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THE RELATIONSHIP BETWEEN INFORMATION TECHNOLOGY ADOPTION AND JOB SATISFACTION IN CONTRACTING COMPANIES IN JORDAN

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SUMMARY: *Despite the popularity of Information Technology and job satisfaction research, little empirical evidence (to the researcher's knowledge) exists of the relationship between IT adoption and job satisfaction within the Jordanian construction industry. This research attempts to fill these knowledge gaps by exploring the relationship between IT adoption and job satisfaction from the perspective of Jordanian contracting firms. Measures were developed using MSQ and IT Barometer surveys. 50 questionnaires were distributed to investigate this relationship among different contracting companies in Jordan. Descriptive statistics were obtained and hypotheses were tested using multiple regression analysis. Results point out that more investment in technology would rather increase employee job satisfaction regarding intrinsic and general perspectives.*

KEYWORDS: *Construction industry, contracting companies, IT adoption, job satisfaction, Jordan.*

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1. INTRODUCTION

The business world is continuously changing due to the advances and developments in technology. Innovations in technology can change the way business activities are performed. Information Technology (IT) has played an important role in business since the 1950s and the use of technology to reduce costs, improve operations, enhance customer service, and improve communications has progressed rapidly over the past four decades (Peslak, 2005).

Employees can make or break an organization (Deal, 2007); they are considered valuable assets to the corporation, and the success of any company is directly linked to the satisfaction of the employees who embody that company. Job satisfaction is an important criterion for the success of an organization where it is closely associated with job turn over and life satisfaction Kumar (2002).

Using new technologies such as Computer-Aided Manufacturing (CAM), Virtual Reality (VR), Expert Systems (ES), and the Internet can give companies an edge. New technologies can result in employees "working smarter" as well as providing high-quality products and more efficient services to customers. Companies that have realized the

greatest gains from new technology have human resource management practices that support the use of technology to create what is known as high-performance work systems. Work, training, programs and reward systems often need to be reconfigured to support employees' use of new technology (Noe et al, 2006).

The construction sector in Jordan has experienced growth during the boom that occurred in the last few years; encouraging investment in the construction sector and raising the importance of deploying technological advancements to this industrial segment. In the context of job satisfaction in Jordan, the effects employee satisfaction has on an organization's business are numerous and the introduction of IT has improved the productivity of design and project management and IT has now become so vital to the construction business (El-Mashaleh, 2007). Therefore, the objective of the present study is to investigate the relationship between IT adoption and job satisfaction of employees working in contracting companies in Jordan.

IT adoption and job satisfaction has been tapped by many researchers within the construction industry and from different perspectives. Some studies indicated the importance of understanding the impact of IT adoption on individual performance and organizational productivity (Igbaria and Tan, 1997), some focused on construction, being one of the most information-dependent industries that have to adopt new technological applications to survive in business environments and achieve competitive advantage (Jennings and Betts, 1996; Arslan and Kivark, 2007). Further studies suggested that IT implementation is not just a technical enhancement but a managerial decision that involves re-engineering of organizational functions and operations (Ahmad et al, 1995).

Several researches discussed computer and internet use, the use and benefits of IT, the level of IT adoption, impact of IT on architecture, engineering and construction and others benchmarked IT adoption across different countries such as U.S., Nordic countries, Brazil, China, Canada, Turkey, South Africa, Australia… etc. (Andresen et al., 2000; Arif and Karam, 2001; Clark et al, 1999; Doherty, 1997; El-Mashaleh, 2007; El-Mashaleh et al, 2006; Goh, 2005; Howard et al, 1998; Korunka and Vitouch, 1999; Lim et al, 2002; Oladapo, 2007; Peansupap and Walker, 2005; Rivard, 2000; Rivard et al, 2004; Samuelson, 2002; Samuelson, 2008; Scheer et al, 2007; Tas and Irlayici, 2007; Zhu and Wang, 2007).

Job satisfaction, as well, was a subject of interest to many researchers who discussed its impact on turnover and productivity (Borcherding and Oglesby, 1974; Carpitella, 2003), tested two-factor theory on construction engineers (Ruthankoon and Ogunlana, 2003) and emphasized the role of employee satisfaction in the success and outcome of the product and the company (Ali and Sabri, 2001; Deal, 2007; Goodrum, 2003; Halvorsen, 2005; Kumar, 2002).

Table 1 summarizes the studies that took place from 1997 to 2008 (to the best of the researchers' knowledge) tapping IT adoption and job satisfaction subjects in the construction industry in various countries of the world.

TABLE 1: Summary of Previous Studies on IT Adoption and Job Satisfaction in the Construction Industry in Various Countries of the World

Author(s)	Country	Research Problem	Research Findings
Doherty (1997)	New Zealand	A survey was conducted to measure the computer use in the New Zealand building and construction industry.	• Large minority did not use computers or used them only casually • Devise a strategy for changing the attitudes of those who did not accept computer applications
Howard et al. (1998)	Scandinavia	The IT barometer survey summarized in this paper compared results from Denmark, Finland and Sweden on the use of computer hardware, software and communications.	• Major IT development projects were found to be under way in Finland and Sweden and it was proposed to measure their progress at the half-way stage by surveying the construction industries in about year 2000 • Denmark needed to carry out more promotion of its IT initiatives and measure awareness of these in year 2000.

