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An exploration study to detect different factors influencing on inefficiency of office automation systems

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C H R O N I C L E

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A B S T R A C T

Office automation systems play important role on increasing productivity and efficiency of organizations. An automated system is capable of improving required communications, speed up the process of tasks and removes unnecessary activities. This paper presents an empirical investigation to detect important factors influencing on inefficiency of office automation systems in ministry of science, research and technology of Iran. The proposed study of this paper designs a questionnaire and distributes it among management team who work for this organization. The results of our investigation indicate that two factors, lack of necessary infrastructure for participating in office automation activities as well as lack of management support, play important role on reaching desirable results. In addition, educational background and work experience also influence office automation systems' applicability.

1. Introduction

Office automation systems play important role on increasing productivity and efficiency of organizations. An automated system is capable of improving required communications, speed up the process of tasks and removes unnecessary activities. During the past two decades, many governmental or non-governmental firms around the world have tried to computerize their administrative tasks. Many job applications are filed through web-based applications. People file their yearly income tax based on internet facilities. These days, when an official letter arrives to an organization, it will be first scanned and uploaded into a computer program and next it will be circulated within the organization. This would help all interested parties to read the letters and take the necessary actions, promptly. The circulation of these kinds of information seems to be easy through availability of intranet systems. However, there are some evidences, which indicate that there were some challenges facing office automation systems. Some users complain that office automation systems are difficult to use, the others find them full of flaws and some other people prefer traditional

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systems to modern automated ones. Nevertheless, when an efficient system proves to work in the system, it will improve efficiency of organization, significantly. Measuring the efficiency of organization, on the other hand, plays an essential role in todays' competitive world.

Roghanian and Foroughi (2010) used data envelopment analysis (DEA) (Charnes et al., 1978) to measure the relative efficiency of airports. Khaki et al. (2012) developed a ranking method based on the Indicator with Limited Sources (ILS) for the efficient decision making units, when there is changes either in inputs/ outputs ILS. The implementation of the proposed model is applied for a case study of banking system. Balanced score card (BSC) is another method for measuring the performance of organizations, which was originally developed by Kaplan and Norton (Kaplan & Norton, 1996, 2000, 2004). There are many applications of BSC methods for measuring the success of the systems in terms of four perspectives including internal processes (Mozaffari et al., 2012). Zhou et al. (2011) performed an investigation to identify critical success factors in emergency management using a fuzzy DEMATEL method.

2. The proposed study

The proposed study of this paper considers different factors influencing on inefficiency of office automation systems in ministry of science, research and technology of Iran. We design a questionnaire and distribute it among management team who work for this organization. The proposed study considers three different factors influencing the efficiency of office automation systems including the factors associated with individual users, the factors related to management teams; and finally technical factors associated with the system. The proposed study uses the following equation is used to calculate the sample size,

$$n = \frac{N \times z_{\alpha/2}^2 \times p \times q}{\varepsilon^2 \times (N-1) + z_{\alpha/2}^2 \times p \times q}, \tag{1}$$

where N is the population size, $p = 1 - q$ represents the yes/no categories, $z_{\alpha/2}$ is CDF of normal distribution and finally ε is the error term. Since we have $p = 0.5, z_{\alpha/2} = 1.96$ and N=98, the number of sample size is calculated as n=70. Table 1 summarizes some of the main barriers of using automation system.

Table 1
The summary of different barriers for having efficient office automation

Item	Reason	Type	Frequency
1	Unfamiliarity of users with computers and related software packages	Personal	32
2	Designing inappropriate system	Technical	43
3	Lack of attention for training before installation	Management	52
4	Lack of motivation to use modern systems compared with traditional ones	Personal	26
5	Fast management change	Management	48
6	Lack of users' participations in the design and development of systems	Management	37
7	Designed system is not attractive	Technical	27
8	Lack of personal motivation to use the system	Personal	29
9	Designing the system without paying enough attention to users	Technical	32
10	Low processing time	Technical	44
11	Lack of a good management in design stage	Management	49
12	Lack of interest among employees to use the system	Personal	34
13	Lack of support on behalf of management team	Management	49
14	Using the automation system is time consuming	Personal	33
15	Facing with complicated system	Technical	23

