

## Measuring the Impact of Information Technology Use on the Marketing Performance of Business Organizations

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### *Abstract*

*This study aims to identify the significance of information technologies and their impact on the marketing performance of Jordanian business organizations. For this purpose, a research model incorporating information technology use, sales, market share and marketing performance has been proposed. A questionnaire has been developed to examine the hypotheses based on the literature review. The initial survey was pretested and evaluated by a panel of experts in marketing and IT in order to assess the validity of each construct. The data was collected from (66) business organizations (industrial and service) in the area of Amman, Jordan. The results of the study indicated a statistically significant correlation between the independent and dependent constructs of the study. The paper additionally employs Ortica applications. All the hypotheses of the study were accepted, there is a statistically significant correlation between the information technology use and improvement in marketing performance (market performance, sales, and market share) percentage.*

**Key Words:** *Information Technology, Infrastructure, Knowledge, Information Systems, Marketing Performance.*

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### **Introduction**

IT is a significant concept at the present time; it has managed in the past few years to elevate marketing in its various activities in a manner which kept pace with the rapid developments in various countries. This has been achieved through the utilization of the various advanced tools and means developed in the field of activities implementation in business organizations, including the marketing field. This is especially notable in regards to telecommunications, information technology, advancements in products provision, and the various means of completion of purchasing and selling transactions, most notably through internet marketing, which significantly changes the direct application of e-commerce. The use of information technology in planning and implementation of marketing activities, including traditional ones, has become the basis of the formulation of marketing strategies due to the positive implications of the use of this technology in raising the efficiency of the marketing performance of various organizations.

The importance of the concept of technology and its reflection on marketing performance in business organizations still holds the interest of many current researchers including (Agan, 2011, Alsamaydai et al 2004, Schillewaert and Ahear 2001, Osullivan et al 2007, Stone et al 2014), while other researchers such as (Traainor et al 2011, Alghazadeh 2015, Alghamdi and Bach 2014) have focused on marketing strategies. In related contexts, other researchers were interested in studying information technology and management in business organizations like (Boonmak, 2007, Chan et al 2006), while many others have turned their attention to information technology and the competitive advantage, such as (Mornagi et al 2014, Breznik 2012, Dehning and Statopoulos 200).

Furthermore, information technology has had an impact on improving marketing productivity which is reflected in raising the efficiency of marketing performance. The impact of Information Technology is evident in the adjustment of marketing practices and methods of planning and implementation, leading to reduced costs and durations. This is accomplished through the use of information systems in accordance with the concept of productivity where the optimal use of available resources reduces costs and maintains the required outputs' quality improvement (Asamydai and Rudian, 2006). Concerning marketing services, information technology contributes to reducing the demand for individual-dependent services in favor of a direct interaction between the service provider and the customer which in turn leads to raising the efficiency of marketing performance.

This study will focus on the use of information technology in business organizations (industrial and services) and its impact on marketing performance, which can be measured in three aspects: Consumer performance (satisfaction and loyalty), market performance (sales and market share), and financial performance, which focuses on profitability and its impact on investment, (ROI).

Due to limitation in terms of time and the difficulty of obtaining profitability indicators on investment's returns, this study will focus on market performance (sales and market share) as the basis for measuring marketing performance.

### Research Questions

The research focuses on the following questions:

Does employing information technology in performing marketing activities in business organizations affect the adequacy of the marketing performance in such organizations?

Is there a relationship between using information technology and the adequacy of the marketing performance?

Does raising the adequacy of the marketing performance justify using information technology, namely, extra costs that have to be paid for by these organizations for the purpose of developing infrastructure (technical tools and machines, etc. ) to be able to use information technology?

### Research Objectives

This study aims towards the following:

The goal of this study is to determine the effect of information technology use on marketing performance, which means the goals of the study can be summarized as following:

- 1- Measuring the effect of information technologies use on marketing performance (market performance, sales, and market shares).
- 2- Determining the relationship between information technology use in a business organization and the adequacy of the marketing performance.