Clark et al. (1999)	United Kingdom	To benchmark the use of IT within ten major UK construction companies	• The construction industry still had a significant gap to bridge to reach best practice in its use of IT to support supplier management • The internal exploitation of IT within the contractor was more advanced than between the separate legal entities of contractor and supplier
Korunka and Vitouch (1999)	Vienna	The effects on staff of the implementation of new office IT were investigated in ten companies in Vienna using a longitudinal design.	• Results suggested that negative effects of IT implementations must be expected if such advancements do not include the enhancement of employee qualifications, which in turn contributes to job satisfaction.
Rivard (2000)	Canada	A survey about the current and planned use of IT and its impact on the Architecture, Engineering, and Construction (AEC) industry in Canada had been conducted.	• Many business processes were almost completely computerized and the tendency was toward a greater computerization of the remaining processes
Andresen et al. (2000)	United Kingdom	The paper presented a new framework for measuring the benefits of IT in construction.	• The framework presented has been subjected to testing and application within UK construction organizations. The results of this testing suggested a number of improvements in the benefits realization process.
Arif and Karam (2001)	South Africa	A survey was conducted to identify the extent of IT application in the building construction context of South Africa	• The survey revealed a major dependency on CAD software • Computer use was clearly concentrated in administration, communication and the core activity of construction drawings production
Samuelson (2002)	Nordic Countries	The paper presented the most significant results from the Swedish survey and a few selected results from the comparison between the three countries (Sweden, Denmark and Finland) regarding the use of IT in the Nordic construction industry.	• The survey produced knowledge about the use of computers, hardware and software, communications and plans and strategies for the use of IT • The comparison between Sweden, Denmark and Finland showed that Finland and Denmark had a greater extent of IT adoption

Lim et al. (2002)	Malaysia	A survey was conducted to measure the actual level of Internet usage and to find the perceived benefits and disadvantaged experienced by the users in the Malaysian construction industry.	• Respondents have accessibility to the Internet; comparable to countries such as the US. • The main use of the Internet is for emails and information search • Provision relevant parties in the industry should look into sufficient infrastructure and IT skills training to enable the workers in this industry to fully utilize the potential of Internet
Ruthankoon and Ogunlana (2003)	Thailand	This study tested the two-factor theory on Thai construction engineers and foremen following Herzberg's interviewing procedure and compared the results to Herzberg's.	• Responsibility, advancement, possibility of growth, and supervision contribute to job satisfaction • Working conditions, job security, safety on site, and relationships with other organizations contribute to job dissatisfaction • It was concluded that Herzberg's theory was not entirely applicable in the Thai construction setting. Some factors should receive attention if employees were to be motivated effectively
Rivard et al. (2004)	Canada	Eleven case studies were gathered from across Canada to define an initial compendium of best practice in the use of IT in the Canadian construction industry.	• The following technologies were demonstrated: 3D CAD; custom Web sites; commercial Web portals; and in-house software development. • The industry could achieve substantial benefits from the adoption of IT if it would have been more widespread.
Goh (2005)	Singapore	This paper investigated the levels of general adoption of IT in the construction industry	• To avoid the "technology for the sake of technology" trap • To develop standards, integrated databases and interactive applications • Business strategy must support investments in information systems • To focus on people, their IT needs and ability to manage change
Halvorsen (2005)	United States	This study was conducted to obtain a greater understanding about the elements and levels of satisfaction and empowerment of on-site supervisors in the residential construction industry.	• It was discovered that a statistically significant correlation existed between satisfaction and empowerment.
Peansupap and Walker (2005)	Australia	This paper examined Information and Communication Technologies (ICT) implementation in construction organizations, with a specific focus using results from a study of a small but indicative sample of Australian ICT literate construction organizations.	• A list of 46 essential variables was developed from integration of three main theories: innovation diffusion, change management, and knowledge management.

