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**Original article**

**Impact of information technology on customer satisfaction in the economics and finance organization (a case study of Zahedan city)**

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**ABSTRACT**

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The topic of this study is the impact of Information Technology on customer satisfaction in the Economics and Finance Organization. In this study, the impact of two important components of information technology (Internet and Mechanization of activities) on components of customer satisfaction (expected perceived value and perceived quality) has been studied. The population of the research is the tax-payers of the Economy and Finance of the city of Zahedan and the number of samples, using Cochran's formula, is 198 altogether. To test the hypotheses, Friedman Test and Wilcoxon two-sample test are used with regard to parametric or non-parametric status of variables. The present research is of applied research regarding its goal, and a descriptive survey regarding method. The results show a significant impact of information technology on customers' expectations and with no considerable impact on the perceived value and perceived quality.

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## 1. Introduction

Today, customer satisfaction has become an important issue for organization and being a loser or winner will be recognized based on the percent of customers they have kept. Non-customer oriented companies cannot endure in a high competitive environment. Therefore, organizations should present products and services required by customers with high quality in order to survive and to be able to have loyal customers and with high satisfaction (Fstico Wa, 2004). The failure to achieve this means no profit, growth failure, unemployment, and finally the loss of business. In public sector the issue is even more acute because method of service giving in public sector is driven from being model in private sector (Iran Nejad & Parizi, 2005). Thus, what that can assist organizations in this mess are information technology and systems.

In economy and finance organization of the city of Zahedan, with development of information technology in the world level and somewhat in national level, still a great part of activities are done traditionally that this leads to the waste of resources and time both for the government and for citizens. On the other hand and despite the purchase and application of information technology in economy and finance organization of the city of Zehedan, it still seems that customers are not satisfied with the performance of this organization. And using information technology has not practically been able to be effective in services to taxpayers and other referrers and satisfy them. In this regard, knowledge of information technology components and their impacts on different aspects of customer satisfaction is necessary. Regarding these points, the present study deals with the investigation of the impacts of information technology on customer satisfaction in Economy and Finance Organization of Zahedan City.

## 2. Review of literature

### 2.1. Information technology

The term IT is used to describe technologies that help us capture, store, process, retrieve, transmit and receive information. The term includes new technologies such as computers, fax transmission, micrographs, telecommunications, microelectronics and also older technologies such as document filing systems, mechanical computing machines, printing and engraving. In general definition, information technology is related to the fashion of usage from equipments which mean application of technology for business processes, data collection, and generating information that is of value for managers (Denials, 2000).

### 2.2. Components of information technology

Information technology includes three main components as follows:

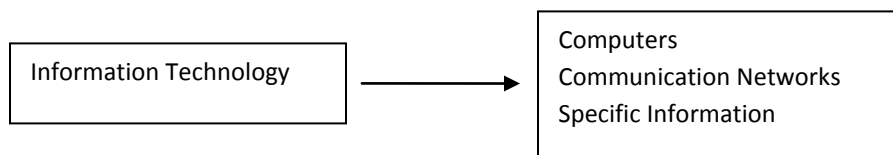


Fig. 1. (Ibid, 2000).

### 2.3. Computers

Computer is a device that can receive a set of instructions, process, store, and deliver results. Instructions for a job are called program, which is why a computer is a programmable tool. Computer system is composed of a series of computers and of controlled devices that process the data by running applications. Physical devices in a computer system are called hardware and programs are called software. Any computer system performs six tasks including the collection, exchange, storage, retrieval, manipulation and display of data (Sarafi Zadeh & Ali Panahi, 2009).

### 2.4. Communication networks

A major part of IT, communications means sending and receiving data and information through a communication network. A communication network comprises a set of stations at various locations that are connected through intermediate devices. These devices enable people to send and receive data. Telephone wires and cables are common communication intermediates (Sarafi Zadeh, 2007).

### **2.5. Specific information**

IT specific information includes the following:

Familiarity with information technology devices

Gaining required skills for using these devices

Consensus in the field of information technology when using it to solve a problem or to gain profit (benefit) from an opportunity (Ibid. 2000)

### **2.6. Internet**

Internet consists of a set of systems, protocols, and hardware that enables data transfer and provides information in electronic form. Internet forms a global network through which computers are connected to each other and they can share data and applications.

