



## A study of the relationship between information technology and employees' job performance

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### Abstract

Nowadays, information technology (IT) could be utilized as one of the most powerful instruments to improve employees' occupational efficiency and quality. Highly increasing trend of this technology has significantly influenced work environments and working trend of different organizations and administrations. Despite advanced facilities of this technology and its widely applied advantages in various resources, there are some organizations where even though considerable financial resources have been invested on this field, employees are still not satisfied and a variety of problems have arisen. The current study aims to study the nature and pathology of the relationship between IT and employees' job performance. The study is applied in terms of objective, and in terms of implementation, it belongs to non-experimental descriptive correlation studies. The statistical community is composed of all employees (educational-clinical-administrative) in Kermanshah School of Dentistry (totally 60 people). Also, to gather data a questionnaire with 92-percent Cronbach's alpha was used. In this study, to analyze data, correlation coefficient test and also statistics including mean and mode are used. Based on the study results, the correlation between the study variables are significant. The maximum significant correlation is related to the relationship between freedom of employees and IT and the minimum correlation is related to the eminence of position and IT. Based on the results, at the end of study some suggestion are also presented including executing enterprise architecture and IT projects, etc., to enhance employees' output and to tackle the problems for top managers, employees and IT officials in charge.

**Keywords:** Information Technology, employees' job performance, Enterprise Architecture

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### Introduction

The issue of the impact of technology on people, organizations and communities is not new and it has been debated since the emergence and development of IT [1]. There are still people who believe that man is threatened by technology [2]. However, people as the members of firms and community must be cautious of impacts of IT. Within these years, different firms have experienced successful and unsuccessful experiences in this regard [3].

The present study entitled "the pathology and nature of the relationship between information technology and employees' job performance" attempts to clarify further the covert and overt dimensions of IT application. Nowadays, information is one of the most critical instruments

to develop management potentials. Achieving information, especially information which appears that play a pivotal and strategic role in organization could be utilized to establish a power base in organization. [4]

On the other hand, when managers equip their employees with further information, they consider themselves as stronger and could more productive and efficient. As the establishment of IT in each organization entails investing heavy costs, then this investment must have justified economic exploitations. One reason is that, by utilizing IT, it is possible to make domestic customers and final customers (clients) more satisfied [3]. IT is a more cost-effective way than traditional ones, so managers must know that the application of IT system to firm play effective roles. IT can influence

indices which are all necessary factors to achieve success in today's firms. The present study attempts to investigate the effect of application of IT on employees' job performance. Of all factors related to IT system, freedom of employees, the eminence of position in firm, position of employees, highly qualified services and job security were selected. The impact of these aspects on employees' job performance is investigated and some solutions to overcome obstacles to application of IT in organizations are presented in the current study.

### Study objective

The present study aims to investigate the pathology and impact of IT on the job performance of Kermanshah School of Dentistry students and also presents some strategies to overcome the problems faced by managers. **Primary Hypothesis:** there is a relationship between the application of IT in firm and the job performance and job security of the college employees.

**Secondary Hypothesis:** there is a relationship between use of IT in firm and providing proper service, freedom of employees, the eminence of position, employees' job satisfaction and their job security.

### Definition of specialized terms of the study

**Enterprise Architecture (EA):** is a well-defined practice for conducting enterprise analysis, design, planning, and implementation, using a holistic approach at all times, for the successful development and execution of strategy. Enterprise architecture applies architecture principles and practices to guide organizations through the business, information, process, and technology changes necessary to execute their strategies. These practices utilize the various aspects of an enterprise to identify, motivate, and achieve these changes [5].

Practitioners of EA call themselves enterprise architects. An enterprise architect is a person responsible for performing this complex analysis of business structure and processes and is often called upon to draw conclusions from the information collected. By producing this understanding, architects are attempting to address the goals of EA: Effectiveness, Efficiency, Agility, and Durability [5].

It is possible to associate enterprise architecture with a set of inter-connected models which the proper selection of them is the main task of an architect. Enterprise architecture stems from the issue of "information systems architecture" and specially "information architecture" and is at the same trend of these architectures, especially in organizations. The difference between enterprise architecture and information systems is that

enterprise architecture takes into consideration all aspects of organization such as users, systems geographical situation, their distribution, job processes, motivations to do jobs, strategies, organizational missions, etc., while information architecture focuses only on information. In fact, enterprise architecture is faced with a type of re-engineering of entire firm in terms of information systems, which mainly attempts to improve firm job processes through application of information technology.

