

# **Assessing Office Automation Effect on Performance Using Balanced Scorecard approach Case Study: Esfahan Education Organizations and Schools**

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## **Abstract**

Survival of each organization depends on its dynamic interaction with internal and external environment. Regarding development of technology and its effect on performance of organizations, organizations need to implement these technologies in order to be successful. This research aims to explore relationship between implementation of office automation and performance using structural equation modeling method (SEM). This study is considered an applied survey in which its method is descriptive. Statistical population was managers of offices and schools of ministry of education in Esfahan and Lenjan city. 130 individuals were selected randomly as sample. In order to evaluate validity of questionnaire, content and construct validity were used and relations between variables of this research has been confirmed based on results of SEM method. For analyzes of data, structural equation method has been used. Regarding obtained results, effectiveness amount of office automation on performance was measured which was equal to estimated standard amount as 83%. Obtained results from main hypothesis test of this research completely conform which there is about office automation in studied organization and office automation could improve performance of organization.

**Key words:** Management information system, office automation, performance, Balanced score card

## **Introduction**

In recent 20 century, extended changes in all domains have been occurred around the world. Such phenomenon has created serious challenges in handle and manage affairs of private and

public sector. One of the actions adopted by governments to deal with such challenges is implementation of popular office automation system. This innovative action is a pervasive and necessary need for all organizations including private, public, voluntary etc. with any size ( Kazemi et al, 2010). Application of new communications and information technologies has created significant changes in products, activities and life of people. Communications and information technologies quickly change social structure and lifestyles of people around the world and affect significantly on their performance. Information societies which aim at production of data and scientific knowledge are extending and show positive performance ( Alagheband, 2007). Today organizations perform in a variable, ambiguous and variable environment. One of the most clear characteristics of present century is continuous and unusual changes which are occurred in social ,cultural, political, economical , technological and supranational condition(Moshref Javadi et al,2011).Using new information technologies has provided new potential in technology-based education which their utilization is very effective on training - learning process.(Charyani, 2001). Facts show that using new technologies in 21 century will affect deeply on social life of human and certainly education will meet these changes. Research conducted in education show that information technology have been used mainly in regular education system (Dalvez, 2001, page22) . Historically, education has been expected to train today generation for future life and society. In traditional past, changes were made slowly so recognition of future which today generation must be trained to live in it was not necessary but today this subject is considered very important in result of technical scientific developments which are referred as technological and scientific revolution and especially since thirty years ago that the growth rate of scientific publications has been double( Amiri, 1990). Also schools and education organizations of Esfahan have tried to implement information technology systems and office automation in order to increase and improve their performance to synchronize themselves with environmental changes and provide condition necessary to increase education system. Today automation and apply new technologies is not only considered as a need but as a critical necessity. Organizations including education organization with regard to span of their practice scope and frequency of activities related to their duties and responsibilities must pay attention to this fact and try to achieve it. Regarding stated necessity and lack of a comprehensive research in this regard, this research tries to explore and consider relationship between mentioned structures in order to assess effect of office automation implementation on manager's performance.

### **Research Literature**

#### **Management information system (MIS):**

Management information system is an integrated system to provide information in order to support planning, control and performance of organization. MIS provide data from external and internal resources and deliver to managers and decision makers. These system has relationship with individuals, methods, equipment, models and data. MIS support middle management via present especial management reports. MIS use computer software and hardware, manual methods, analysis models, planning, control, decision making and one database. The integrity property of this system does not mean that it has a single and homogenous structure but hints that its internal components are included proportionally(Taohidul Islam & Chik,2011). MIS affect on three individual, social and organizational level. One of the important effects of information systems technology is effect of new technologies on people which cause cooperation of physically disabled groups ,

concern about losing job and be unemployed , isolation feeling in such a way that increases individual efficiency and could shows higher performance during his/her work time( Sarafizadeh, 2002) . Each change in organization like MIS, are potentially affected by its workforces in organization..Human factor is main and fundamental pillar in information systems. In case this factor does not play its role well the efficiency and utilization of system is suspected (Shoji, 2008).