We first select a group of 20 people to verify the questionnaire and Cronbach alpha has been calculated as 0.69, which fairly approves the questionnaire. In our survey, 31 participants were female and 39 of them were male. In terms of educational background, 30 people, representing

42.9%, hold bachelor of science and 44 people representing 62.9% of the participants had social science educations. In addition, 53 people representing 75.7% of the participants had between 11 to 20 years of job experience.

As we can observe from the results of Table 1, Lack of attention for training before installation seems to be the most important item and facing with complicated system appears to be the least important item.

3. The results

3.1. Personal barriers

In this section, we present details of our findings in terms of personal factors. Fig 1 shows details of the responses for personal factors.

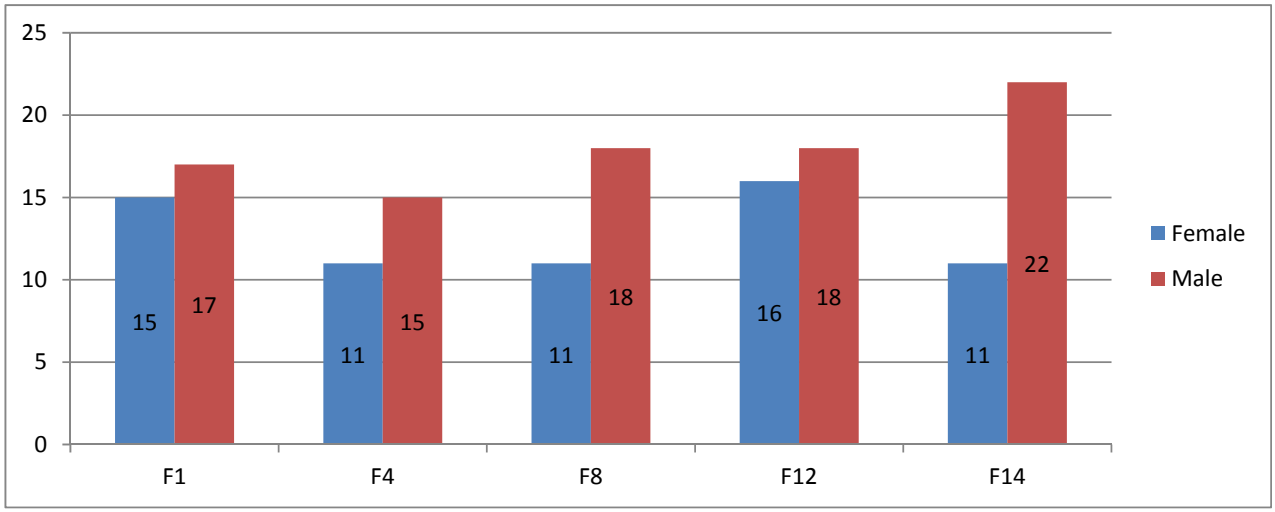

Fig. 1. The frequency of answers to personal questions

As we can observe, lack of interest to use computer system is the most important personal factor and interest in using traditional system has received the lowest point. In addition, we have performed a Chi-square test to verify whether the numbers are randomly selected or not. Table 2 shows details of our survey,

Table 2
The results of Chi-Square for personal barriers

	F1	F4	F8	F12	F14
Chi-square	13.829	27.457	20.064	10.314	12.007
df	1	1	1	1	1
Asump. Sig.	0.000	0.000	0.000	0.000	0.001

As we can observe from the results of Table 2, all null hypotheses are rejected and we can conclude that the figures are not randomly distributed.

3.2. Management barriers

The second item is associated with management factors and Fig 2 shows details of the responses for these factors.