### **2.7. Automated office systems**

"Office Automation" is information systems that combine software and hardware features such as word processors, e-mail, and teleconferencing to perform the task of publishing and distributing information. It makes it possible for the organizations administrative tasks to be done so effectively and reduce errors, improve services provided to customers. Thus, office automation supports various administrative systems (Mcleod, 2006).

### **2.8. Customer satisfaction**

Customer satisfaction is an emotional response that is achieved from interaction with a supplier or consuming the product. Therefore, customer satisfaction will affect their subsequent reactions toward the organization (Grigoroudus & Sisikus, 2005).

### **2.9. Factors affecting customer satisfaction**

Factors affecting customer satisfaction include expectations, the perceived quality, and the perceived value (Fournle, 1992).

### **2.10. Customer expectations**

This variable is comprised of two parts; the first part of the customer's expectations is before taking the product or service received from non-experimental methods such as leaflets and banners, advertisements or linguistic recommendations of other customers. The second part consists of client and anticipates customer experiences and knowledge about the manufacturer or service provider is providing quality goods or services in the future. Therefore, the variable "customer expectations" has positive impact on customer satisfaction. Furthermore, customer expectations have positive and direct impact on perceived quality and perceived value. This type of relationship indicates that customer uses knowledge and past experiences to predict his expected quality and value (Ibid. 21).

### **2.11. The perceived quality**

Customer's overall assessment of the quality of the product or services of the organization has been gained by taking his last experience. This factor has a direct positive effect on customer satisfaction, quality experts believe that customer perception of the quality of a product or service can be investigated from two aspects:

Amount of the customer's provided needs by the product or service (in compliance with customer requirements)

Levels of reliability of the product or service to meet customer requirements (reliability) higher the customer perception of quality, customer satisfaction will increase as well.

**2.12. The perceived value**

Perceived value means the amount of product or service quality perceived by the customer compared to the price that the customer has paid for it.

In this research, two components of information technology that are mechanization and internet of have been considered and three factors of expectations, perceived value, and perceived quality are the factors affecting customer satisfaction that are used from and customer satisfaction index model of Fournlel (1992).

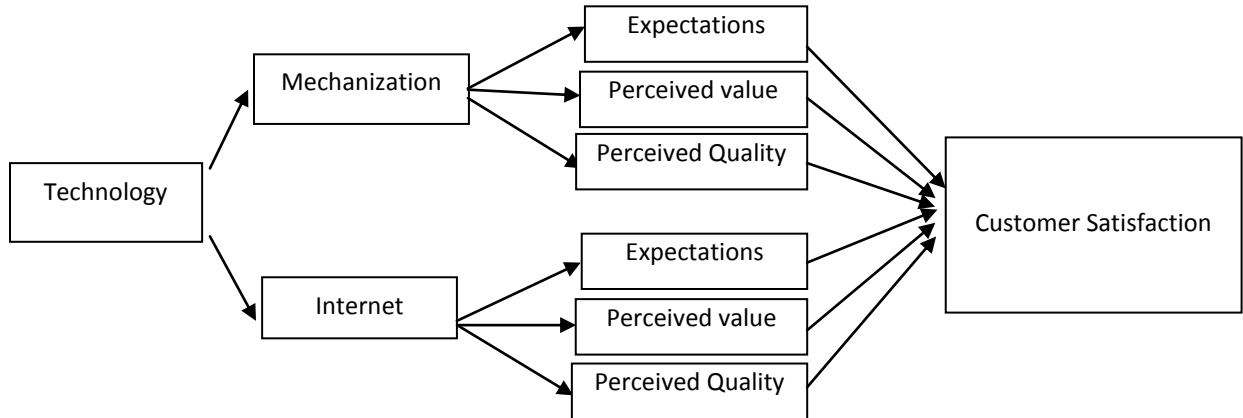


Fig. 2. Research Theoretical framework.

**3. Research hypotheses**

**3.1. Main hypothesis**

Using information technology increases customer satisfaction in Economy and Finance Organization of Zahedan City.

**3.2.Secondary hypotheses**

1-Mechanization of activities increases customer expectations in Economy and Finance Organization of Zahedan City.

2-Mechanization of activities increases customer perceived value in Economy and Finance Organization of Zahedan City.

3-Mechanization of activities increases customer perceived quality in Economy and Finance Organization of Zahedan City.

4-Using Internet increases customer expectations in Economy and Finance Organization of Zahedan City.