**Job satisfaction:** it is an important factor to enhance output and personal satisfaction in organization. Managers attempting to increase employees' job satisfaction by different methods. Different practitioners have presented different definitions of job satisfaction. Fishrohana considers job satisfaction a mental factor and defines it as an emotional consistency between job and the relevant conditions, indicating that when a job provides person with appropriate conditions that person is satisfied with its job, and vice versa [6].

**Job security:** it is an employee's ability to preserve its job position; it is also very low probability of losing an employer's job [6].

**Organizational post:** according to national recruiting regulations, organizational post is a place in firm, ministries and institutions where the required qualified manpower either holder of another job or not is selected and recruited [7].

**Job performance:** it results from the activities of a person in terms of executing the assigned tasks and responsibilities in a specified time interval. The result emanates from observance of all relevant rules and regulations to achieve organizational objectives and measurement or valuation of those objectives [7].

### Study method

#### Data collection methods

The data required for the present study is categorized into two categories.

A- **Library-based method:** in this study method, by referring to printing and electronic sources, researcher has gathered the required data to present a theoretical and experimental background by a note-taking method.

B- **Questionnaire method :** in this method, using questionnaire, interview and utilizing performance measurement standard of Professor Moghimi [8], the researcher has gathered quantitative information to analyze the relations in the hypotheses. The mentioned questionnaire has 17 questions in five factors (proper service, freedom of employees, job satisfaction, job security and the eminence of organizational position).

### Statistical community and sampling method

The study statistical community is composed of all employees in Kermanshah School of Dentistry which totally 65 people work in different units (educational, research, administrative and financial). As the number of statistical community was limited and available, and also based on the high generalizability of the results to other populations, the total population (56 people) were selected as the sample and participated in the study.

### The reliability of the study

Given that the above questionnaire was used and confirmed already by other researchers, the questionnaire derived from the book of Dr. Moghimi [8] was selected. To confirm form and content reliability, and whether or not the questionnaire is sufficient to confirm the study hypotheses, the generalizations of the study was confirmed again by the practitioners of the university research group.

### The validity of the study

Cronbach's alpha test or confidence capability or questionnaire reliability is a statistical test which its result is a coefficient named Cronbach's alpha [9]. To test the validity or reliability, a

questionnaire which designed in the form of Likert Scale and its answers are multi-item is applied. Cronbach alpha coefficient is applied to measure the degree of one-dimensionality of attitudes, judgments and other items which their measurement is

not easy. In the present study, Cronbach alpha method is used to confirm the questionnaire. After implementing Formula (1), the number (92%) is obtained, indicating that the questionnaire can approach researchers to their claims to a high extent.

$$\alpha = \frac{k}{k-1} \left(1 - \frac{\sum_{i=1}^k \sigma_{Y_i}^2}{\sigma_X^2}\right) \quad (1)$$

### Data analysis method

In the present study, to analyze data, the descriptive statistics techniques are used including frequency table and inferential statistics such as Pearson correlation statistics, T-test, etc. are used. As the questions arisen in the questionnaire are designed based on a scale in conducting Likert method, there are five spectra including (very low, low, moderate, high, very high) which each item receives a score as follows:

**Table 1:** Spectra and Score

Spectra	Score
Very low	1
Low	2
Moderate	3
High	4
Very high	5

In the present study, to analyze data, inferential and descriptive methods are used. To better show data, the percent and frequency table are used; and regarding inferential statistics, to test the study hypotheses, the regression analysis and Pearson correlation test are applied.

In this study, the data collected from the questionnaire which is presented in the form of 17 closed items, are analyzed using the software SPSS and appropriate statistical methods (based on the type of study and statistical methods) in a

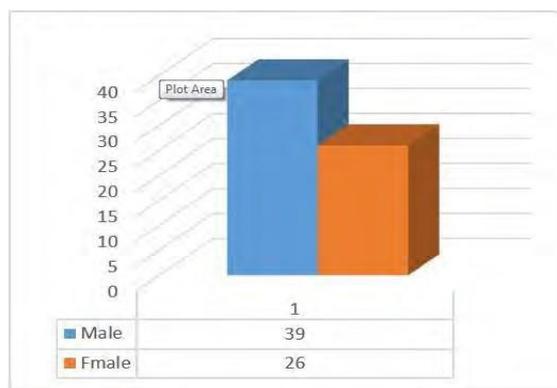
descriptive manner. In the study, descriptive statistics test including frequency table for data analysis is used which the description of its data is as follows:

#### a. The gender of the subjects

Table 2 and Figure 1 the frequency distribution related to the gender of the sample people. The results of Table 2 and Figure 1 indicate the highest frequency is related to the males with 60%.