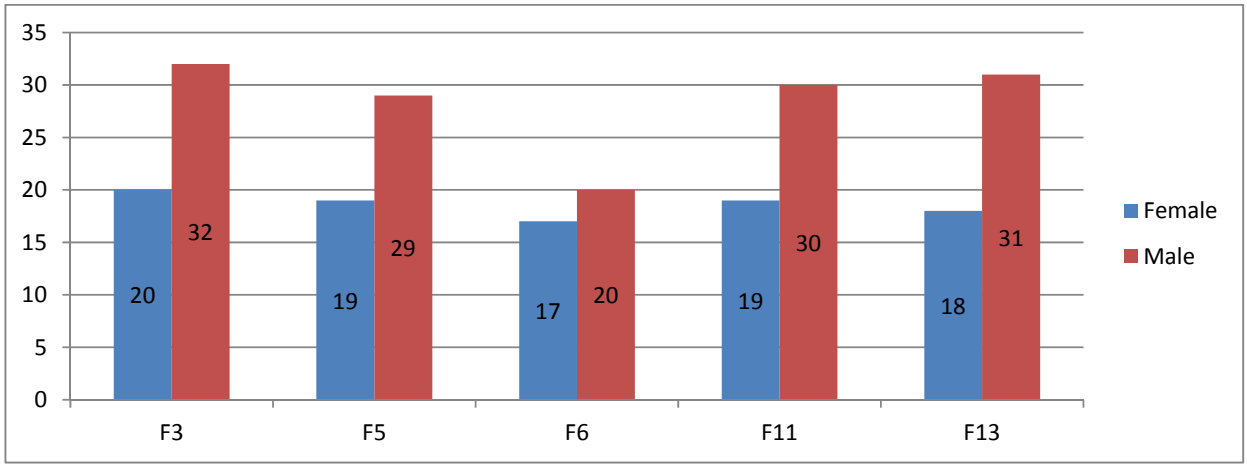

Fig. 2. The frequency of answers to management related questions

As we can observe from the results of Fig. 2, the third factor (F3), which is the lack of attention for training before installation is the most important managerial factor and lack of users' participations in the design and development of systems, F6, has received the lowest point. In addition, we have performed a Chi-square test to verify whether the numbers are randomly selected or not. Table 3 shows details of our survey,

Table 3
The results of Chi-Square for management type barriers

	F3	F5	F6	F11	F13
Chi-square	16.514	9.657	0.229	12.200	11.200
df	1	1	1	1	1
Asump. Sig.	0.000	0.002	0.633	0.001	0.001

As we can observe from the results of Table 3, all null hypotheses, except the case associated with F6, have been rejected and we can conclude that the figures are not randomly distributed.

3.3. Technical barriers

Finally, the third item is associated with technical factors and Fig 3 demonstrates details of the responses for these factors.