5-Using Internet increases customer perceived value in Economy and Finance Organization of Zahedan City.

6-Using Internet increases customer perceived quality in Economy and Finance Organization of Zahedan City.

**4. Research methodology**

The present research is functional regarding the aim and is descriptive in field study type regarding its method. The population of the research is the tax-payers of the Economy and Finance of the city of Zahedan and the number of samples, using Cochran's formula, is 198 altogether. Questionnaires are used for field data collection. The questionnaire included 6 general questions and 16 specific questions.

Validity of assessment tool was confirmed by teachers and experts. Cronbach alpha was used for measuring reliability of the research as well.

$$\alpha = \frac{K}{K-1} \left( 1 - \frac{\sum_{i=1}^K S_i^2}{S_{SUM}^2} \right)$$

**Table 1**

Cronbach alpha test of the questionnaire reliability.

Cronbach Alpha Measure	No. of Questions	Sample Number
87.42	16	196

In the recent questionnaire alpha value is 0.7842, which is larger than 0.7, then it is a reliable questionnaire.

**4.1. Assessment of hypothesis 1**

First step: normalization test (Kolmogrov-Smirnov) for the impact of mechanization of activities on expectations:

H0: Data is normal (Data has come from normal population)

H1: Data is not normal (Data has not come from normal population)

**Table 2**

Normalization Test for the Impact of Mechanization of Activities on Expectations.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of mechanization of activities on expectations	0.001	0.05	H1	It is not normal

Second Step: regarding the fact that the variable of impact of mechanization of activities on expectations is not normal, non-parameter methods (Wilcoxon single-sample test) are used for testing hypothesis which results are as follows.

H0: *median* ≤ 3

H1: *median* > 3

H0: Mechanization of activities has little or average impact on expectations.

H1: Mechanization of activities has much impact on expectations.

**Table 3**

Wilcoxon Single-sample Test for the Impact of Mechanization of Activities on Expectations.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of mechanization of activities on expectations	0.000	0.05	H1	<i>median</i> > 3

Amount of the level of significance is 0.000 and is less than error 0.05. It is concluded from Hypothesis one that mechanization of activities has much impact on expectations.

**4.2. Assessment of hypothesis 2**

First step: normalization test (Kolmogrov-Smirnov) for the impact of mechanization of activities on the perceived value:

H0: Data is normal (Data has come from normal population)

H1: Data is not normal (Data has not come from normal population)

**Table 4**

Normalization Test for the Impact of Mechanization of the Perceived Value.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of mechanization of activities on the perceived value	0.000	0.05	H1	It is not normal

Second Step: regarding the fact that the variable of impact of mechanization of activities on the perceived value is not normal, non-parameter methods (Wilcoxon single-sample test) are used for testing hypothesis which results are as follows.

H0:  $median \leq 3$

H1:  $median > 3$

H0: Mechanization of activities has little or average impact on the perceived value.

H1: Mechanization of activities has much impact on the perceived value.

**Table 5**

Wilcoxon Single-sample Test for the Impact of Mechanization of Activities on the Perceived Value.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of mechanization of activities on the perceived value	0.620	0.05	H0	$median \leq 3$

Amount of the level of significance is 0.620 and is greater than error 0.05. It is concluded from Hypothesis Zero that mechanization of activities has less to average impact on the perceived value.

#### 4.3. Assessment of hypothesis 3

First step: normalization test (Kolmogrov-Smirnov) for the impact of mechanization of activities on the perceived quality:

H0: Data is normal (Data has come from normal population)

H1: Data is not normal (Data has not come from normal population)

**Table 6**

Normalization Test for the Impact of Mechanization of the Perceived Quality.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of mechanization of activities on the perceived quality	0.003	0.05	H1	It is not normal

Second Step: regarding the fact that the variable of impact of mechanization of activities on the perceived quality is not normal, non-parameter methods (Wilcoxon single-sample test) are used for testing hypothesis which results are as follows.

H0:  $median \leq 3$

H1:  $median > 3$

H0: Mechanization of activities has little or average impact on the perceived quality.

H1: Mechanization of activities has much impact on the perceived quality.

