and development, this will help decision makers to get the needed practices through which these institutes can overcome the challenges which are facing such as rapid changing in education requirements, increasing complexity of the technology domain, which required solid and updated information and analytical systems, and IT staff and student skills.

In addition the new raising challenges, like infrastructure and applying project management concepts in order to gain a competitive advantage, which will lead these institutes to grow and attract more students while offering quality education.

A model was developed in order to support the research theoretical parts about the effects of IT infrastructure, IT system analysis, IT plan, IT systems, IT staff skills, students skills and library systems on increasing productivity at higher education institutes, for this purpose a survey was done and distributed among departments and students and there were (156) respondents.

Through the theoretical study, and based on the outputs of the research survey, the researchers found that the results indicated that higher institutes productivity can be enhanced, and this enhancement will be reflected in several sub factors of the tested model, like enhancing IT systems will seriously impact the higher institute productivity and this impact can be noticed in many fields like the incomplete, and limited information for decision-making, ineffective use of employee time, lack of accurate and real-time information in the right people's hands when they need it and so on.

The findings present number of recommendations which aim to develop the awareness about the productivity of higher education institutes, from the perspective of their students.

This research clearly highlights the needs to build the right culture that keeps looking at technology as a main asset of the higher institute, in addition to pay attention to the employee factor, and try to develop their skills; all of these will make the needed results by building an IT strategy for wise investment in information technology.

**Keywords:** *IT, Education, Productivity, Knowledge, Systems, Capabilities.*

## 1. INTRODUCTION

Technology plays a great role in productivity of any organization to achieve the innovation management [1]. The main common use of IT in educational institutes is to provide students with access to online resources and enhancing educational experience, especially with the rise in student numbers and how to provide them with flexible learning opportunities[15]. Further, the use of web

technology in the library of higher institutes is to facilitate the access to the electronic resources [6]. Also, the rapid changes in IT enhanced the dissemination of information, sharing material, and publications [28]. Furthermore, if the technology designed in a way made it easy to use and support academic goals, it will help student to use digital primary-source collections to the fullest extent [25]. Although the use of technology in learning has been shown to increase motivation, enhance critical



thinking and develop a more comprehensive perspective, many students do not learn the skills needed to master technology as quickly as others. This is concerning because it supposed that students will enhance their skills when using technology frequently [2].

## 2. LITERATURE REVIEW

According to the aforesaid, the rapidly growing interest in use information technology in education sector over the world, due to several reasons like the neediness to create well educated generations to deal the rapid advancement of science and technology to build the country and modernize it. Also, the latest researches lead to recognize that technology as an asset. However, educational institutes can use it to improve students' level by developing and maintaining the present and future value of technology assets and increase productivity of technology among the actors [1].

This study derive its importance as it is deals with one of the main issues that affects the productivity of the companies, and how to benefit from the technological assets, in other words; Higher education institutions can overpass the challenges that affect the productivity of the by implementing the wise investment strategy in information technology because it is recognized as an effective tool for improving the productivity at universities. The main objective of this study is to identify the extent to which the components of IT affecting the productivity. So, the researchers are trying to answer the following main question: To what extent these components (IT Infrastructures, IT Systems, IT Staff, Students' IT skills and Electronic Library) in affecting the work productivity in higher education institutions.

### 2.1. Information Technology Pillars

The Information Technology pillars include it infrastructure, it systems, it staff capabilities, it students' skills and e. library.

#### 2.1.1. IT Infrastructure

The expenditures on building and maintaining information technology infrastructure, takes over 58 percent of an organization's information technology budget and the percentage is growing at 11 percent a year [11]. So, Infrastructure is the important base of technology innovations [5], [35]. However, many firms resort to overspend on

software, paying insufficient attention to data accuracy and integrity [7], [21].

#### 2.1.2. IT Systems

Because of positive expects that the investment in information technology systems will lead to large outcomes for the firms [21]. Soto-Acosta & O'Cerdan [32] found that there is positive relationship between firm performance and business strategies, so companies should use the sense and respond strategy making in this turbulent environment of economic and businesses , especially under unpredicted future, and this planning needs joint efforts from all stakeholders in the organizations [27], [12], [34], [19]. However, the key success factor to avoid this turbulent environment is planning of the enterprise system [14]. Further, the most important key to achieve success for information systems managers is strategic information systems planning, and IT systems should be reliable and have good performance [10].

#### 2.1.3. IT staff Capabilities

IT staff is one of the important success factors of the organizations, because they contribute to system analysis and design in addition to human resources planning [17], [33], [29]. For that, majority of organizations are seeking to acquire the people holding oriented approach in business [26], [33], [29]. Thereby, the existence of knowledge workers is the focal point of information system success, but they must be qualified in several skills, in addition to their IT skills, like ability to understand the vision and issues of business, self-development, and team working [8], [33].