## Study Model

The study model basically incorporates the development factors and variables that the current study intends to measure. These were drawn from many studies including: stone et al 2014, kevin et al 2011, yavuz, 2011, supattra, 2007 Alsamydai et al 2004.

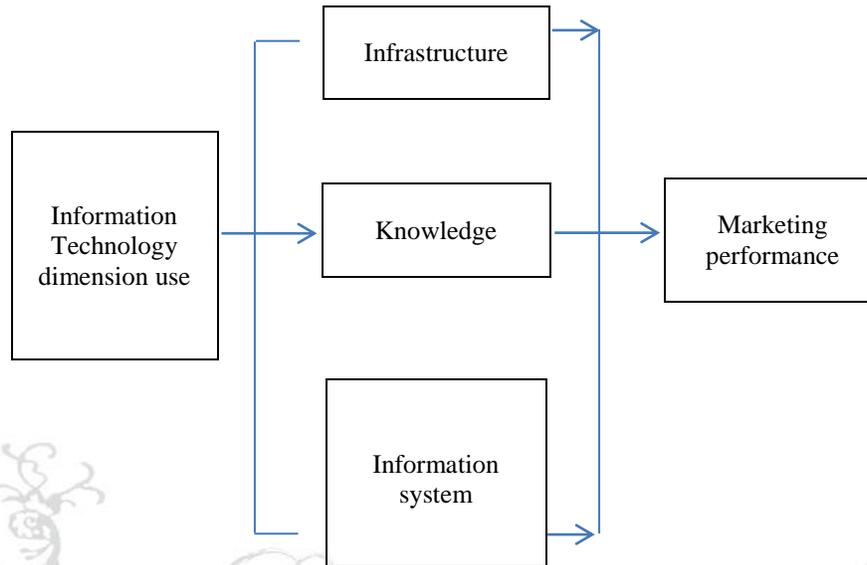


Figure (1) study model

## Procedural Definitions of the Components of the Study Model

### Information Technology

In this study, information technology is viewed as a set of software applications in support of marketing performance activities. Boonmak (2007) stressed the importance of information technologies specifically the internet based ones. In addition, Sehillewaert Ahearn (2001) discussed vital role that information technology as the tools of an organization's sales activities.

According to Alsamydai and Rudiana (2004), the term information technology refers to anything concerned with the use of computer technology and the hardware and software used for the storage, retrieval and processing of information. Reliance on information technology has helped in obtaining the desired results of the organizations and aids them in making decisions (production, Marketing, and Finance) which contribute to the upgrading of the performance.

As stated in O'Brien and Marakas, (2006) information technologies have a vital role in adjusting the approach by which a company compete. They provide companies with an efficient way to operate, collaborate and formulate efficient marketing decisions. Many researchers, such as leek et al (2003) Naud and Holland (2004) correlated that information technology effect marketing strategies that one important to secure profitable relationships with consumers.

The effect of information technology on the marketing process has been widely known in the last two decades (Leverich et al 1998). Information technology and its effects on business have been in the forefront of scientific thinking in the last two-three decades (Salo et al 2005). Many researchers concluded that technology has an impact on the main activity of marketing strategies, which is the securing and refining of profitable relationships with the consumer. (Leek et al 2003), (Naude and Holland, 2004), Avra Movie,

2010 explains that the business's reaction is a result of a continuous accurate and rapid flow of information possible through information systems and information technology. Information technology systems are increasingly being required to perform more sophisticated activities (Sorensen and Buatsi, 2002). Information is power, which is equally true for core business production processes and marketing activities. The information provided by technology enables marketing to gain a deeper knowledge of processes, thereby facilitating instituting changes aimed at increasing efficiency and reinforcing the competitive position of the company. As stated in Boonmak (2007), information technologies are a vital component of a successful business or organization. Information technologies including infrastructure, Knowledge and information systems.

### **Infrastructure**

The infrastructure of any organization consist of accounting, finance, Human resources and information system (Rommeyl, 2006) information systems include recruiting, hiring, training and providing employee benefits and compensation. Investment in new IT, website development, and product design purchasing activities, sales, and supply chain.