**Table 2:** The frequency distribution related to the gender of the sample people

<i>Variables</i>	<i>Absolute frequency</i>	<i>percent</i>	<i>Cumulative percent</i>
<b>Female</b>	37	57	57
<b>Male</b>	28	43	100
<b>Sum</b>	65	100	



**Figure 1:** the frequency distribution related to the gender of the sample people

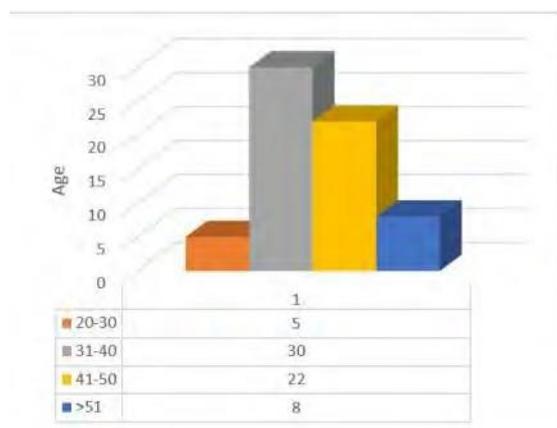
**b. Age of the subjects**

Table 3 and Fig 2 indicate the maximum frequency is related to the age range 31 to 40 (46%) and the

minimum frequency is related to the age range 20 to 30 years (7%).

**Table 3:** Frequency distribution related to the age of individuals in the sample

<i>Variables</i>	<i>Absolute frequency</i>	<i>percent</i>	<i>Cumulative percent</i>
20-30	5	7	7
31-40	30	46	53
41-50	22	34	87
>51	8	13	100
<b>Sum</b>	65	100.0	



**Figure 2:** Frequency distribution related to the age of individuals in the sample

**c. The education of the subjects**

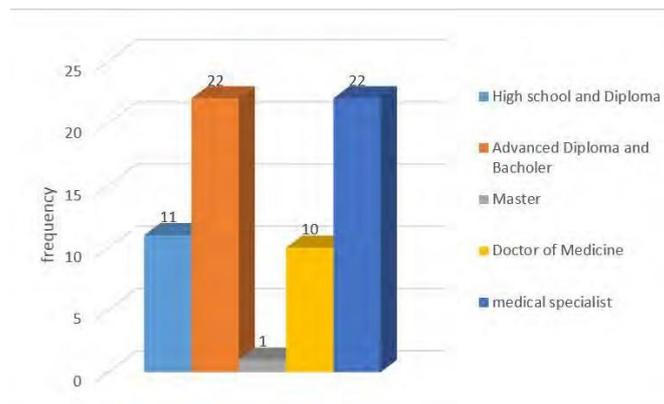
The table 4 indicates that the maximum frequency is related to the education level specialist and

(35%) and minimum frequency is related to Master (1%).

The summary of questions and the results are presented in Table 5.

**Table 4:** The frequency distribution of the education level including High School and Diploma, Advanced Diploma and Bachelor, Master, Doctor of Medicine and Medical Specialist related to the individuals in the sample

<i>Variables</i>	<i>Absolute frequency</i>	<i>percent</i>	<i>Cumulative percent</i>
<b>High School and Diploma</b>	11	17	17
<b>Advanced Diploma and Bachelor</b>	21	32	49
<b>Master</b>	1	1	50
<b>Doctor of Medicine</b>	10	15	65
<b>Medical Specialist</b>	22	35	100
<b>Sum</b>	65	100	



**Figure 3:** High School and Diploma, Advanced Diploma and Bachelor, Master, Doctor of Medicine and Medical Specialist related to the individuals in the sample