#### 2.1.4. IT Students' skills

To accomplish the success of information technology in higher education institutions, students must have the know-how, capabilities, skills, and expertises [36]. Beyond that, higher education institutions provide community intellectual capital, so they try to align the students ability with their overall strategy. [30], [13], [41].

#### 2.1.5. E. Library

E-library significantly reduced time finding and verifying information [9] thereby, higher education institutions are an important e-resource for high technology firms [37]. Any e-library should be rich



of the subject contains, and these subjects should be up to date, in addition to make sure that the e-library should be available 24/7/365 [21].

## 2.2. Higher Institute Productivity Pillars

The higher institute productivity pillars include efficiency, vision and missions, support decision makers, students and staff productivity

### 2.2.1. Efficiency

The success in information technology implementation depends on the successful in meeting the user(s) [21]. Moreover, any organization must take in consider, during implementing information technology, both the technical and social systems that shaped the organization [22]. Many dimensions are used to assess information technology such as efficiency of execution, technical performance, and business performance, in addition to measurement tools like system usage estimation, cost analysis, employees, and incremental performance in decision-making effectiveness' efficiency). Furthermore, appropriate frameworks are required to direct the specialists in education how to exploit advanced information and communication technologies, to significantly enhance the efficiency of traditional learning and training methods [4].

### 2.2.2. Vision and Missions

To help employees to aware what they are doing, and achieve organization's mission, organization have to build a shared vision' especially for the future desired goals [16]. So, in the company's plan, it is better to determine the necessary people involved to achieve the vision of the organization [31], including increase the relation with students and staff as both of them are considered as customers of the university [21].

the information technology pillars were IT Systems, IT Staff Capabilities, Students IT skills and Electronic Library.

### 2.2.3. Support Decision Makers

Obtaining good information technology infrastructure will enhance the ability of decision makers by providing requested and accurate information; this will lead to faster problem solving and more rapid adaptation to organization requirements [20], [40], [24]. Moreover, managers are encouraged to include management values, to consider the experience, culture, structure, and processes to facilitate the implementation of information technology practices [23].

### 2.2.4. Students and Staff Productivity

Information technology helps people to improve variety skills [39]. In addition; if information technology taken in consider of organization management as a crucial factor to reach innovation and getting competitive advantage as a result of that, so organizations will interact with information technology as a capability centred on understanding the strategic advantage of know-how, creating intellectual capital, and understanding the strategic advantage of know-how [18], [38], [3], thereby, the firm can depend on information technology to establish information systems to improve the productivity of the staff, students and decision makers[21].

## 3. RESEARCH MODEL AND HYPOTHESES

Based on the literature review, a model was developed to be tested. The core elements of the Model which was build is the information technology and the higher institute's productivity. The proposed model comprises of two constructs as described, the main elements of productivity which the researchers studied are "Efficiency, Vision, Decision makers and Performance", while

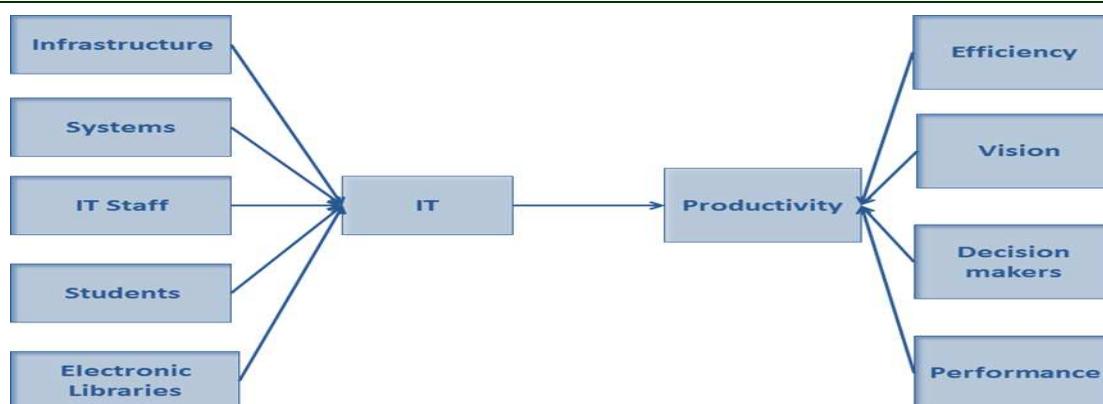


Figure 1 Main Research Model

#### 4. RESEARCH METHODOLOGY AND MEASUREMENT MODEL

The researchers used the survey technique to test the proposed model, the sample used in this study consists of 156 respondents representing higher

education's institute in Oman. The sample was selected randomly from students and employees.

Excel was used for data entry, then the data will be exported to SPSS 21, for analysis; normality test will be done the factor analysis and finally regression check will be done to evaluate the effect of IT in higher institute's productivity.