Information technology (IT) is generally divided into two major components; Technical IT infrastructure and human IT infrastructure. Managerial IT is often dependent on other interpersonal relationships, which may take years to develop (Chatfielol and Bjom- Andersop, 1997).

The reinforcement of these skills is very complicated process at organizations (Mata and Barney 1999), This is because IT managers need to work with other functional managers and several suppliers and customers to develop suitable IT programs in organizations (Yavaz, 2011). Therefore, it is apparent that IT infrastructure provides a sustainable competitive advantages for firms (Bharadwaj, 2000).

### **Knowledge**

Knowledge is increasingly becoming the resource rather than a resource for generation. It is widely recognized that knowledge is the most critical asset to individuals as well as organization to succeed in an increasingly competitive environment. Many definitions of knowledge exist, for example Jenex (2007) defines knowledge as that which is understood. For Crowne (2009) knowledge is the most valuable asset a firm holds and it is difficult to protect because of the challenges related to determining its expropriation.

Alsamydai and Rudiana (2012) define knowledge a fluid mixture of experiences and insights provided by the foundation and you. It also embodies the experiences and new information which arises in the minds of knowledgeable organizations including business organizations as they often put this knowledge in documentation, storage and archive and not only that, but in systems, processors, practices and standards. (Alsamydai and Rudiana 2004) additionally refer to knowledge as the collection of facts and methods and conditions which constitute the scientific and cultural breadth of human perception and make it able to handle any problem it may face.

In this regard, Alsamydai and Rudiana. (2012) make three distinctions regarding data which can be stored on paper, computer disks or USB. Information exists in the collective thought of the knowledgeable society, but it is the information lying in the person's individual thought that an organizations or individuals can benefit from so that it may be deemed knowledge. (Knowledge = information stored + the ability to use that information).

### **Information systems (IS)**

As stated in (Alfred, 2010) information system is the set of components that includes people, computers, and information collection procedures to facilitate decision-making. Therefore, any organization must have

the time and effort that is devoted to data collection, processing and delivery for everyone who is looking for information.

Information systems have become more complex in concurrence with the increasingly complicated decisions facing organizations. The decision-making effort necessitates an applied scientific level that must be consistent with the need for information, and that information requires preparation and training of the workers to use practical information system for decision-making (Alsamydai and Rudiana.2012).

Information system help organizations and business organizations in strategic and operational decisions as well as in supporting the adoption of those resolutions so that they help in lifting performance and reflect the organization's ability to use information technology techniques. Information systems have often been considered a support function, but this is no longer the case as they have become an integral part of an organization's efforts across the value specter (Gunasekarm and Ngai 2004). They have had early and significant contributions where they were heavily involved in creating efficiencies in supplier inventory, logistics and operations. Keeping in mind that marketing is about the provision of value, several trends related to and pertinent to discussions of marketing and marketing strategy are parts of the firm infrastructure.

### **Marketing Performance**

Business performance can be defined as the measured objects' ability to generate output which has predetermined characteristics related to predetermined goals. As stated in Aghazadeh (2015) business performance consists of three main components:

**Customer performance: A Satisfied and Loyal Customer**

**Market Performance: Sales Volume and Market Share**

**Financial Performance: profit, ROI.**

Marketing performance measurement has long been a main concern in marketing literature and a core troubling issue for companies. Morgan et al (2003) indicate that "both academics and managers currently lack a comprehensive understanding of marketing performance process and the factors that affect the design and use of marketing performance assessment system within corporations".

### **Literature Review**

Literature dealing with the effect of information technology reveals that besides information gathering, segmental and targeted market, mass customization ,customer relationship management (Rust-Espinoza, 2006) and client interaction (communication and sales), further areas of the marketing mixture (Brady, 2003) have equally benefited from the development of information technology.