**Office automation:**

Office automation refers to the use of electronic devices in office activities in order to increase efficiency. This increased efficiency is resulted by completion of information exchange inside office and between offices and their environment and finally could help to manager by provide better information ( Beheshtian, 1999). Office automation is a mechanism which aims to improve organization efficiency and productivity through use of effective and efficient management by utilizing electronic flow of correspondence in organization level , easy searching stored data, quick and timely response to client, removal of paper from administrative correspondence cycle, proper control over users, maintaining and recording data efficiently and improve communications within organization( Rahimian, 1998) , increase nonproductive activities like physical archiving of documents, maintaining records of operation in less volum, high safety and easy access, producing necessary report with different diagrams, decrease duties of office managers, typists and secretaries, possibility to telephone supervising on tasks and activities in any time , control over classified data, precision in doing operation and recording all affairs, removal of paper completely in performing work process, facility and speed in operation flow, high security in maintaining documents and possibility to rapid access them( Starifar, 1998). Regarding conducted researches in information technology, the first step is identification of office automation system that is very important. Today implementation of office automation in organizations and companies is one of the issues being considered especially in both academic and applied communities (Esmall & Yasin,2002).

**Performance:**

Performance has different meanings and each scholar study especial aspect of it. Armstrong (1994) has defined performance as "achieving goals with defined quality and quantity ". Oxford dictionary of English defines performance as the act of performing, applying or executing anything organized or promised (Armstrong, 1994:7). This definition shows that performance is related to doing an activity and also the results. Therefore performance can be considered as a kind of behavior. Another scholar defines performance as the shared performance of effort , ability and role understanding (Trance, 1997:22). Kane (1996) argues that performance is a process which the person pays no attention to and is in fact separate from the goal. Bernadin (1995) believes that performance should be defined as work results because these results have the strongest relationship with the organization strategic goals, customer satisfaction, and economic cooperation. Brumbach (1998) presents a more comprehensive view of performance which includes behaviors and results. He discusses that performance means behavior and results. Behaviors are initiated by the agent and change performance from a thought into action. Behaviors are not only tools to achieve results but also are in turn derived from results of consequences of mental and physical activities and so they can be considered separate from results ( Armstrong, 1997, page 12). Organizational performance shoe that how an organization achieves its related objects and aims. It implies

start from a special status and achieve a certain aim which could includes several aim points including market share, sales volume, employee motivation, customer satisfaction, quality level etc( Laurens, 2008). Performance management( PM) can be understood as a collections of information and proceedings that is applied to increase optimum use of resources and facilities in order to achieve goals using economic methods in an effective and efficient manner. Instruments and techniques of PM are used in order to increase employees efficiency and gain competitive advantage for organization ( Almasi, 1995). Success level of each organization is evaluated based on optimum performance level of its employees. So progressive human resources systems which could increase overall productivity of system and help and run organization to achieve its goals by present proper solutions and provide necessary coordination between goals of organization and employees are required to evaluate success of organizations. PM reconciles goals of organization and employees and increases workforce efficiency and profitability by providing collaborative environment ; submitting goals of organization and ways to obtain them to employees ; hold evaluation meetings ; guide employees and applying payment systems based on performance.PM by providing a type of coordination between organizational goals and staff goals motivates staff to strive to achieve the goals of organization so their goals which are reconciliation of respect and compensatory aids are realized more and on the other hand organizations could perform more successfully in competitive environment to obtain income and provide their employees with better and more benefits and payments in result of increased efficiency(Greenberg and Baron, 2000) .

Different definitions of performance are listed in table 1 .