**Table 7**

Wilcoxon Single-sample Test for the Impact of Mechanization of Activities on the Perceived Quality.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of mechanization of activities on the perceived quality	1.000	0.05	H0	$median \leq 3$

Amount of the level of significance is 1.000 and is greater than error 0.05. It is concluded from Hypothesis Zero that mechanization of activities has less to average impact on the perceived quality.

#### 4.4. Assessment of hypothesis 4

First step: normalization test (Kolmogrov-Smirnov) for the impact of using internet on expectations.

H0: Data is normal (Data has come from normal population)

H1: Data is not normal (Data has not come from normal population)

**Table 8**

Normalization Test for the Impact of Using Internet on the Expectations.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of using internet on expectations	0.008	0.05	H1	It is not normal

Second Step: regarding the fact that the variable the impact of using internet on expectations is not normal, non-parameter methods (Wilcoxon single-sample test) are used for testing hypothesis which results are as follows.

H0:  $median \leq 3$

H1:  $median > 3$

H0: Using Internet has little or average impact on the expectations.

H1: Using Internet has much impact on the expectations.

**Table 9**

Wilcoxon Single-sample Test for the Impact of Using Internet of the Expectations.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of Using Internet on the expectations	0.000	0.05	H1	$median > 3$

Amount of the level of significance is 0.000 and is less than error 0.05. It is concluded from Hypothesis One that using internet has much impact on the expectations.

#### 4.5. Assessment of hypothesis 5

First step: normalization test (Kolmogrov-Smirnov) for the impact of using internet on the perceived value.

H0: Data is normal (Data has come from normal population)

H1: Data is not normal (Data has not come from normal population)

**Table 10**

Normalization Test for the Impact of Using Internet on the Perceived Value.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of using internet on the perceived value	0.000	0.05	H1	It is not normal

Second Step: regarding the fact that the variable the impact of using internet on the perceived value is not normal, non-parameter methods (Wilcoxon single-sample test) are used for testing hypothesis which results are as follows.

H0:  $median \leq 3$

H1:  $median > 3$

H0: Using Internet has little or average impact on the perceived value.

H1: Using Internet has much impact on the perceived value.

**Table 11**

Wilcoxon Single-sample Test for the Impact of Using Internet of the Perceived Value.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of Using Internet on the perceived value	0.291	0.05	H0	<i>median</i> ≤ 3

Amount of the level of significance is 0.291 and is less than error 0.05. It is concluded from Hypothesis Zero that using internet has much impact on the perceived value.

**4.6. Assessment of hypothesis 6**

First step: normalization test (Kolmogrov-Smirnov) for the impact of using internet on the perceived quality.

H0: Data is normal (Data has come from normal population)

H1: Data is not normal (Data has not come from normal population)

**Table 12**

Normalization Test for the Impact of Using Internet on the Perceived Quality.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of using internet on the perceived quality	0.004	0.05	H1	It is not normal

Second Step: regarding the fact that the variable the impact of using internet on the perceived quality is not normal, non-parameter methods (Wilcoxon single-sample test) are used for testing hypothesis which results are as follows.

H0: *median* ≤ 3

H1: *median* > 3

H0: Using Internet has little or average impact on the perceived quality.

H1: Using Internet has much impact on the perceived quality.

**Table 13**

Wilcoxon Single-sample Test for the Impact of Using Internet of the Perceived Quality.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of Using Internet on the perceived quality	1.000	0.05	H0	<i>median</i> ≤ 3

Because the amount of the level of significance is 1.000 and is greater than error 0.05, it is concluded from Hypothesis Zero that using internet has little to average impact on the perceived quality.

**4.7. Assessment of the main hypothesis**

First step: normalization test (Kolmogrov-Smirnov) for the impact of IT on the customer satisfaction.

H0: Data is normal (Data has come from normal population)

H1: Data is not normal (Data has not come from normal population)

**Table 14**

Normalization Test for the Impact of Using IT on Customer Satisfaction.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of using IT on customer satisfaction	0.345	0.05	H0	It is normal



Second Step: regarding the fact that the variable the impact of using IT on customer satisfaction is normal, parameter methods (single-sample T-Student test) are used for testing the hypothesis which results are as follows.

H0:  $\mu \leq 3$

H1:  $\mu > 3$

H0: Using IT has little to average impact on the customer satisfaction.

H1: Using IT has much impact on the customer satisfaction.

**Table 15**

Single-sample T-Student Test for the Impact of Using IT on the Customer Satisfaction.