The research of Trainor et al (2011) examines the performance implications of integrating information technology with marketing capabilities and other firm -level resources. The study of Boonmak (2007) examines how management information systems, information systems and information technology affect the performance of organizations. Khallafand Skantaz (2004) studies the effect of expertise on marketing value in a paper titled "Does leadership Matter? The effects on information technology expertise on the market value of a firm. Chan et al (2005) addresses firm performance differences in a paper titled "wealth creation form information technology: An assessment of firm performance differences using the EVA. The study of Agan (2011) examines the impact of operations, marketing, and information technology capabilities on supply chain integration .This study conceptualized supply chain integration as a higher level process integration capability comprised of operational, marketing, and information technology capabilities. Bush (2001) investigates the effect of information technology infrastructure on supply chain

integration. Marinagi et al (2014) examine the impact of the information technology the development of supply chain competitive advantage.

The Shehillwaert and Aheavne (2001) study examines the effect of information technology on salespersons performance to understand information technology impacts. Delon and Mclean (1992-2003) proposed a theoretical framework linking perceptions of information, system and service quality to impact on the user's performance through the degree of system use and satisfaction system. Alghamdi and Bach (2014) surveyed technological factors to improve performance of marketing strategy As stated in this study (2014) marketing strategies must consider interactive technologies since the majority turn to online marketing and advertisements, and information on products and services, to make purchases and compare brands. The study of Stone et al (2014) examines the impact of IT on individual and firm marketing performance, the results of this study address the measure of organization traits, individual traits, information quality, system service quality, and tasks performance using the marketing organization mediated individual performance impacts (perceived usefulness), attitudes toward using the system, and system use. The study of Lamberti and Noci (2010) examines marketing strategy and marketing performance measurement systems. The result of this study shows that companies pursuing different marketing strategies adopt different MPMS, the authors further explores the impact on the relationship, discussing it in the context of existing literature.

The marketing literature has established the role of marketing in firm performance outcome such as firm performance generally and new product development more specifically (Akedenez at al 2010., Theodosiu et al 2012., Nath and then Raman 2014., Jifeng 2015, Jifeng, 2015). Alsamydai et al (2004) study examines the effect of using information technology on marketing performance efficacy. The results of this study have shown that the use of information technology has had an effect on marketing performance efficacy.

## Study Hypotheses

In light of the study objective and model, the study hypotheses were formulated as following:

### First Category

- H1: the infrastructure dimension of information technology has an influence on marketing performance.
- H2: the knowledge dimension of information technology has an influence on marketing performance.
- H3: the information system dimension of information technology has an influence on marketing performance.
- H4: the use of information technology has a positive effect on marketing performance.
- H5: the information technology dimension has an influence on marketing performance.

### Second Category

An examination of the relationship between the period of information technology use and marketing performance.

- H6: there is a significant positive theoretical relationship between the period of information technology use and the increase in marketing performance (sales and market share percentage)

### Third Category

An examination of the constructs of study model.

- H7: there is a significant positive relationship between the constructs of the study's model: information technology dimensions (infrastructure, knowledge and information system) and marketing performance.

## Methodology

### Data Sources

The current research methodology is based on two sources of data collection; a secondary source consisting of books, periodicals, literature and references which have been resorted to in order to accomplish the purposes of this research, and a primary source which is related to data collection through the design of a questionnaire. The final version of the questionnaire comprised of (66) items to measure.

### Study Instruments

A special questionnaire was administered as a tool for this research which was designed as stated in the study model, utilizing the Likert scale (strongly agree, agree, neutral, disagree, and strongly disagree). In addition, this study was divided into four dimensions which are related to the different components of the study model. The dimensions are: (information technology dimension; infrastructure, knowledge, information system, and marketing performance dimension).

### Test of Natural Selection

The Kolmogorov-Smirnov test was used to test the extent to which the data followed natural selection. P-value was higher than 5% for each part of the research which indicated that the data followed the natural selection model. Several statistical techniques were used including Kolmogorov-Smirnov test, Cronbach's alpha. Descriptive analysis, multi regression analysis, and one sample t-test. The t-test was employed to accept /reject the hypotheses (group) through testing the average mean of single sample, based on the value of scale midpoint, the higher the value the more favorable the attitude, and vice versa. A midpoint equal to (3) was chosen by adding the low-coded value of the Likert scale (1) and the upper coded value (5) of the Likert scale while using the Pearson correlation coefficient for testing the four dimensions of the study model.