Table 1) classification of different definitions of performance

definition	year	Author
.Performance is behavior and outcome	<b>1988</b>	<b>Beramach</b>
Performance is efficiency and effectiveness in doing assigned duties	<b>1989</b>	<b>Rabinz</b>
Performance is a process including behavior and is apart from results	<b>1990</b>	<b>Cample</b>
Performance is achieving goals with .defined quality and quantity	<b>1994</b>	<b>Armstrong</b>
.Performance is work outcomes	<b>1995</b>	<b>Bernain</b>

Performance is a process which is not attended by person and is apart from aim **1996**

**Balanced Score Card:**

**Ceni**

History of the word balanced evaluation refers to Robert Kaplan and David Norton. They published an article in 1992 and presented a new approach named balanced evaluation to evaluate performance ( Kaplan and Norton,1992). In fact, balanced score card is a management evaluation criteria and a strategic management system ( Chan and Ho,1997) that has been not replaced by financial evaluation indices but has been presented to complete it. Balanced score card is a method that are used to evaluate financial and also nonfinancial measures. comprehensive system is a management new system of balanced performance evaluation which make organizations able to translate company's vision and strategy into

action. If this system is completely and successfully established, the strategic planning system could be implemented (Papp, 1999). This name is selected for balanced evaluation method because it concludes a set of scales and establishes a balance between short term and long term goals, between financial and nonfinancial scales, between leader and follower indices and between perspectives of internal and external performance and emphasizes on maintenance of cause and effect relations between them (Milis and Mercken, 2004). Criteria of Balanced score card are appointed in diagram 1.