<p><b>Hypothesis 1:</b> There is a significant relationship between IT System and its components (IT Infrastructure, System Development and System Availability).</p>	H1a: Well-designed IT infrastructure is positively associated with information technology application rate
	H1b: Well implemented IT Systems in higher education institute is positively associated with information technology application rate.
	H1c: High capabilities of the IT staff at the higher education institute is positively associated with information technology application rate.
	H1d: High capabilities of the IT students at the higher education institute is positively associated with information technology application rate.
	H1e: Greater existence of well planning and development e.library System is positively associated with information technology application rate.
<p><b>Hypothesis 2:</b> There is a significant relationship between higher institute education dimension and its components (Efficiency, vision, support decision maker, performance)</p>	H2a: Higher efficiency is positively associated with higher institute education productivity.
	H2b: Clear vision is positively associated with higher institute education productivity.
	H2c: Flexible decision making is positively associated with higher institute education productivity.
	H2d: Good performance is positively associated with higher institute education productivity.
<p><b>Hypothesis 3:</b> Information Technology applied in the organization will enhance the organizational strategic position.</p>	

Table 1: Research Hypotheses

5. DATA ANALYSIS AND ARESULTS

A descriptive data analysis showed distribution results.

5.1. Descriptive Data Analysis

After ensuring that the sample meets the normality conditions, the researchers started factor analysis for each construct.

Data was analysed using excel and distributed by role, sex, faculty and the program the results showed that 62% of the samples were from the bachelor level, 15% were postgraduate students and 23% were from the diploma level.

Distribution by Education Level

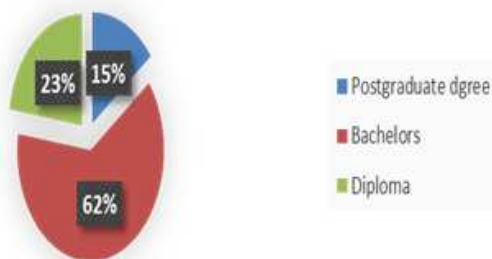


Figure 2: Sample Distribution By Education Level

Also the results showed that 29% of the samples were employees and 71% were students, and this gave the students perspective more weights in results, as the students are goal from each educational process.

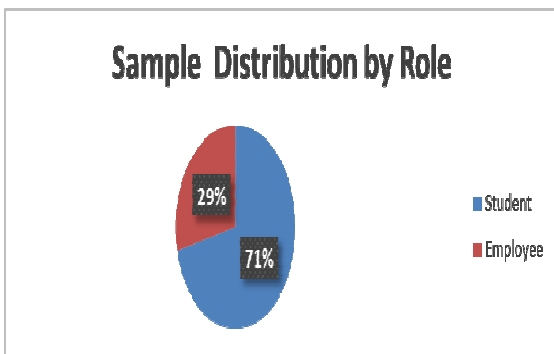


Figure 3: Sample Distribution By Role

In addition, the sample was fairly balanced by males 49% and females 51%.

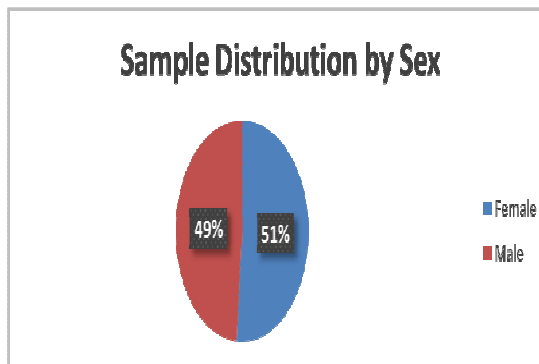


Figure 4: Sample Distribution By Sex

5.2. Information Technology Construct Factor Analysis

The initial factor analysis indicated the existence of one dimension (one-factor solution) of IT construct. All variables seen in below are the principal descriptors of first dimension.

The factor analysis showed sound validity. Loadings ranges from .518 to .815 showing a clear validity, as the measures greater than 0.5 are thought to reach the usual accepted range so the items loaded significantly on a one dimension.

Reliability was calculated based on Chronbach’s alpha for the systems construct, the result showed a reasonable reliability Chronbach’s Alpha equals to .699.

Table 2: Factor Analysis Results

Infrastructure	0.711
Systems	0.815
IT Staff Capabilities	0.685
Students IT skills	0.706
Electronic Library	0.518
Chronbach’s Alpha	0.699
N of Items	4

5.3. Productivity Dimension Factor Analysis

The initial factor analysis indicated the existence of one dimension (one-factor solution) of productivity construct. All variables seen in below are the principal descriptors of first dimension.

The factor analysis showed sound validity. Loadings ranges from .755 to .837 showing a clear validity, as the measures greater than 0.5 are





thought to reach the usual accepted range so the items loaded significantly on a one dimension.