**Table 5:** the summation of the results from the items of the questionnaire

<i>Row</i>	<i>Question</i>	<i>Variable</i>	<i>Percent</i>
1	What are the rates of application of personal computers in firm in recent years?	High	39
2	How much you feel security in your job position?	Very Low	32
3	To what extent firm hold educational sessions for making staff and managers informed of information technology?	Low and Very Low	84
4	How much application of technology can enhance your situation with regard to assigned tasks quantitatively and qualitatively?	High and Very High	78
5	How much computer networks have become common in different units of firm?	Very High	84
6	How much is the rate of application of domestic networks or internet in recent years in your firm?	High and Very High	82
7	How much you use computer and computer networks to fulfill your daily activities?	High and Very High	89
8	How much is the rate of firm's application of information technology in your firm in recent years?	High	52
9	To what extent managers and staff use information dissemination computer systems in firms to access to their required information?	High	52
10	To what extent your firm has established mechanized systems for providing students with proper services?	Low	43
11	Averagely, how much of total service provided by your organizational unit (such as paying salaries) is done in an electronic way?	High	73
12	How is your rate of participation in the decision made in top levels of organization?	Moderately	43
13	How much eminent is your position in college?	Moderately	53
14	How much you receive from firm?	Low	41
15	To what extent establishment of friendly relations with others in organization is satisfactory?	High	41
16	How much varied are tasks and activities in your position?	High	38
17	To what extent you are aware of the results of your work?	Moderately	56

### The analysis of the results obtained from the questionnaire

The results indicate that more than 39 percent of staff uses personal computers in their home, and more than 32% of staff feels very little security in their job. Also, in the Dentistry college, educational sessions on IT are not almost held and the maximum frequency related to the items low and very low is totally (84%).

Most of the employees believe that IT can help them while doing their tasks very high and high (78%) and also the college's computer networks has become almost widespread in all the college departments (84%). The results indicate that use of internet in the college, since 2011, has grown very much and much (82%) and almost all activities in the college (89%) are done in an administrative automation manner. So the majority of respondents believe that IT application has been very common in recent years (52%).

The results indicate that most of managers and employees use computer system to access to information (52%). However, the personnel and colleagues believe that system services for students are low (43%), while most of organizational services are done electronically (73%) and the eminence of personnel post in the college is moderate (53%). The results show that the rate of salary received by the personnel is averagely low (41%) and the relationship between colleagues is friendly (41%). Given the results, it could be found that the variety of occupational tasks among the personnel is high (38%) and also the knowledge rate of job results among the personnel is average (56%).

As it could be seen in Table 5, the correlation coefficient between the study variables is significant, and primary and secondary hypothesis is accepted. The maximum significant relationship was between freedom of employees and IT ( $r = 0/99$ ,  $p=0/56$ ) and the minimum correlation rate was between the eminence of position and IT ( $r=0.14$ ,  $p=0.99$ ).

### Pathology

One of the main objectives of this study is to investigate the role of IT on the performance of personnel and its pathology and presenting some solutions to overcome them. Given the studies conducted, the following is the most distinguished challenges and weaknesses in this regard.

- 1- The lack of consistency between IT strategies and organizational strategies
- 2- Inefficiency of control and supervision system in the area of IT
- 3- Inappropriate administrative processes
- 4- The low level of information owned by employees
- 5- The resistance of manpower to become updated

- 6- The issues and problems related to the security of computer networks and systems
- 7- The lack of cooperation between officials in charge and managers
- 8- Lack of sufficient facilities and equipment
- 9- The lack of hardware facilities and an appropriate network bed
- 10- The lack of skilled manpower

The first to third item is three critical weaknesses of Iranian firms and they will be ignored most of the time, however, some efforts have been made in this regard in recent years. [10] the most of the strategies expressed in the most of studies are related to the lack of facilities and personnel resistance to becoming updated. However, given the present strategic issues, if the consistency between IT strategies and organizational strategies and also establishment of a systematic system for studying and controlling IT control by officials are ignored, the desirable results could not be achieved. Communication and information technology must act based an appropriate strategy, and lack of this proper strategy hinder firm from achieving its desirable results. Other factors including the lack of skilled manpower to implement applied plans of a firm (such as administrative automation), accounting programs, data bank, personnel's limited knowledge of IT, their resistance to change, challenges to the security of computer networks and systems, etc. are important issues which cannot be easily ignored. However, given the significance of the first to third items, some strategies to overcome them are proposed in the next parts if the present study.

### Presenting a strategy

As it was indicated in the above, the lack of consistency between IT strategies and organizational ones, the inefficiency of control and supervision system in the area of IT and inappropriate administrative processes, are three fundamental damages in nowadays organizations. In this part, enterprise architecture is described as a fundamental strategy to overcome these three problems.

Architecture, at least for architects and practitioners of engineering area is not an unknown word. The word "Architecture" reminds us of a comprehensive and large scale view on the structure and behavior of an entity which has some characteristics such as intricacy and dynamicity, and providing and maintaining it entails paying a considerable attention to the totality, uniformity, flexibility and interaction. [5] Nowadays, architecture has received attention not only in the area of software and hardware but also it plays significant roles in the management of different aspects of a firm. Enterprise architecture

includes business models, processes and data, supporting systems, network and also technology infrastructures for both existing and appropriate status of architecture. Also, enterprise architecture requires some standards, security consideration and a transfer plan. [11]

By the widespread extension of IT in firms, development of a systematic approach to management and control of information systems and maintenance of the uniformity of system's components are increasingly required.