### Test of Reliability

Cronbach's alpha test was used to determine the fitness of the measuring tool and concluded a =.81 which is an excellent value when the accepted percentage is higher than 60%. Furthermore, the validity of the measuring tool was tested through consulting a panel of expert judges whose opinions were taken into consideration while designing the questionnaire in its current final version. The results are shown in table (1).

Table (1): coefficients reliability

No . of cases	Cronbach's Alfa	Items
66	0.81	17

### Results General

By using descriptive analysis it was determine that the mean of all questions are over the midpoint (3) except for the questions (3,6), this results show in the table (2):

Table 2

Questions	Mean	Std.Dev	T.Value	Sig: tarlle
First : infrastructure				
1- Your organization uses information technologies to support its activities.	3.28	1.09	2.14	.006

2- Your organization provides the necessary technology and infrastructure to use information technologies.	3.75	1.19	5.17	.000
3- Your organization provides necessary service that ease the use of information technologies.	2.31	.78	-7.03	.000
4- Your organization improves the heeded infrastructure and new technologies to use information technologies.	3.33	1.36	1.98	.005
5- The website and the system that is specialized to store the information in your organization is characterized by its effectiveness and flexibility to ease the use of information technologies.	3.36	1.32	2.23	.000
<b>Second: Knowledge</b>				
6- Your organization provides skilled researchers help in using information technologies.	2.95	1.52	-.24	.081
7-your organization provides special advising and educational programs that helps in using information technologies.	3.81	1.12	5.21	.000
8- Your organization provides training programs to train employees to use information technologies.	3.59	1.12	4.27	.000
9-your organization provides experienced employees specialized in using information technologies.	3.49	1.44	2.46	.001
10- Your organization provides effective systems to execute the methods and techniques of information technologies.	3.45	1.09	3.36	.001
<b>Third: information systems.</b>				
11- Your organization provides systems to execute the method.	3.50	1.23	3.30	.002
12-your organization uses information systems to communicate with it customers.	3.53	1.13	3.78	.000
13- The information provided by your company is described as being accurate objective and reliable.	3.61	1.27	3.86	.000
14- Your organization provides information that can highly affect its customers.	3.65	1.14	4.62	.000
<b>Fourth: marketing performance.</b>				
15- The use of information technologies increases the organization sale percentage.	4.51	.66	18.59	.000
16-the use of information technologies increase the organization market shore.	4.39	.60	18.73	.000
17 - the use of information technologies improves the marketing performance	4.48	.63	18.89	.000

### Testing Hypothesis

The first category : test result of first set of hypothesis of the study one shown in table (3) statistical analysis of this table , illustrates the overall mean score of respondent which measures the dimension (D1 ,D2,D3, and D4) that correspond to the first hypotheses . The mean values of theses one (H1=3.21, H2=3.45, H3=4.57 and H4=4.46) these values one above the scale midpoint (3) with the standard deviation showing small dispersion this mean moreover. These result were further validated by one sample t-test which revealed that the overall mean difference for these dimension as whole was statistically significant (N =0.000) at ns=0.01) with height T-value (H1=2.20, H2=3.54, H3=4.57and H4=24.17) these scores an bigger than tabular (tabular t=1.96).As a result of the four hypotheses an accepted, this result show in the table (4).

Table 3: testing hypotheses first category

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The hypotheses	Test value =3			
	Mean score	Std .dev	T-value	sig
H1: the physical dimension of information technology an influence on marketing performance.	3.21	.78	2.21	.000
H2: the knowledge dimension of information technology has an influence on marketing performance.	3.45	1.03	3.54	.000
H3 : the information dimension of information technology has an influence on marketing performance	3.57	1.02	4.57	.000
H4: the use of information technology has a positive effect on marketing performance.	4.46	.49	24.17	.000

Multi –Regression Analysis

H5: the information technology dimensions have an influence on marketing performance. By using multi-regression analysis to test the H5 hypotheses, the results of the analysis one shown in table (4).