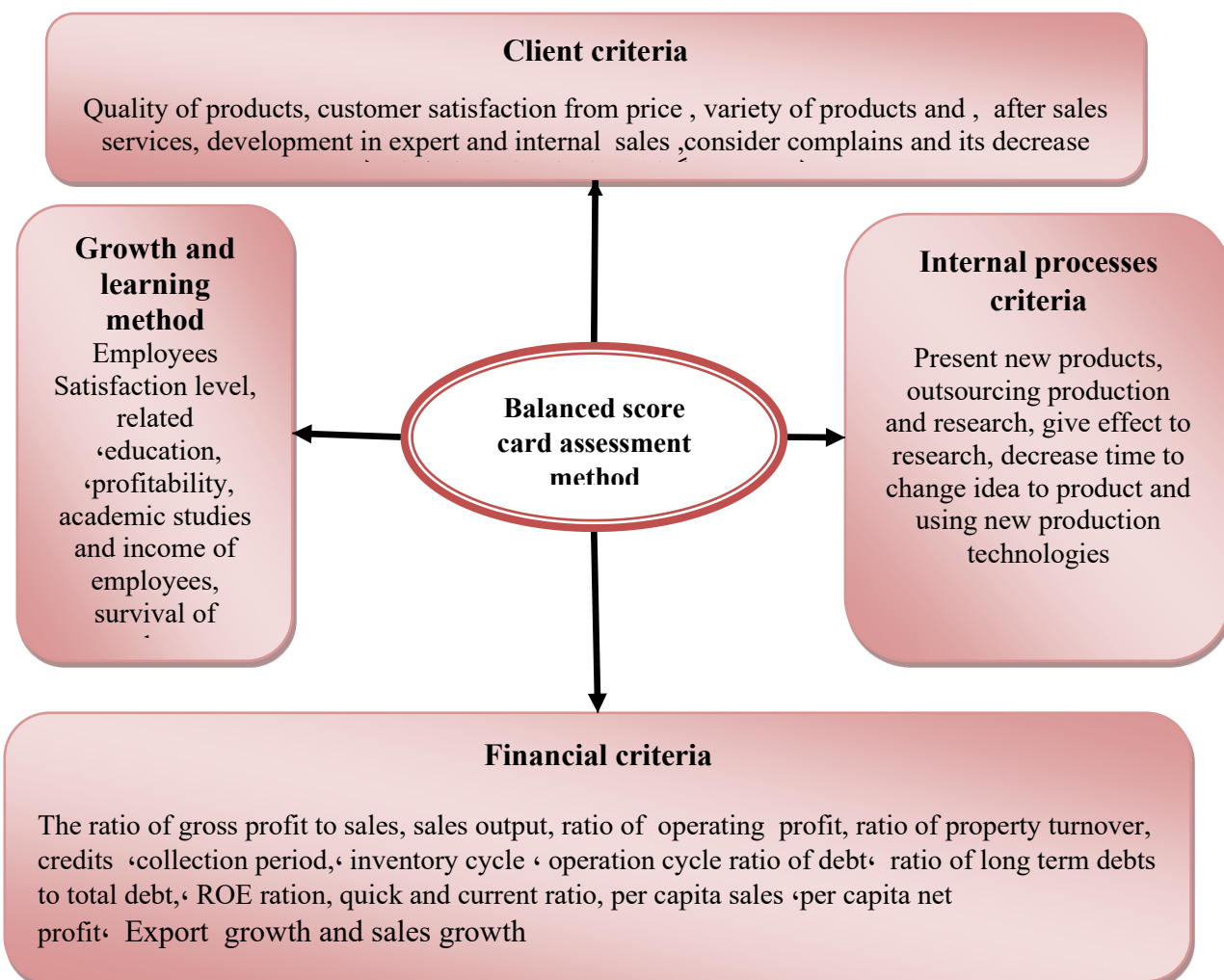


Figure 1) Balanced score card method (Kaplan and Norton, 1996)

### Conceptual Model of research

Two main structures considered in this research are implementation of office automation and performance each are evaluated by variables and indices which their selection reasons are explained in details in following. Shiri (1385) in research titled studying effect of automation on performance of employees of Iran insurance stock company, Hamedan, in order to evaluate office automation has used indices including easy and rapid access to information and statistics, providing procedure unity in doing all affairs, precision in doing operation and speed in affairs accomplishment. In his research also these indices are used because they are simple while are holistic. Used instrument in this research is based on balanced score card. This instrument has a conceptual framework which changes large strategic purposes of

organization to valuable indices and provides balanced distribution between critical areas of organization ( Heinz,2001,pp.441-461).

Regarding mentioned necessity about implementation of office automation and its effect on performance in education, in this research effect of office automation on performance is considered and so bellow theoretical pattern is presented:

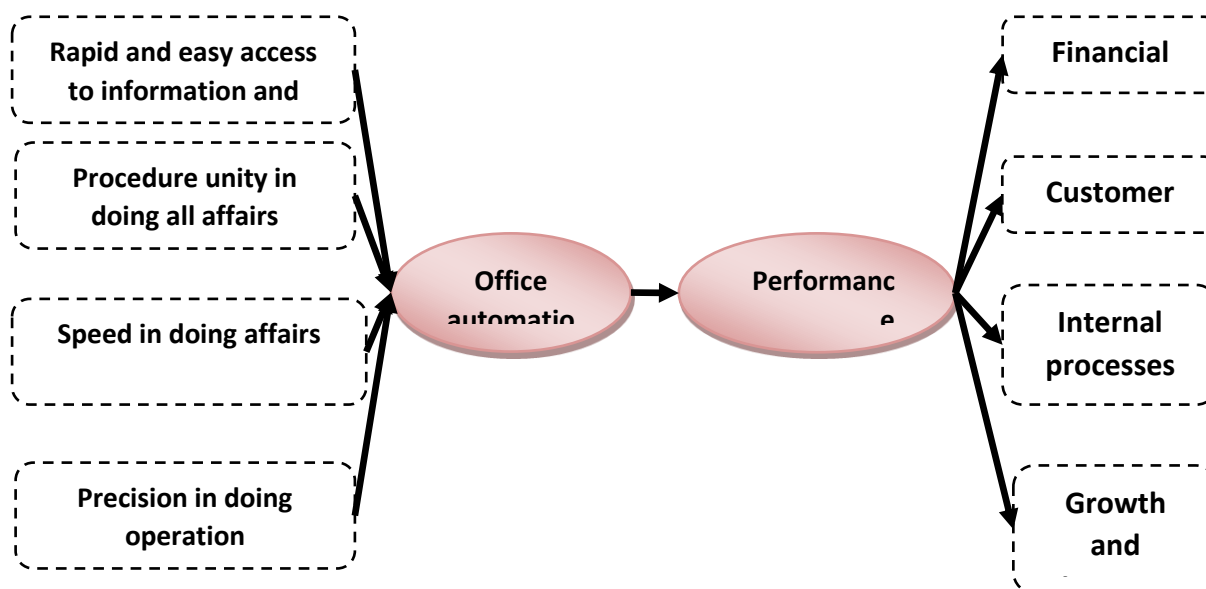


Figure 2 -Conceptual model of research

### Hypotheses of research

Regarding mentioned contents 5 general defaults are considered which are confirmed or denied using statistical analysis and this is stated during research . Hypotheses of this research are :