El-Mashaleh et al. (2006)	United States	This paper examined the impact of IT on construction firm performance based on data collected from 74 construction firms	• Analysis provided empirical evidence that IT was positively associated with firm performance, schedule performance, and cost performance. • No relationship was found between IT use and customer satisfaction, safety performance, and profitability
Zhu and Wang (2007)	China	This paper discussed the categorization, classification, management and revision of information standards for the Chinese construction industry.	• A systematic introduction of the organizing system and major issues related to the development and implementation of the system were provided to have better understanding towards the standardization efforts in the Chinese construction industry
El-Mashaleh (2007)	Jordan	This paper reported the findings of conducting a modified version of the IT barometer survey. It benchmarked the current IT usage, availability, and perceived impact in the construction industry in Jordan.	• The perceived benefits for IT adoption according to the respondents were mentioned • The main obstacles for IT use were high investment costs and greater know-how required from staff.
Tas and Irlayici (2007)	Turkey	A survey about the current and planned use of IT and its impact on the construction industry in Turkey has been conducted so as to help in the choice of acquiring building products.	• The current level of usage and the future expectations for building product information system have newly become widespread in Turkey • The development of building product information systems was said to be an important step to solve many problems in construction industry field.
Scheer et al. (2007)	Brazil	This paper main objective was to foster greater understanding of IT and its application in the Brazilian construction industry.	• Important improvements of international investors' participation in the Brazilian construction market were noticed and consequently more credit availability. • One of the most important steps to be undertaken was academic research and professional educational efforts that would continually increase IT use in undergraduate civil engineering courses.
Oladapo (2007)	Nigeria	Investigate the state of ICT in the Nigerian construction industry; identify its impact in the industry and the constraints to its adoption.	• The main uses of ICT were identified • The top five constraints to the use of ICT were stated • A comparison with results of similar studies indicated that IT usage is quite high for a developing country like Nigeria
Samuelson (2008)	Sweden	Describe the development of IT use in construction and facility management sectors during a nine-year period, by presenting the most significant results from the Swedish IT-Barometer 2007 survey, with comparisons with the situation in 1998 and 2000.	• There has been a clear increase in the use of IT in the last few years. • The possibility of making use of IT to support new ways of working and to make the process more efficient is increasing. • Contractors have been those who use IT least of all.

2. METHODOLOGY

This paper proposes a conceptual model relating IT adoption and job satisfaction, as shown in Fig. 1, where IT adoption, the independent variable, represents the degree to which IT has been implemented and used in each organization within the research, and job satisfaction, the dependent variable, is defined as a pleasurable feeling that results from the perception that one's job fulfills or allows for the fulfillment of one's important job values.

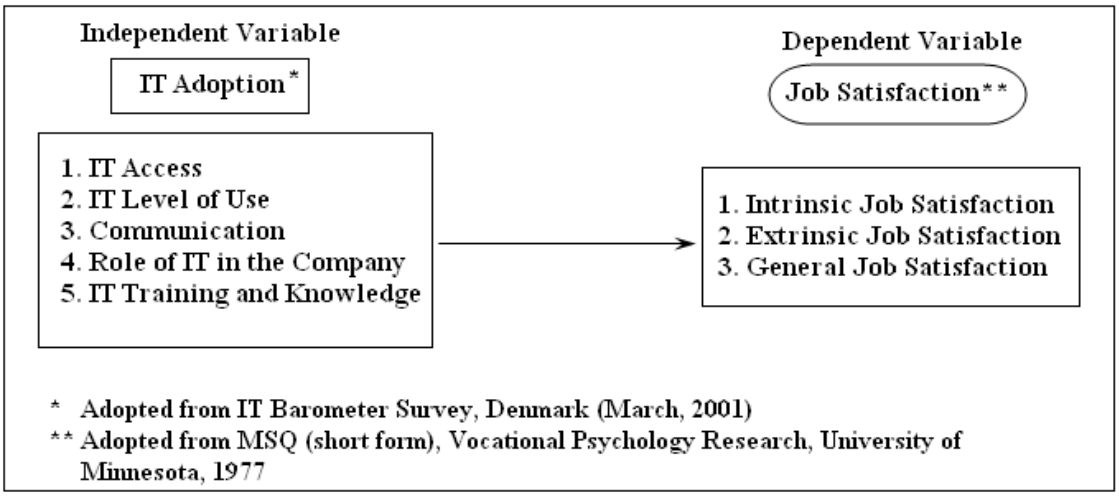

FIG. 1: Schematic Diagram for Variables and their Relationships

2.1 Population and Sample

An exploratory pilot study was conducted at Jordan Construction Contractors Association (JCCA), Amman Chamber of Commerce and Ministry of Public Works and Housing to seek out detailed information regarding the potential participants constituting contracting companies within the construction sector in Jordan.

Contracting companies in Jordan are classified into six categories according to capital and experience. Class-A contracting companies represent those of which their capitals exceed JOD (Jordanian Dinars) 2,000,000 and their experience includes the completion of major projects with a minimum total value of JOD 3000,000 (Ministry of Public Works and Housing, 2008).

The population of the study comprises all working employees in class-A contracting companies in Jordan constituting a number of 41 companies (JCCA, 2008).

The sampling was confined to specific types of organizations adopting IT and conforming to the criteria set by the research. Judgment sampling was used as the sampling design that involves the choice of subjects who are most advantageously placed or in the best position to provide the information required by this research.

The majority of the employees who participated in the study were young (67.5%) with ages ranging between 20 and 35 years old as shown in Fig. 2.