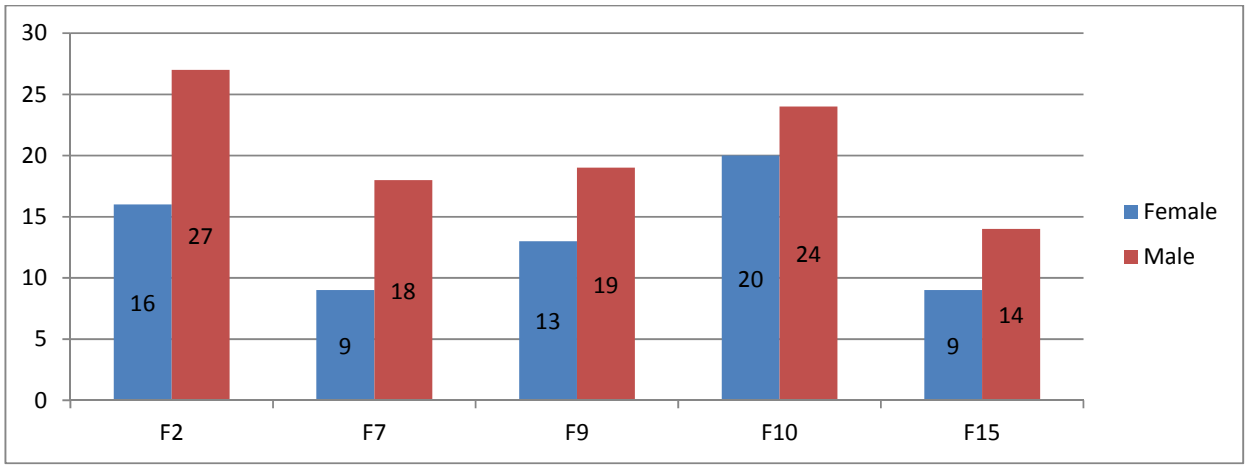

Fig. 3. The frequency of answers to technical based barriers

As we can observe from the results of Fig. 3, the third factor (F10), which is associated with inefficient and slow software package is the most important technical factor and Facing with complicated system, F15, has received the lowest point. In addition, we have performed a Chi-square test to verify whether the numbers are randomly selected or not. Table 4 presents details of our survey,

Table 4
The results of Chi-Square for technical factors

	F2	F7	F9	F10	F15
Chi-square	0.864	24.864	13.829	0.457	36.007
df	1	1	1	1	1
Asump. Sig.	0.353	0.000	0.000	0.499	0.000

As we can observe from the results of Table 4, all null hypotheses, except the case associated with F2 and F10, have been rejected and we can conclude that the figures are not randomly distributed.

In summary, it appears that managerial barriers are blamed the most followed by technical challenges and personal factor.

3.4. The effect of gender

We have also used Chi-Square test to understand whether gender plays an important role on using office automation systems or not. Table 5 demonstrates the results of our survey as follows,

Table 5
The summary of Chi-Square for the effect of gender

		Personal		Technical		Management		
		Not selected	Selected	Not selected	Selected	Not selected	Selected	Total
Female	Count	91	64	88	67	70	85	155
	%	58.7%	41.3%	58.8%	43.2%	45.2%	54.8%	100%
Male	Count	105	90	93	102	45	150	195
	%	53.8%	46.2%	47.7%	52.3%	23.1%	76.9%	100%
Total	Count	196	154	181	169	115	235	350
	%	56.0%	44.0%	51.7%	48.3%	32.9%	67.1%	100%

In addition, Table 6 demonstrates the results of applying Chi-Square test.

Table 6
The results of Chi-Square test for the effect of gender

	Personal			Technical			Management		
	Value	df	Sig. (2-sided)	Value	df	Sig. (2-sided)	Value	df	Sig. (2-sided)
Pearson Chi-Square	0.829	1	0.363	2.852	1	0.091	19.091	1	0.000
Continuity correction	0.643	1	0.422	2.500	1	0.114	18.104	1	0.000
Likelihood Ratio	0.830	1	0.362	2.858	1	0.091	19.112	1	0.000
Linear-by-Linear Association	0.827	1	0.363	2.844	1	0.092	19.037		0.000
N of Valid Cases	35			350			350		

The results of Table 6 indicate that personal and technical barriers have no correlations with gender but management barriers and gender are correlated when the level of significance is five percent.

3.5. The effect of work experience

Another important factor is associated with the relationship between different barriers and work experience. Table 7 demonstrates the results of our survey on the effect of work experiences as follows,

Table 7
The summary of Chi-Square for the effect of work experience

Work experience		Personal		Technical		Management		Total
		Not selected	Selected	Not selected	Selected	Not selected	Selected	
1-10	Count	56	34	32	58	37	54	90
	%	62.2%	37.8%	35.6%	64.4%	40.7%	40.7%	100%
11-20	Count	122	93	122	93	65	149	215
	%	56.7%	43.3%	56.7%	43.3%	30.4%	69.6%	100%
>21	Count	18	27	27	18	13	32	45
	%	40.0%	60.0%	60.0%	40.0%	28.9%	71.1%	100%
Total	Count	196	154	181	169	115	235	350
	%	56.0%	44.0%	51.7%	48.3%	32.9%	67.1%	100%

In addition, Table 8 demonstrates the results of applying Chi-Square test.