Enterprise architecture is a new approach which is regarded today as an effective method to accommodate the strategic objectives of enterprise architecture and information and communication technologies.

Fig. 4 shows the different layers of enterprise architecture by which and also relevant guidance at each layer, problems and challenges to application of IT in organization could be overcome and the job performance of personnel enhanced.

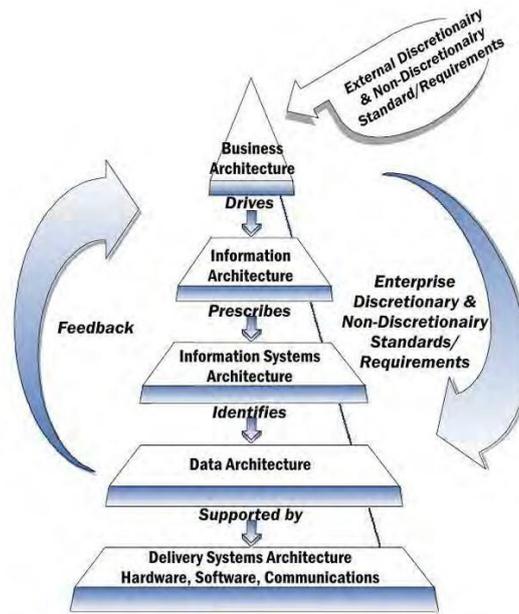


Figure 4: NIST Enterprise Architecture Model [5]

For instance, one critical problem of firms is the existence of inappropriate business processes, which even by large scale investments made on IT, personnel's job satisfaction is not fulfilled and performance not improved either. Therefore, regarding the architectural layer of profession (business), it is recommended that the existing processes are identified and then investigated and finally after recognition of problems, appropriate processes for enhancing performance are presented.

In addition, in this layer, standards and exterior compulsory requirements for the appropriate application of IT in firm are considered. Generally, it could be said that the main goal of architecture is to create consistency between IT and organizational business, i.e. the most appropriate application of IT to enhance firm business. Enterprise architecture along with appropriate planning in process domains, data, information systems and communication

infrastructures can help identify better firm's requirements in the area of IT and systematic investment happen in this area.

In addition, considering the critical nature of information in firm as one of the most important

assets for strategic decision making, enterprise architecture attempts to pay special attention to gather, process, and manage such information. By recognizing the situation of a firm in process domains, data, system and communication infrastructures, enterprise architecture attempts to depict an optimal situation for firm in the relevant areas and explain clearly the appropriate way to achieve success and efficiency.

During the entire stages, qualitative and quantitative investigations are expressed based on the existing standards.

Therefore, it is proposed that before making decisions to purchase computer equipment or information systems for enhancing the performance of firm and personnel and also increasing their job satisfaction, firm must takes necessary actions to evaluate firm capability in terms of different issues and implementation of the strategies dependent upon IT. One of the most important of these evaluations is to conduct enterprise architecture which acts an effective strategy in the area of IT and has received the attention of many firms and IT specialists. Providing personal with sufficient information and training in long term and short term sessions on

the application of computer systems and information systems is another important suggestion to Kermanshah School of Dentistry.

## Conclusion

In Iran, the application of modern strategies based on IT in firms is significantly increasing, and firms have found that to progress their own strategies, to enhance personnel and firm efficiency, to increase employees satisfaction and also to achieve a competitive advantage, they are required to apply modern strategies based on IT. The findings of the present study are derived from Kermanshah School of Dentistry, and show that there is a highly significant relationship between application of IT in firms and job performance of Kermanshah School of Dentistry personnel. The maximum significant correlation is related to the relationship between freedom of employees and IT, and the minimum one is related to the correlation between the eminence of the position and IT.

Considering the intensity of this correlation, to utilize optimally IT in firms, a very concise and efficient planning and providential strategy is needed to analyze firm in different domains. The next necessity is to formulate strategic plans in the area of IT which enables us to utilize optimally IT to enhance the performance of firm and personnel. The neglect of these issues leads to useless and repeated investments and ultimately loss of energy and financial sources. Therefore, in the present study, the application of enterprise architecture to overcome challenges and damages, taking into account various successful examples as a reasonable solution is recommended.

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