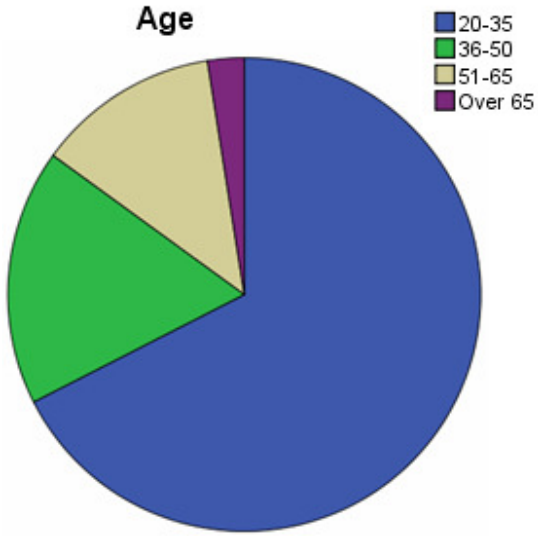

FIG. 2: Age Distribution of Participating Employees

All of the respondents have graduated from high school and over half of them (55%) hold bachelor's degree. It is important to note that 37.5% of the participants have completed graduate studies. The statistical results shows that 40% of the participating employees occupied non-managerial positions since most of them were young and probably with little experience. About one third (32.5%) worked in middle management, 20% were first-level supervisors and the rest (7.5%) worked in top management. Respondents occupied different functional positions including engineers, developers, draftsmen, contractors and owners. Table 2 summarizes descriptive statistics obtained for respondents' years of experience and their firms' ages.

TABLE 2: Descriptive Statistics – Years of Experience and Firm Age

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Years of Experience in Current Organization	40	.25	12.00	2.6290	2.66447	1.875	.374
Firm Age	40	2	30	9.00	7.264	1.376	.374
Valid N (listwise)	40						

2.2 Data Collection

A questionnaire was developed by referring to the IT Barometer Survey (IT Barometer Survey-Denmark, 2001) and Minnesota Satisfaction Questionnaire (MSQ) short version module (University of Minnesota, 1977) derived from the MSQ 1967 Long-Form (Weiss, Dawis, England & Lofquist, 1967). 50 questionnaires were personally administered and electronically mailed to employees. The response rate was 80%.

2.3 Measures

The independent variable, IT adoption, was measured according to the IT Barometer Survey, using direct single questions and interval scale questions that used 5-point Likert scale to measure five dimensions: (1) IT access, (2) IT level of use, (3) communication, (4) role of IT in the company, and (5) IT training and knowledge. Whereas job satisfaction, the dependent variable, was measured according to MSQ by rating 20 job-related statements on 5-point Likert scale exploring 3 dimensions; intrinsic, extrinsic and general job satisfaction.

Goodness of research measures was assessed through checking the reliability and validity of scales as follows:

1. Reliability: Job satisfaction scale consists of 20 items. Cronbach's alpha reliability coefficient of this scale was obtained the test indicated that the Cronbach's alpha was found to be 0.859. Since reliability coefficients that lie in the 0.7 range are acceptable, thus the internal consistency reliability of the dependent variable scale can be considered to be good.

   The mean inter-item correlation for the five items of the independent variable (IT adoption) was calculated as it is more appropriate to report and use the mean inter-item correlation for short scales with less than ten items (Briggs & Cheek, 1986). Briggs and Cheek recommend an optimal inter-item correlation range of (0.2 – 0.4). The result was found to be 0.3125 which lies in the optimal range previously mentioned.
   The results, thus, indicate that the internal consistency reliability of the measures used in this study can be considered to be good.

2. Validity: The researcher examined content validity of measures by presenting the developed measure to a panel of judges who attested to the content validity of the instrument.

The normality of the distribution of scores for job satisfaction was assessed. Table 3 shows that the mean value for the dependent variable is 3.35 and that the 5% trimmed mean has nearly the same value (3.34) which indicates that extreme scores are not having a strong influence on the mean.

TABLE 3: Job Satisfaction Descriptive Statistics

Descriptives

			Statistic	Std. Error
Job Satisfaction	Mean		3.3525	.08004
	95% Confidence Interval for Mean	Lower Bound	3.1906	
		Upper Bound	3.5144	
	5% Trimmed Mean		3.3403	
	Median		3.2500	
	Variance		.256	
	Std. Deviation		.50624	
	Minimum		2.45	
	Maximum		4.60	
	Range		2.15	
	Interquartile Range		.94	
	Skewness		.460	.374
	Kurtosis		-.487	.733

The test of normality was conducted where the results of Kolmogorov-Smirnov statistic were obtained. A non-significant result (Sig. value of more than 0.05) indicates normality. In the case of this study the Sig. value was 0.081, suggesting an approximate normal distribution of scores for job satisfaction.

This is also supported by an inspection of the normal probability plots (Normal Q-Q Plots) in Fig. 3. In these plots, the observed value of each score is plotted against the expected value from the normal distribution. The figure shows a reasonably straight line suggesting a normal distribution.

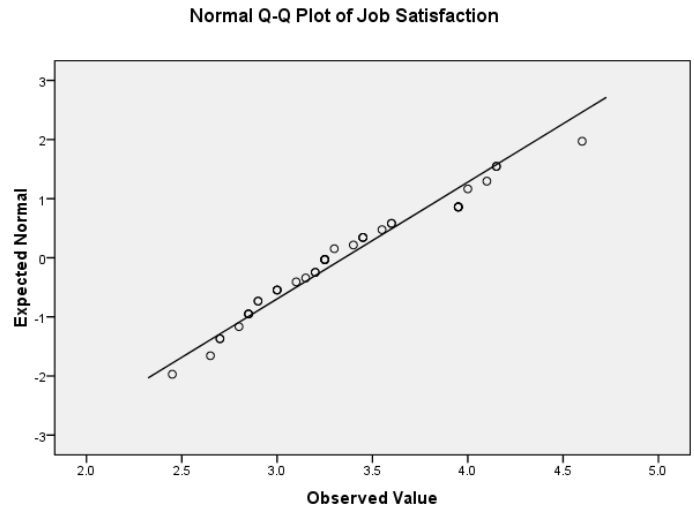

FIG. 3: Normal Q-Q Plot of Job Satisfaction

The detrended normal Q-Q plots displayed in Fig. 4 are obtained by plotting the actual deviation of the scores from the straight line. As the figure shows, no real clustering of points occurs and most of the points are collecting around the zero line.