#### **Main hypothesis:**

**H<sub>1</sub>:** implementation of office automation on performance of Esfahan schools and education organizations.

#### **Secondary Hypotheses:**

**H<sub>2</sub>:** easy and rapid access to information and statistics increases Performance.

**H<sub>3</sub>:** procedure unity in all affairs increases performance.

**H<sub>4</sub>:** speed in performing affairs increase performance.

**H<sub>5</sub>:** Precision in operation increase performance.

### Methodology

The present research is applied in terms of purpose and nature and correlation in terms of method and descriptive and inferential statistics method is used to analyze data and is based on structural equations model. Field method using standard questionnaire and 5-point Likert spectrum is used for collect data. SPSS18 and Amos 20 software are used to analyze data. SEM method is used to analyze hypotheses and consider overall fitting of research model. Statistical society of this research includes managers of Esfahan education organizations, Dist.1, 2, 3 and managers of Esfahan and Lenjan education schools ( including Zarinshahr, Chamgordan, Mobarah and Sedeh districts). It must be noted that other districts like Dist.2

and Fouladshahr Dist. Were not selected because statistical society of these regions could not be accessed for research. So researcher has had access to mentioned regions to distribute questionnaire. Sampling was done by classified random method. This classification has been done as random of Esfahan, Zarinshahr Mobarakeh, Chmgordan and Sedeh cities. To determine sample volume also with regard to Cochran formula  $d=0/1$  ,  $t=1/96$  and maximum variance between research variables was obtained as 125 individuals. In general 130 questionnaires were distributed in statistical society and 127 questionnaires were finally collected and analyses of this research are performed based on obtained responses.

Table 2) Demographic properties

Properties description		Percent	Properties description		Percent
Age	20-30	7	Study	B.S	70
	30-40	43		M.A	26
	40-50	50		PHD	3
Sex	male	52			
	female	48			

In this research face validity is used to consider validity of questionnaire and to achieve this aim some questionnaires were given to scholars who have specialty in knowledge management domain especially subject of this research namely knowledge sharing. Using Delphi method corrected questionnaire was delivered to scholars again after considering their opinions and finally after applying their final opinions , the certain and final questionnaire was produced and so face validity was confirmed. To determine final reliability Cronbach’s Alpha method is used. Regarding variance of each question and also obtained general variance, Cronbach’s Alpha coefficient was calculated using SPSS software which was obtained as 0/89 for questionnaire and this shows good reliability of this questionnaire.

Table 3) Cronbach’s Alpha coefficients

<b>Cronbach’s Alpha coefficient</b>	<b>Variable</b>
<b>0/85</b>	Quick and rapid access to information and statistics
<b>0/82</b>	procedures unity in affairs accomplish
<b>0/91</b>	Speed of affairs accomplishment
<b>0/92</b>	Precision in doing operation
<b>0/82</b>	Financial performance
<b>0/79</b>	Customer performance
<b>0/85</b>	Internal process performance
<b>0/91</b>	Learning performance

After investigating and confirming the measurement patterns in the first step, path analysis was used to test the hypotheses in the second step. In table three, general indices of path analysis has been presented.