Table (4) multi regression analysis

Information Technology Dimensions	Variables	R	R <sup>2</sup>	dF	F	T	Sig
	Infrastructure	.563	.317		9.61	3.01	.003
	Knowledge			2		2.15	.002
	Information System			62		2.42	.005

Dependent variable: marketing performance

Multi regression was used and we find that after observing our results in previous schedule that T-values:3.01,2.15 and 2.42 which are higher than its t- tubular value =1.96 which means that we refute the bull hypotheses H0 and accept the alternative hypotheses , H1,H2 and H3 meaning that use of information technology affects sales and market share increase which is considered a strong as R value=.563 which is high moreover information technology dimensions explains what is R2=.317 increase in marketing performance.

Testing hypotheses (H6):

H6: there is significant positive theoretical relationship between the period of information technology use and the increase in marketing performance (sales and market share percentage).The results of questions (18, 19, and 20) one shown in table (5).

Table (5) Period, sales and market share percentage

Period (years)	Sales %	Market share %
1 to 3	0.03	0.02
4 to 6	0.07	0.05
7 to 9	0.09	0.08
10 to 13	0.10	0.10
13 to and more	0.14	0.12

By using regression analysis

The results of this analysis was shown down

- Sales

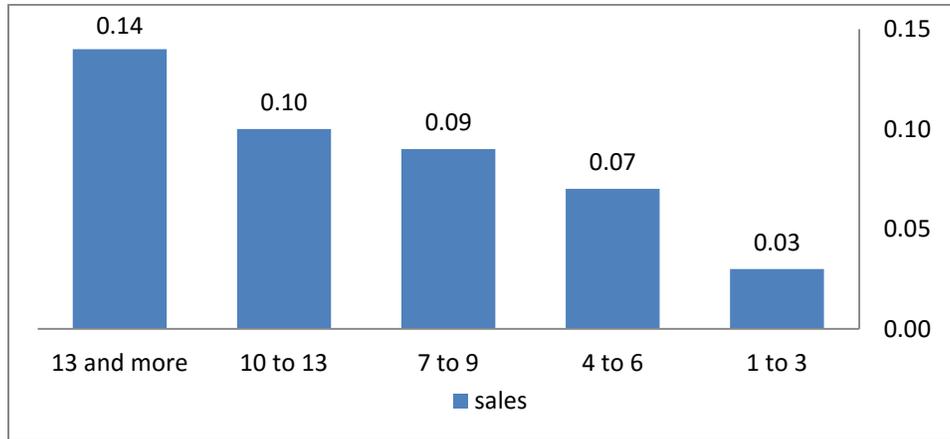


Diagram (1) sales percentage

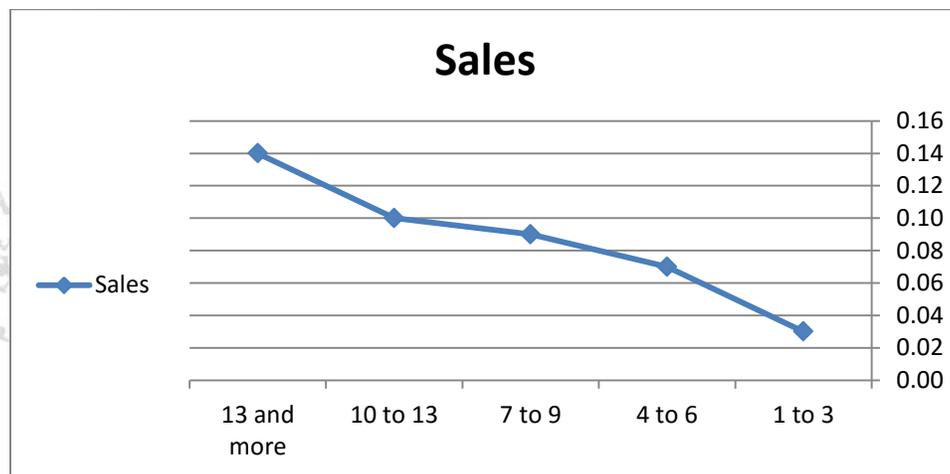


Figure (2) sales percentage

- Market share

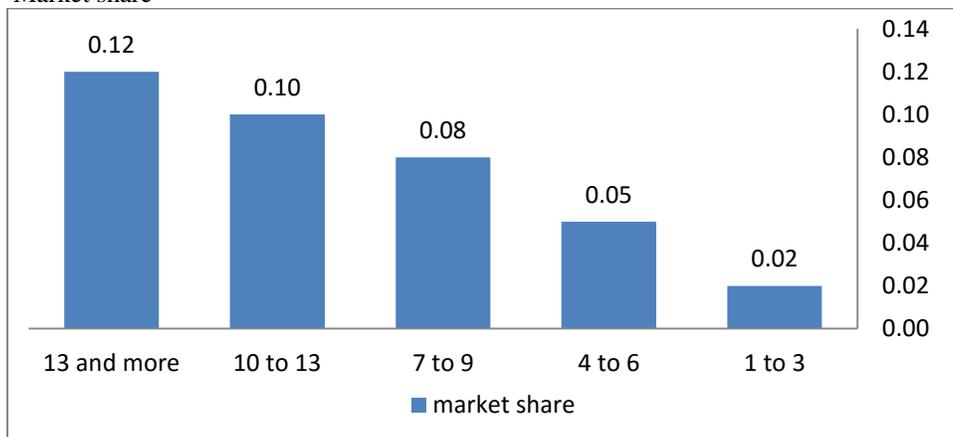


Diagram (2) Market share

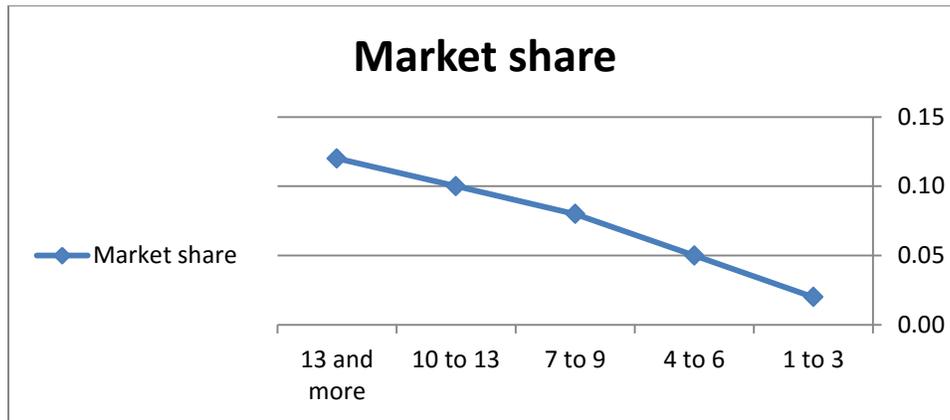


Figure (3) Market share

- Sales and market share

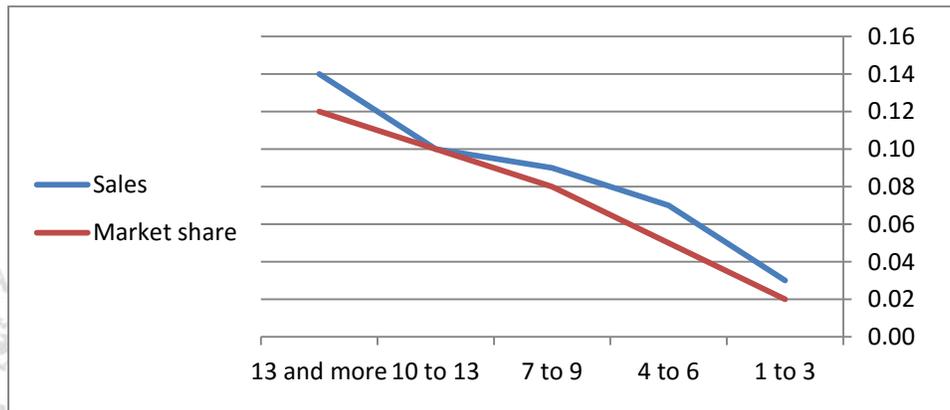


Figure (3) Sales and market share

The previous results indicated that there is a significant positive relationship between the spent on information technology and marketing performance that is indicated by the increase in sale value and market share.