FIG. 4: Detrended Normal Q-Q Plot of Job Satisfaction

The final plot provided in Fig. 5 is a box plot of the distribution of scores for job satisfaction. As can be seen from the figure, the rectangle represents 50% of the cases, with the whiskers (the lines protruding from the box) going out to the smallest and largest values. The median (3.25) is represented by the line inside the rectangle, and no point is drawn outside this range as an outlier.

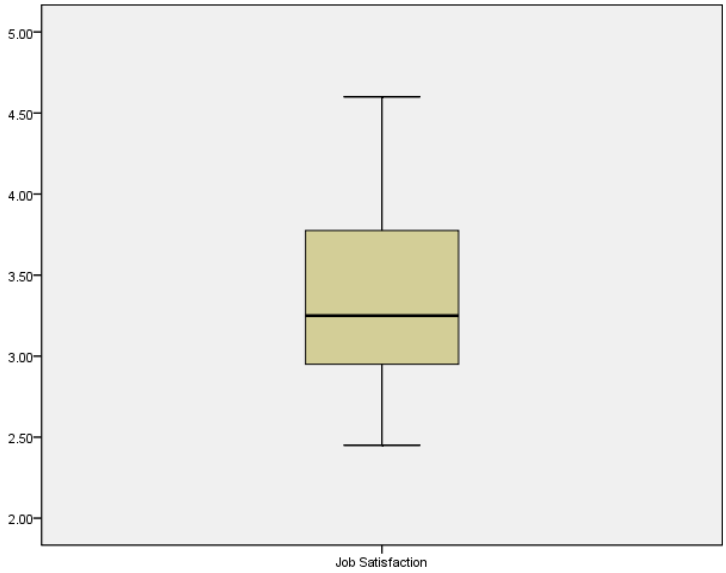

FIG. 5: Box Plot of the Distribution of Scores for Job Satisfaction

3. DATA ANALYSIS

3.1 Inferential Statistics: Pearson Correlation

The Pearson correlation matrix is used to indicate the direction, strength and significance of the bivariate relationships of all the variables in the study. The Pearson correlation matrix obtained for the variables of interest is shown in Table 4.

TABLE 4: Pearson Correlation Matrix

Correlations

		IT Access	IT Level of Use	Communication	Role of IT in the Company	IT Training and Knowledge	Job Satisfaction
IT Access	Pearson Correlation	1	.288	.363*	.481**	.200	.537**
	Sig. (2-tailed)		.071	.021	.002	.215	.000
	N	40	40	40	40	40	40
IT Level of Use	Pearson Correlation	.288	1	.252	.373*	.325*	.394*
	Sig. (2-tailed)	.071		.117	.018	.041	.012
	N	40	40	40	40	40	40
Communication	Pearson Correlation	.363*	.252	1	.079	.542**	.339*
	Sig. (2-tailed)	.021	.117		.630	.000	.032
	N	40	40	40	40	40	40
Role of IT in the Company	Pearson Correlation	.481**	.373*	.079	1	.222	.241
	Sig. (2-tailed)	.002	.018	.630		.168	.134
	N	40	40	40	40	40	40
IT Training and Knowledge	Pearson Correlation	.200	.325*	.542**	.222	1	.155
	Sig. (2-tailed)	.215	.041	.000	.168		.340
	N	40	40	40	40	40	40
Job Satisfaction	Pearson Correlation	.537**	.394*	.339*	.241	.155	1
	Sig. (2-tailed)	.000	.012	.032	.134	.340	
	N	40	40	40	40	40	40

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Different authors suggest different interpretations for values of Pearson correlation. According to Cohen (1988), values lying in the range (0.1 – 0.29) suggest small correlation, values in the range (0.3 – 0.49) suggest medium correlation and values in the range (0.5 – 1) suggest large correlation between variables. The results in Table 5 indicate that there is small positive correlation between role of IT in the company and job satisfaction. It is also clear

that the more training and IT knowledge employees receive, the more satisfied they get at their workplaces. Moreover, an obvious large correlation is found between IT access and job satisfaction while the values of 0.394 and 0.339 correlating IT level of use and communication respectively to job satisfaction point out that there is relatively medium positive relationship between these two variables and job satisfaction. The correlations are almost all in the expected direction.

3.2 Hypothesis Testing

Three hypotheses were generated for this study. Multiple regression analysis was used to test the hypotheses. The results of the tests are discussed below:

3.2.1 Hypothesis 1

$H1_0$: There is no statistically significant relationship between IT adoption dimensions (IT access, IT level of use, communication, role of IT in the company, IT training and knowledge) and intrinsic job satisfaction.