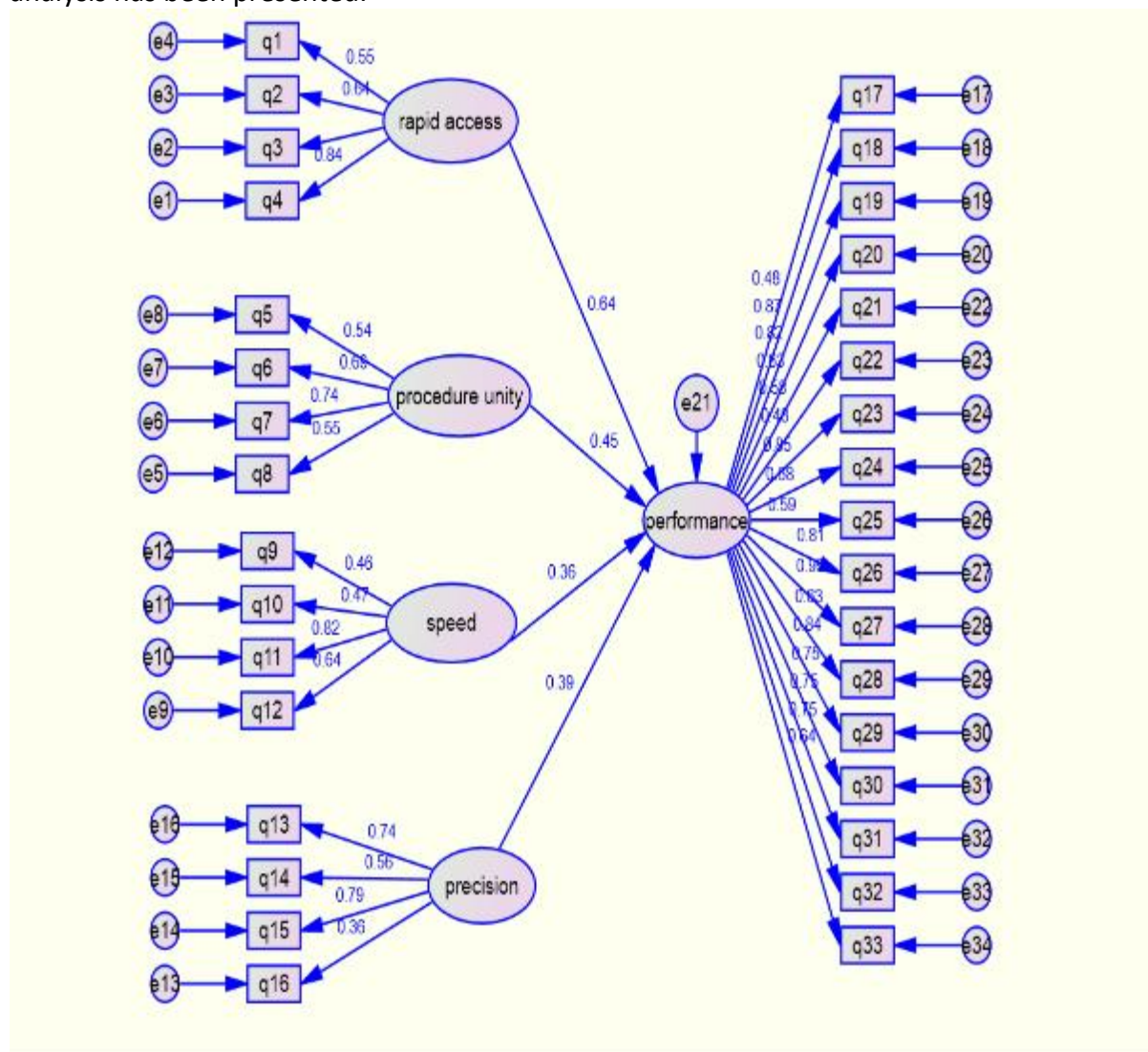


Figure 3) structural equation model to determine study secondary hypotheses (first model)

Table 4) general fit indices of secondary hypotheses (first model)

<b>CMIN/DF</b>	<b>1.884</b>	<b>NFI</b>	<b>0.82</b>
GFI	0.89	CFI	<b>0.92</b>
AGFI	0.85	PRATIO	<b>0.926</b>

As it is seen in the above table all the indices have suitable desirability and generally confirm the model validity. In the second step, partial fit indices must be evaluated. So factor loads and structural coefficients of the models are evaluated.

Table 5) regression weights

Significance level	Critical ration	Standard error	Standard estimated value	Regression relationships		
***	5.128	.125	.640	Easy and quick access	<---	performance
***	5.703	.080	.455	Procedure unity in doing affairs	<---	performance
***	2.985	.078	.362	Speed of affairs accomplishment	<---	performance

The interpretation of above table is that the first secondary hypothesis, easy and rapid access to statistics and information, enhances the performance with the significance level of \*\*\* (the symbol \*\*\* shows  $p > 0.001$ ) and the critical ratio of 0.752 has been confirmed and is indicative of direct, positive and strong effect of easy and rapid access to statistics and information factor on performance. Also the second hypothesis of speed of affairs accomplish, enhances performance and has been confirmed with the significance levels of \*\*\*, \*\*\*, \*\*\*, \*\*\* and with respect to critical ratios it can be concluded that these components have direct, positive and significant effect on the dependent variable.