Reliability was calculated based on Chronbach's alpha for the systems construct, the result showed a reasonable reliability Chronbach's Alpha equals to .739.

Table 3: Factor Analysis Results

Efficiency	0.797		
Vision	0.837		
Decision	0.836		
Performance	0.755		
Cronbach's Alpha	0.739	N of Items	4

### 5.4. Structural Model Testing

This proposed model comprises of two constructs as described below:

- Technology was modeled as a first order construct comprised of the five first-order dimensions: (1) Infrastructure, (2) Systems, (3) IT Staff Capabilities (4) Student IT skills (5) e. Library
- Productivity was modeled as a second order construct comprised of three first-order dimensions: (1) Efficiency, (2) Vision, (3) Decision and (4) Performance.
- Through the theoretical study, and based on the outputs of the research survey, the researcher found that the results indicated that higher education institutes' productivity can be enhanced, and this enhancement will be reflected on all processes, in addition; poor information technology will seriously impact university productivity and this impact can be noticed in many fields like the incomplete or limited information for decision-making which means lack of accurate real-time information in the right people's hands when they need it, ineffective student productivity.
- From other hand and it it's clear that infrastructures, IT Systems, IT Staff, Students IT skills and electronic library are very important factors that play a significant role in the Productivity but with different ratios. And it seems that higher education institutes' IT staff have a serious problem regarding the Self-development and intention to share information in addition to problems regarding to e-library systems within the university.

- And it is noticeable also that all the relation between the technology and its pillars (Infrastructure, Systems, IT Staff, Students IT Skills, e.Library) are so weak.

Table 4: Information Technology Factors

Regression		Beta (β)
<b>Technology Construct</b>		
Infrastructure	IT	0.285
Systems	IT	0.295
IT_Staff	IT	0.309
Stud_skills	IT	0.279
e. Library	IT	0.282

And it is noticeable also that all the relation between the productivity and its pillars (Efficiency, Achieving the university vision and missions, Support decision makers, Increasing student productivity) are also weak.

Table 5: Productivity Factors

Regression		Beta (β)
<b>Productivity Construct</b>		
Efficiency	Productivity	0.317
Vision	Productivity	0.306
Decision	Productivity	0.322
Performance	Productivity	0.294

### 5.5. Model Analysis

According to analysis using SPSS, it can be concluded that information technology has a huge role in achieving productivity in higher education institutes.

Table 6: Model Analysis

Model		Unstandardized Coefficients B	t	Sig.
1	(Constant)	1.398	4.217	.000
	IT	.686	6.926	.000

**Productivity = 0.686 \* Information Technology**  
(Where Constant = 1.398)

According to analysis, results of hypotheses testing are listed in the following table:

Table 7: Hypotheses Testing Results

Hypo. No.	Hypothesis	Result
<b>H1</b>	<b>Information Technology</b>	<b>Accepted</b>
H1a	Infrastructure	Accepted
H1b	Systems	Accepted
H1c	IT Staff Capabilities	Accepted
H1d	Students IT skills	Accepted
H1e	Electronic Library	Accepted
<b>H2</b>	<b>Higher Institute Productivity</b>	<b>Accepted</b>
H2a	Efficiency	Accepted
H2b	Achieving the university vision and missions	Accepted
H2c	Support decision makers	Accepted
H2d	Increasing student productivity	Accepted
<b>H3</b>	<b>Information Technology - Higher Institute Productivity</b>	<b>Accepted</b>

## 6. DISCUSSION AND RECOMMENDATIONS

The study aims to suggest a means to enhance the understanding of the concept of productivity at higher education institutes and its importance by using technology as a main tool as it is contributing as much as 0.686 of overall productivity, so the outcomes of the theoretical and statistical study are used to put a practical suggestions through which higher education institutes can enhance its productivity.

Based on the findings, number of recommendations are presented to use information technology as a main tool to develop and achieve good awareness about the productivity.

It is clear that higher education institutes should pay attention to IT staff and student factor regarding IT skills as their contribution values were (0.309, 0.279) respectively, and always tries to develop their IT skills and experience, so more focused training programs should be implemented to staff and students, in addition to developing of processes with proper technological tools and create a culture of collaboration and building systems which the can store the experiences and IT staff best practices.

In addition, Infrastructure (0.285), Systems implemented and used (0.295) and e. Library (0.282) are very important factors that upper management at these institutes identifies and use appropriate IT and e.library systems for internal work and enrich the contents of it

## 7. RESEARCH LIMITATIONS

There are several limitations, the first one is that this study was conducted in Oman, other higher institutes in other countries should be involved in the study to generalize the model and results, also the researchers' opinion that the questions are really explain the theoretical ideas, these questions were from the point of view of the researchers, in addition, structural equation modelling should be used to better analyze the collected data.

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