$H1_A$: There is a statistically significant relationship between IT adoption dimensions (IT access, IT level of use, communication, role of IT in the company, IT training and knowledge) and intrinsic job satisfaction.

The results of multiple regression of the five independent variables against intrinsic job satisfaction are demonstrated in Table 5.

TABLE 5: Multiple Regression Output – Hypothesis 1

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	IT Training and Knowledge, IT Access, IT Level of Use, Role of IT in the Company, Communication[a]	.	Enter

a. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.597[a]	.356	.262	.45785

a. Predictors: (Constant), IT Training and Knowledge, IT Access, IT Level of Use, Role of IT in the Company, Communication

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.943	5	.789	3.762	.008[a]
	Residual	7.127	34	.210		
	Total	11.070	39			

a. Predictors: (Constant), IT Training and Knowledge, IT Access, IT Level of Use, Role of IT in the Company, Communication

b. Dependent Variable: Intrinsic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.157	1.009		.155	.877
	IT Access	1.024	.570	.306	1.795	.082
	IT Level of Use	.110	.060	.286	1.840	.074
	Communication	.626	.405	.274	1.545	.132
	Role of IT in the Company	-.042	.187	-.038	-.225	.823
	IT Training and Knowledge	-.054	.192	-.048	-.281	.780

a. Dependent Variable: Intrinsic

In the model summary table, *R* (0.597) represents the correlation of the five independent variables with the dependent variable. *R Square*'s value of (0.356) indicates the explained variance and shows that 36% of the variance of intrinsic job satisfaction has been significantly explained by the five independent variables. The ANOVA table shows that F (5, 34) = 3.762 is significant at the 0.008 level, thus hypothesis 1 is substantiated.

The next table (*Coefficients*) helps us to see which among the five independent variables influences most the variance in intrinsic job satisfaction. If we look at the *Beta* column, we can see that the highest numbers in the beta are 0.306 for IT Access which is significant at the 0.082 level and 0.286 for IT Level of Use which is significant at the 0.074 level. It may also be seen that these are the only independent variables that are significant. The positive beta weights indicate that if intrinsic job satisfaction is to be increased, it is necessary to enhance employees' IT access and IT level of use.

The multiple regression equation can be written as follows (after the removal of insignificant variables):

Intrinsic job satisfaction = (1.024 * IT Access) + (0.110 * IT Level of Use) + 0.157

3.2.2 Hypothesis 2

$H2_0$: There is no statistically significant relationship between IT adoption dimensions (IT access, IT level of use, communication, role of IT in the company, IT training and knowledge) and extrinsic job satisfaction.

$H2_A$: There is a statistically significant relationship between IT adoption dimensions (IT access, IT level of use, communication, role of IT in the company, IT training and knowledge) and extrinsic job satisfaction.

The results of multiple regression of the five independent variables against extrinsic job satisfaction are demonstrated in Table 6.

In the model summary table, *R* (0.537) represents the correlation of the five independent variables with the dependent variable. *R Square*'s value of (0.289) indicates the explained variance and shows that about 29% of the variance of extrinsic job satisfaction has been significantly explained by the five independent variables. The ANOVA table shows that F (5, 34) = 2.758 is significant at the 0.034 level, thus hypothesis 2 is substantiated.

The next table (*Coefficients*) helps us to see which among the five independent variables influences most the variance in extrinsic job satisfaction. If we look at the *Beta* column, we can see that the highest number in the beta is 0.544 for IT Access which is significant at the 0.005 level. It may also be seen that this is the only independent variable that is significant. The positive beta weight indicates that if extrinsic job satisfaction is to be increased, it is necessary to enhance employees' IT access.

The multiple regression equation can be written as follows (after the removal of insignificant variables):

Extrinsic job satisfaction = (2.186 * IT Access) + 0.791

TABLE 6: Multiple Regression Output – Hypothesis 2

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	IT Training and Knowledge, IT Access, IT Level of Use, Role of IT in the Company, Communication[a]	.	Enter

a. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.537[a]	.289	.184	.57887

a. Predictors: (Constant), IT Training and Knowledge, IT Access, IT Level of Use, Role of IT in the Company, Communication

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.620	5	.924	2.758	.034[a]
	Residual	11.393	34	.335		
	Total	16.013	39			

a. Predictors: (Constant), IT Training and Knowledge, IT Access, IT Level of Use, Role of IT in the Company, Communication

b. Dependent Variable: Extrinsic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.791	1.276		.620	.540
	IT Access	2.186	.721	.544	3.031	.005
	IT Level of Use	.083	.076	.179	1.094	.282
	Communication	-.081	.512	-.029	-.158	.876
	Role of IT in the Company	-.177	.237	-.133	-.747	.460
	IT Training and Knowledge	-.219	.243	-.163	-.902	.373

a. Dependent Variable: Extrinsic

3.2.3 Hypothesis 3

$H3_0$: There is no statistically significant relationship between IT adoption dimensions (IT access, IT level of use, communication, role of IT in the company, IT training and knowledge) and general job satisfaction.