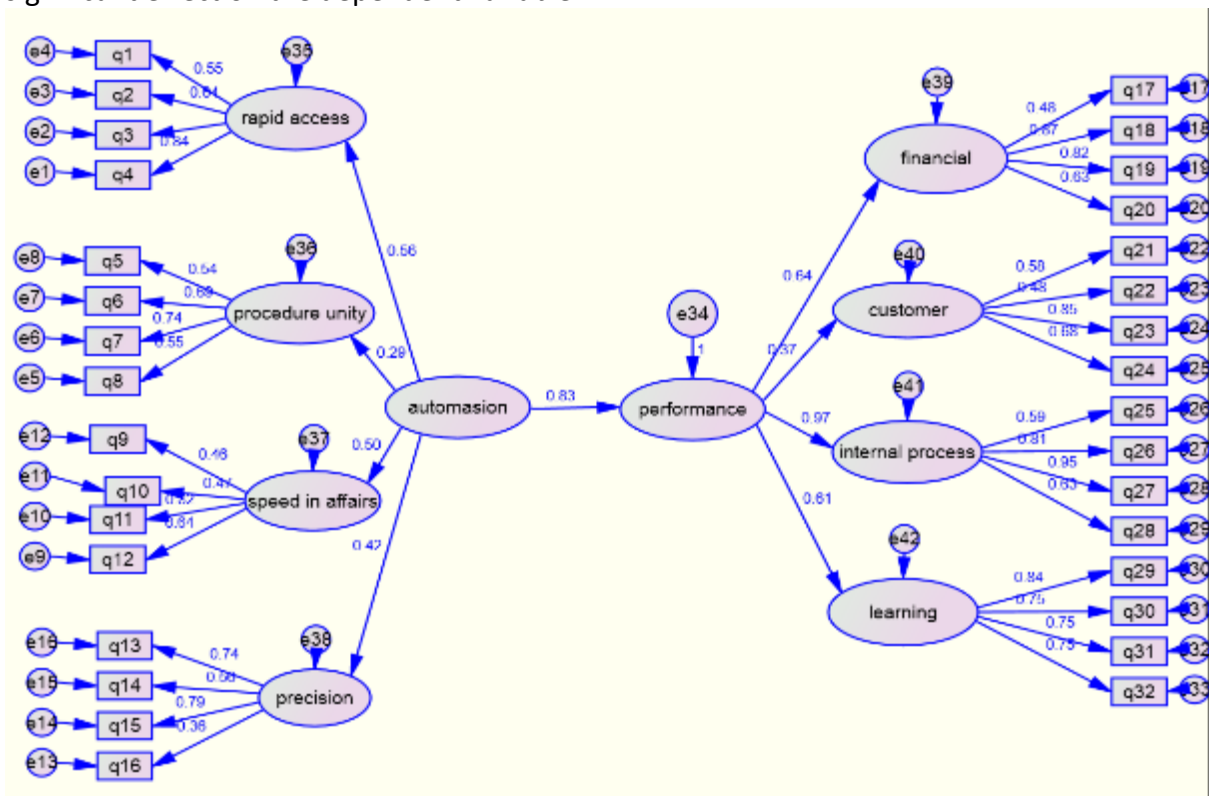


Figure 4) structural equation to determine study main hypothesis (second model)

Table 6) General Indices of second model

0.754	NFI	1.914	CMIN/DF
0.864	CFI	0.082	RMR
0.936	PRATIO	0.725	GFI
0.070	RMSEA	0.712	AGFI

Table 7) regression weights of second model

Significance level	Critical ration	Standard error	Standard estimated value	Regression relationships
***	6.067	.198	1.204	office automation <--- performance

Above table shows that partial fit indices (critical ratio and significance level) are in an acceptable level and all factor loads have significant difference with zero. Besides the calculated P for the present relation in the model has been less than 0.05. Therefore it can be concluded that partial fit indices confirm the fittings of data in the model.