Variable	Level of Significance	Error	Hypothesis Confirm	Conclusion
The impact of Using IT on the Customer satisfaction	0.452	0.05	H0	$\mu \leq 3$

Because the amount of the level of significance is 0.452 and is greater than error 0.05, it is concluded from Hypothesis Zero that using IT has little to average impact on the customer satisfaction.

**4.8. Ranking the variables of the research by friedman and wilcoxon tests**

Ranking of Mechanization Impact on Three Indexes (Expectations, the Perceived Value, and the Perceived Quality).

Friedman Test for comparing the impact of mechanization of activities on the three indexes (Expectations, the Perceived Value, and the Perceived Quality):

Indexes	Average Ranks
Expectations	2.29
Perceived Value	2
Perceived Quality	1.71

**Table 16**

Friedman Test for comparing the impact of mechanization of activities on the three indexes (Expectations, the Perceived Value, and the Perceived Quality).

Level of Significance	Error	Hypothesis Confirm	Conclusion
0.000	0.05	H1	$\mu_i \neq \mu_j$ i, j for at least one

H0 :  $\mu_1 = \mu_2 = \mu_3$

H1 :  $\mu_i \neq \mu_j$  i, j for at least one

Because the level of significance is 0.000 and is less than error measure 0.05, for at least one j, l indexes are not equal to each other, thus, couple equality of these indexes should be investigated by using Wilcoxon two-sample test.

Wilcoxon Two-Sample Test for Investigation of two-by-two equality of indexes:

**Table 17**

Wilcoxon Two-Sample Test for Investigation of two-by-two equality of indexes.

Variables	Level of Significance	Error	Hypothesis Confirm	Conclusion
Expectations- Perceived Value	0.002	0.05	H1	$\mu_1 \neq \mu_2$
Expectations- Perceived Quality	0.000	0.05	H1	$\mu_1 \neq \mu_3$
Perceived Value- Perceived Quality	0.002	0.05	H1	$\mu_2 \neq \mu_3$

H0:  $\mu_i = \mu_j$

H1:  $\mu_i \neq \mu_j$

Thus, with regard to the level of significance of 3 Wilcoxon two-sample tests and comparing them with the error 0.05, it is concluded that all three indexes have significant difference with one another.

Regarding the non-parameter Friedman and Wilcoxon Two-Sample tests and average rank of indexes, the ranking of mechanization of activities impact on three indexes is done as follows.

- Rank 1 = Expectations
- Rank 2 = Perceived Value
- Rank 3 = Perceived Quality

**4.8. Ranking the impact of using internet on three indexes**

Friedman Test for comparing the impact of using internet on the three indexes (Expectations, the Perceived Value, and the Perceived Quality):

Indexes	Average Ranks
Expectations	2.30
Perceived Value	2.04
Perceived Quality	1.66

**Table 18**

Friedman Test for comparing the impact of using internet on the three indexes (Expectations, the Perceived Value, and the Perceived Quality).

Level of Significance	Error	Hypothesis Confirm	Conclusion
0.000	0.05	H1	$\mu_i \neq \mu_j$ i, j for at least one

H0:  $\mu_1 = \mu_2 = \mu_3$

$\mu_i \neq \mu_j$

H1 : i, j for at least one

Because the level of significance is 0.000 and is less than error measure 0.05, for at least one j, l indexes are not equal to each other, thus, couple equality of these indexes should be investigated by using Wilcoxon two-sample test.

Wilcoxon Two-Sample Test for Investigation of two-by-two equality of indexes:

**Table 19**

Wilcoxon Two-Sample Test for Investigation of two-by-two equality of indexes.

Variables	Level of Significance	Error	Hypothesis Confirm	Conclusion
Expectations- Perceived Value	0.020	0.05	H1	$\mu_1 \neq \mu_2$
Expectations- Perceived Quality	0.000	0.05	H1	$\mu_1 \neq \mu_3$
Perceived Value- Perceived Quality	0.002	0.05	H1	$\mu_2 \neq \mu_3$

H0:  $\mu_i = \mu_j$

H1:  $\mu_i \neq \mu_j$

Thus, with regard to the level of significance of 3 Wilcoxon two-sample tests and comparing them with the error 0.05, it is concluded that all three indexes have significant difference with one another.

Regarding the non-parameter Friedman and Wilcoxon Two-Sample tests and average rank of indexes, the ranking of the impact of using internet on three indexes is done as follows.