$H3_A$: There is a statistically significant relationship between IT adoption dimensions (IT access, IT level of use, communication, role of IT in the company, IT training and knowledge) and general job satisfaction.

The results of multiple regression of the five independent variables against general job satisfaction are demonstrated in Table 7.

In the model summary table, *R* (0.532) represents the correlation of the five independent variables with the dependent variable. *R Square*'s value of (0.283) indicates the explained variance and shows that about 28% of the variance of general job satisfaction has been significantly explained by the five independent variables. The ANOVA table shows that $F(5, 34) = 2.679$ is significant at the 0.038 level, thus hypothesis 3 is substantiated.

The next table (*Coefficients*) helps us to see which among the five independent variables influences most the variance in general job satisfaction. If we look at the *Beta* column, we can see that the highest number in the beta is 0.388 for IT Access which is significant at the 0.039 level. It may also be seen that this is the only independent variable that is significant. The positive beta weight indicates that if general job satisfaction is to be increased, it is necessary to enhance employees' IT access.

The multiple regression equation can be written as follows (after the removal of insignificant variables):

General job satisfaction = (1.587 * IT Access) + 0.534

TABLE 7: Multiple Regression Output – Hypothesis 3

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	IT Training and Knowledge, IT Access, IT Level of Use, Role of IT in the Company, Communication[a]	.	Enter

a. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.532[a]	.283	.177	.59181

a. Predictors: (Constant), IT Training and Knowledge, IT Access, IT Level of Use, Role of IT in the Company, Communication

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.692	5	.938	2.679	.038[a]
	Residual	11.908	34	.350		
	Total	16.600	39			

a. Predictors: (Constant), IT Training and Knowledge, IT Access, IT Level of Use, Role of IT in the Company, Communication

b. Dependent Variable: General

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.534	1.304		.409	.685
	IT Access	1.587	.737	.388	2.153	.039
	IT Level of Use	.124	.077	.263	1.601	.119
	Communication	.063	.524	.023	.121	.904
	Role of IT in the Company	.034	.242	.025	.141	.889
	IT Training and Knowledge	-.096	.248	-.070	-.386	.702

a. Dependent Variable: General

4. DISCUSSION OF RESULTS

In a research conducted by Vargas, Hernández and Bruque (2003), it was hypothesized that firm size and previous experience in using IT, positively affect the level and speed of IT adoption. Another research by Kurtenbach and Thompson (1999) hypothesized that factors in the demographic category will not significantly influence IT adoption and use although previous literature suggested that IT use would be higher for younger, more educated individuals (Batte et al, 1990). In this study, demographic data of participating employees has been extensively examined. There was no indicated relationship between employees' experience and the level of IT adoption in the organization as shown in Fig. 6.

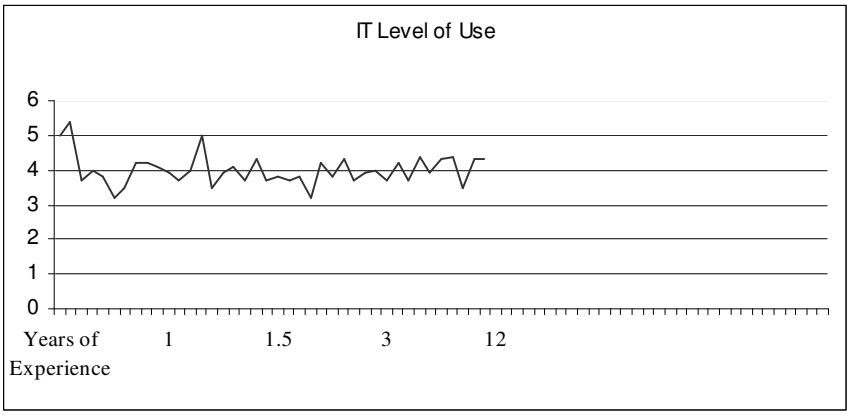

FIG. 6: IT Level of Use with respect to Respondents' Years of Experience

However, IT usage was higher for employees working in large-sized firms. Middle-aged respondents contributed to higher levels of IT use although older employees did not necessarily lessen it as shown in Fig. 7.

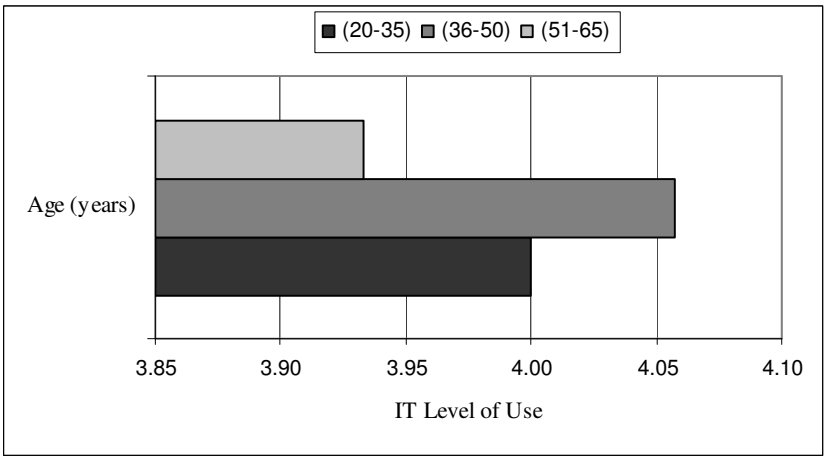

FIG. 7: IT Level of Use with respect to Respondents' Ages

No specific pattern of IT use was noticed for college degree holders; however, graduate degree holders showed conspicuous high level of IT use Fig. 8.