Considering the fact that in the main hypothesis, the emphasis is on relationship between office automation as independent and performance variable, so based on the above table it can be concluded that office automation has direct, positive and significant effect on performance. As a result, the study main hypothesis is confirmed.

### Study results

It has been declared in the study main hypothesis that implementing office automation has some effect on the performance of Esfahan education organizations and schools. Structural equation modeling has been used to test this hypothesis. Test results show this hypothesis. Regarding the acceptability of general and partial fit indices, the main study hypothesis has been accepted and the amount of influencing office automation on performance has been calculated as 0.83 which is equivalent to the standard evaluated amount. The enhanced results from testing study main hypothesis are completely compatible with what is going in the organization under study regarding office automation. As expected office automation results in performance improvement.

- The first secondary hypothesis proceeded to determine the effect of rapid and easy access to information on performance. The results of investigations show that rapid and easy access to information has effect on performance with the evaluated standard amount of 0.64. It is worth mentioning that considering the results of one- sample t- test, the level of rapid and easy access to information factor has been assessed more than average amount and thus confirms the direct, positive and strong effect of rapid and easy access to information factor on performance.
- The Second secondary hypothesis proceeded to determine the effect of developing procedure unity in doing all affairs. The results of investigations show that procedure unity in doing all affairs has effect on performance with the evaluated standard amount of 0.45. It is worth mentioning that considering the results of one- sample t- test, the level of developing procedure unity factor has been assessed more than

average amount in all affairs and thus confirms the direct, positive and strong effect of developing procedure unity factor on performance.

- The third secondary hypothesis proceeded to determine the effect of speed in affairs accomplishment on performance. The significant level of 0.362 was accepted based on statistical analyses and considering this hypothesis.
- The fourth secondary hypothesis proceeded to determine the effect of precision in doing affairs on performance. The significant level of 0.39 was accepted based on statistical analyses and considering this hypothesis.

### **Discussion and Recommendations**

In this section based on the enhanced results from field studies and the conducted tests on the gathered data, theoretical studies, observations, interview with managers, employees and experts in this respect and also the obtained experiences, the researcher presented some recommendations regarding any dimensions of office automation during conducting this study. The recommendations presented in this section can be applied by automation system planners so that these recommendations can be one of the main axes of future planning by these managers to develop the system.

Considering the effect of implementing office automation on the performance of education organizations and schools, some steps must be taken to improve and enhance the performance by simplifying and smoothing some of the working processes with regard to using automation, getting necessary feedback from this system in specified time intervals. The relevant managers and authorities in the organization must perform a comprehensive investigation in this respect at the beginning and before implementing automation. Also it is recommended that enough consideration be given to man power requirements for supporting the system along with implementing computer systems. Also considering the above results, it is recommended that in applying office automation systems and enforcing changes and developments, essential attention is given to human engineering subjects and the employees' resistance against change and effective techniques to overcome their resistance and by using systematic attitude, some steps are taken to perform changes and developments and apply office automation systems. In the other words, in future planning and policy makings increasing attention must be given to man powers especially organization managers as the most important agents to develop changes and also as the acceptors and implementers of these systems.

On the other hand it is recommended that at first the priorities of strategies to upgrade the performance of office automation system in education office of Esfahan County are evaluated and credited for all employees of the organization by the experts working in the same organization and in the second step it is recommended that the above results are evaluated and credited in other organizations especially the public organizations dealing with education system. Measurements and crediting the strategies to upgrade the performance of office automation system in the sample and other organizations and offering comprehensive viewpoints of their status quo can provide the necessary knowledge for optimum resource allocation for the policymakers and consequently improve organizational productivity. Providing complementary-expertise educational workshops and courses (in the case of providing these courses, it is recommended that complementary and advanced courses are held) are presented and held for all users of automation systems in the organization and also all general learners interested in learning computer are taught especially in its communicational level among all employees of the organization.

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