Table 8
The results of Chi-Square test for the effect of job experience

	Personal			Technical			Management		
	Value	df	Sig. (2-sided)	Value	df	Sig. (2-sided)	Value	df	Sig. (2-sided)
Pearson Chi-Square	6.138	2	0.046	12.826	2	0.002	3.430	2	0.180
Likelihood Ratio	6.116	2	0.047	12.944	2	0.002	3.360	2	0.180
Linear-by-Linear Association	5.131	1	0.023	10.317	1	0.001	2.746	1	0.097
N of Valid Cases	350			350			350		

The results of Table 8 indicate that personal and technical barriers have meaningful correlations with job experience but management barriers and job experience is not correlated when the level of significance is five percent.

3.6. The effect of educational background

The other important factor is associated with the relationship between different barriers and educational background. Table 9 presents details of the results of our survey on the effect of educational background as follows,

Table 9
The summary of Chi-Square for the effect of educational background

Work experience		Personal		Technical		Management		Total
		Not selected	Selected	Not selected	Selected	Not selected	Selected	
Social science	Count	110	110	119	102	68	152	220
	%	50.0%	50.0%	53.8%	46.2%	30.9%	69.1%	100%
Basic science	Count	31	14	24	21	15	30	45
	%	68.9%	31.1%	53.3%	46.7%	33.3%	66.7%	100%
Engineering	Count	37	18	19	36	11	38	49
	%	67.3%	32.7%	34.5%	65.5%	22.4%	77.6%	100%
Art	Count	18	12	19	10	21	15	36
	%	60.0%	40.0%	65.5%	34.5%	58.3%	41.7%	100%
Total	Count	196	154	181	169	115	235	350
	%	56.0%	44.0%	51.7%	48.3%	32.9%	67.1%	100%

In addition, Table 10 demonstrates the results of applying Chi-Square test.

Table 10
The results of Chi-Square test for the effect of educational background

	Personal			Technical			Management		
	Value	df	Sig. (2-sided)	Value	df	Sig. (2-sided)	Value	df	Sig. (2-sided)
Pearson Chi-Square	9.279	3	0.026	9.155	3	0.027	13.380	3	0.004
Likelihood Ratio	9.441	3	0.024	9.279	3	0.026	12.754	3	0.005
Linear-by-Linear Association	5.291	1	0.021	0.421	1	0.516	3.607	1	0.058
N of Valid Cases	350			350			350		

The results of Table 10 indicate that personal, technical and managerial barriers have meaningful correlations with educational backgrounds when the level of significance is five percent. In terms of personal barriers, social science maintains 50%, in terms of technical barriers people with engineering background hold 65% and in terms of managerial barriers, people with engineering and social science maintain 77 and 69 percent correlation.

4. Conclusion

Building an efficient business unit requires efficient internal processes and this would never happen until we optimize all components of the system, properly. In this paper, we have presented an empirical investigation to detect important barriers in front of executing office automation systems. The proposed model of this paper designed a questionnaire consist of three parts including personal, technical and managerial barriers. In terms of personal barriers, lack of interest to use computer system is the most important personal factor and interest in using traditional system has received the lowest point. In terms of managerial barriers, lack of attention for training before installation has been the most important managerial factor and lack of users' participations in the design and development of systems has received the lowest point. Finally, in terms of technical barriers, inefficient and slow software package has been the most important technical factor.

We have also investigated the relationship of users' personal characteristics with three types of barriers. The results of our survey have indicated that personal and technical barriers had no correlations with gender but management barriers and gender were correlated when the level of significance was five percent. In addition, the results of our survey indicated that personal and technical barriers had meaningful correlations with job experience but management barriers and job experience was not correlated when the level of significance was five percent. Finally, the results of our survey have indicated that personal, technical and managerial barriers had meaningful correlations with educational backgrounds when the level of significance was five percent.

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