Rank 1 = Expectations  
 Rank 2 = Perceived Value  
 Rank 3 = Perceived Quality

Wilcoxon Two-sample Tests for Investigating Two-by-Two Equality of Questions 1 to 3:

**Table 20**

Wilcoxon Two-Sample Test for Investigation of two-by-two equality of questions related to hypothesis one.

Variables	Level of Significance	Error	Hypothesis Confirm	Conclusion
Question 1- Question 2	0.979	0.05	H0	$\mu_1 = \mu_2$
Question 1- Question 3	0.000	0.05	H1	$\mu_1 \neq \mu_3$
Question 2- Question 3	0.000	0.05	H1	$\mu_2 \neq \mu_3$

H0:  $\mu_i = \mu_j$

H1:  $\mu_i \neq \mu_j$

Thus, with regard to the level of significance of 3 Wilcoxon two-sample tests and comparing them with the error 0.05, it is concluded that all questions 1 and 2 have significant difference with one another.

Regarding the non-parameter Friedman and Wilcoxon Two-Sample tests and average rank of indexes, the ranking of the impact of three questions is done as follows.

Rank 1 = Question 2  
 Rank 2 = Question 2 = Question 1

Friedman Test for comparing the impact of questions 9 to 11 related to the hypothesis 4:

Indexes	Average Ranks
Question 9	1.99
Question 10	1.84
Question 11	2.16

**Table 21**

Friedman Test for comparing the impact questions 9 to 11 related to the hypothesis 4.

Level of Significance	Error	Hypothesis Confirm	Conclusion
0.003	0.05	H1	$\mu_i \neq \mu_j$ i, j for at least one

H0:  $\mu_1 = \mu_2 = \mu_3$

H1:  $\mu_i \neq \mu_j$   
i, j for at least one

Because the level of significance is 0.003 and is less than error measure 0.05, for at least one j, l indexes are not equal to each other, thus, couple equality of these questions should be investigated by using Wilcoxon two-sample test.

### 2.9. Wilcoxon two-sample test for investigation of two-by-two equality of questions

**Table 22**

Wilcoxon Two-Sample Test for Investigation of two-by-two equality of questions related to the hypothesis 4.

Variables	Level of Significance	Error	Hypothesis Confirm	Conclusion
Question 9 – Question 10	0.240	0.05	H0	$\mu_1 = \mu_2$
Question 9 – Question 11	0.130	0.05	H1	$\mu_1 \neq \mu_3$
Question 10 – Question 11	0.001	0.05	H1	$\mu_2 \neq \mu_3$

$$H_0: \mu_i = \mu_j$$

$$H_1: \mu_i \neq \mu_j$$

Thus, with regard to the level of significance of 3 Wilcoxon two-sample tests and comparing them with the error 0.05, it is concluded that questions 9 and 10 do not have significant difference with one another.

Regarding the non-parameter Friedman and Wilcoxon Two-Sample tests and average rank of questions, the ranking of the impact of three questions is done as follows.

Rank 1 = Question 11

Rank 2 = Question 9 = Question 10

### 3. Conclusions

Testing hypotheses indicates that both of the components of Information Technology, Internet and Office Automation, have a significant role in customer satisfaction. People do their affairs with spending the minimum time and cost and with high speed through the Internet and gain their required information precisely in the least time. Also office automation is welcomed by taxpayers of Economy and Finance of Zahedan city due to its ease and quickness of doing jobs and elimination of bureaucracy. According to taxpayers, an office automation system gives service to them in a very good way and causes their satisfaction with the service. As a result, all public and private organizations particularly the Economy and Finance organization of Zahedan city should give great importance to the issue of information technology and the creation of appropriate infrastructure and culture and encouraging customers to use at their own agenda. The following suggestions can be posed about this:

Providing better conditions for developing information technology for easier communication of virtual organizations with each other and with people.

Having a vision of excellence towards new information and communication technologies by authorities.

Identification of experiences of successful countries in the implementation of information technology and its various aspects, both in the domestic and international level.

Providing necessary and sufficient conditions for culture to use e-government services and explain the culture of using new technology.

Utilizing the expertise of experts and novices in the field of information technology

Reducing paper systems and replacing new information connections and operationalizing these systems.

Increasing the annual budget for the full achievement of IT objectives and programs.

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