H6 There is a significant relationship between the construers of study model (information technology dimension physical, knowledge and information) and marketing performance). The third category: it test the constructs of the study model. In order to test the relationship between the components of the study model, Pearson correlation coefficient was adopted and hypotheses (H7) were developed.

Result of the analysis of Pearson correlation coefficient and shown in the table (6):

Table (6) Pearson correlation.

Dimension	Dim 1	Dim 2	Dim 3	Dim 4
Dim 1	1			
Dim 2	.351**	1		
Dim 3	.586**	.431**	1	
Dim 4	.535**	.274*	.451**	1

\*\*Correlation is sine cant at the 0.01 level (2-tailed).

\* Correlation is sine cant at the 0.05 level (2-tailed).

## Discussion and Conclusion

The current study seeks to determine the effect of the use of information technology in business organizations on marketing performance. For this purpose, a study model was developed which included several factors that were divided into four dimensions including: information technology dimension (infrastructure, knowledge and information system) and marketing performance. Three categories of the hypotheses were developed based on the literature review and a pre-test study. The first category consists of four hypotheses where each one covers a dimension included in the study model, representing the information technology dimension that affects the marketing performance as stated in the survey of the study sample. The second category focuses on the relationship between the period of information technology use and marketing performance (sales and market share percentage), while the third category seeks to test the constructs of the study model, in order to test the relationship between the components of the study model.

The analysis of the data was mainly based on conducting “Descriptive statistics” to extract the means and standard deviation. This was followed by using a one sample T-test analysis to examine the first four hypotheses, and then by using a multi regression analysis to test the H5 hypothesis. As for the of the research’s second category’s hypothesis, it was mainly developed to examine the relationship between the period of information technology use and marketing performance (Sales and marketing share). The third category’s hypothesis (the seventh hypothesis), was mainly developed to examine the relationship between the different constructs of the study’s model, and person’s correlation coefficient was used to test it. The most important results of this study were:

The responses of the study's sample to the questionnaire's items (20 questions) were all positive, except for two questions (questions 3 and 6) as the means for these questions were less than three (midpoint=3). The data of the study's first dimension (infrastructure) indicated that the organizations provide the necessary technology, the infrastructure and the use of information technology with a mean value of (3.75). In contrast, the results indicated that the organizations did not provide skilled researchers to help in using information technologies, as the mean value of this dimension was (2.95) which is lower than (3). In general, the knowledge factors within its dimensions indicated a positive effect on marketing performance showing a mean value of (3.45) and T value of (3.54). Conversely, the surveyed organizations did not provide the necessary services for the use of information technology, and the value of this dimension was (2.31), which is lower than the midpoint (3). Regarding the second factor, which is related to knowledge, it was found that organizations provide special advising and educational programs that help in using information technology with a mean value (3.81). As for the third dimension, the information system, results indicated that the organizations provide information that can highly affect its customers and scored a high mean value of (3.65), results additionally indicated that this dimension has a positive influence on marketing performance with a mean value of (3.57) and a T. value of (4.57). Regarding the fourth dimension, marketing performance, the results of this dimension in general have had high values with a mean value of (4.46) and T-value (24.17), indicating that the use of information technology has an effect on sales, marketing share and marketing performance. The current study also observed a relationship between the period of information technology use and the increase in sales and market share percentage. The findings of the current study showed that the use of information technology in business organization has an influence on sales, market share and marketing performance. Moreover, all the hypotheses of the current study, relating to the four dimensions, were accepted and indicated that the factors that were chosen in this study have significant influence on marketing performance. Additionally, the current study confirmed that there is a statistically significant correlation between the components of the study's model in which marketing performance infrastructure dimension had the highest correlation value. (535).

In conclusion, this study is considered valuable to the business organization sector by providing a unique, significant managerial and practical contribution as it has not only focused on information technology dimensions and their influence on marketing performance but also:

- 1- The correlation value between information technology and marketing performance, which were (451).
- 2- The inclusion of various technology factors in this study, which has contributed to a comprehensive research model. Future research studies should include different factors to further investigate the effect of information technology on marketing performance.

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