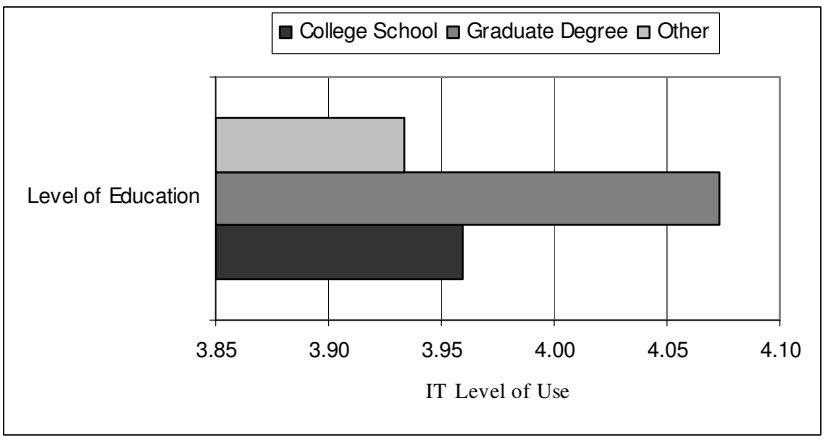

FIG. 8: IT Level of Use with respect to Respondents' Level of Education

In reviewing the findings of this study, it was evident that IT access, IT level of use and communication are the variables that most contributed to employee satisfaction within contracting firms.

Hypotheses testing revealed that there is a significant relationship between IT adoption dimensions and intrinsic, extrinsic and general dimensions of employee job satisfaction. These findings lead to the fact that the more IT investment incurred in an organization, the more satisfied its employees will be with their working conditions, their relationships with coworkers and personal job characteristics such as creativity, ability, responsibility, social status… etc. Moreover, IT adoption levels affect the level employees are satisfied with their supervisors, company policy, compensation and recognition.

The study has also revealed that advantageous elements that most contributed to IT adoption were faster access to information, having work done more quickly and better communications. Nevertheless, continual demand to upgrade and greater know-how required represented the highest rated disadvantages of IT at participants' workplaces.

5. CONCLUSIONS

This paper attempted to provide a basis for understanding the perception of IT adoption and its relationship with job satisfaction for employees working in Jordanian contracting firms. Results point out that more investment in technology would rather increase employee job satisfaction regarding intrinsic, extrinsic and general perspectives.

Construction activity in general and construction IT in particular is showing great promise in emerging economies. The construction industry around the world, both in developed and emerging economies is facing various challenges. The identification of the issues more critical for emerging economies would help to make the research efforts to address them more effective. This study would be of significance to construction industries in Jordan specifically and the Middle East generally due to the shortage of construction IT research in the Middle East (Serpell and Barai, 2007). This research is poised to expand the general knowledge-base for further research into the area of construction industry and technology.

The intellectual contribution of this research lies in developing a conceptual methodology that can be carried through further research elsewhere. This study's generalizability might not be high to a certain extent, but it is true for other developing countries that share similar characteristics with Jordan.

5.1 Recommendations and Limitations of Study

IT knowledge base in the construction sector may be expanded by increasing the level of exposure to IT advancements. As top managers get more informed and knowledgeable about the way IT affects their work, more strategies to deploy IT advancements would be implemented. Managerial support of IT adoption is an important step toward emphasizing IT dimensions in an organization. While it might appear too late to change the attitudes of most present-day decision makers, increased investment in IT training and knowledge in the developing world could produce the future crop of leaders who will ensure optimum use of IT in their organizations.

Construction industry in Jordan and in other developing countries would be able to maximize the Return on Investment (ROI) in IT by going beyond basic applications such as word processing and spreadsheets toward more technical business applications like e-business, electronic data management and teleworking. This would consequently build a clearer vision of how IT may enable future construction products and processes to be more competitively procured.

Moreover, and as per the results highlighted by the research, there should be better provision and dissemination of information about employees' job satisfaction in order to improve management's ability to get the most out of the current workforce and start reaping desirable benefits. This should include information about what makes use of employees' abilities, the way they get along with their coworkers, the chances for advancements on their jobs and how they are affected by working conditions.

This study is limited in several aspects. The most significant limitation is that the survey results are based on the viewpoints of class-A contractors. Besides, this research is only limited to the private sector and can be, in the future, directed to the public sector.

5.2 Future Research and Development

This research could be used as an avenue for other researchers to conduct additional studies on IT-construction. The aspects of this research could be improved by applying the methodology used in this research to other developing countries, thereby increasing the data availability for future comparisons among different countries.

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