IJBPAS, July, 2015, 4(7): 660-670

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

INTEGRATION BARRIERS TO THE E-GOVERNMENT INFORMATION SYSTEMS

ALI KHISHVAND[1], SEDIGHEH MOHAMMADESMAIL[2*], FAHIMEH BAB ALHAVAEJI [3], FATEMEH NOUSHIN FARD[4]

1, 2, 3, 4: Department of information and knowledge science, Faculty of human science, Islamic Azad University, Science and Research branch, Tehran, Iran

***Corresponding Author: E Mail: khishvand52@yahoo.com**

ABSTRACT

Not applying integrated information systems results in inefficiency of e-government. Hence the objective of this paper is identification of integrated barriers of e-government information systems.In this descriptive study, qualitative Meta -analysis method was used to extract structure of frame and factors. Research data were collected through researcher-made questionnaire from 58 e-government experts. They were analyzed by descriptive and analytical statistical methods.The most important integration barriers of information systems include technical barriers (3.94), designing barrier (3.55), governmental barrier (3.46), strategy barrier (3.42), and human barrier (3.36).Since the most important challenge of information system integration is technical aspect as well as its related issues, as long as information systems are not technically in a satisfactory condition and do not provide integration conditions, merging systems will encounter problems.

Keywords: e-government, information systems, integrations.

INTRODUTION

Ambitious e-government initiatives have started in a considerable number of countries. In December 2002, George W. Bush signed a law whereby a forward step was taken toward IT public sector modernization in the United States [2], In England, the first goal set by the Minister Tony Blair was to have 100% continuous public-sector services till 2005[9],

Generally speaking, the main goal of European Union was to have continuous services in e-government by "2005 e-government plan". Vast creativity and similar e-governments are observable in other countries as well [1],There are numerous e-government operators with greater efficiency, greater access to public sector services, widespread services, greater transparency, reduced corruption, and strengthened citizens. [8],E-government, following to centralize and, accordingly, electronic government integration (EGI), is observed as success factor of critics to reach e-government maturity [3], Although no single definition exists concerning e-government due to dynamic and varying nature of technology, the following definitions describe the issue to some extent:

E-government is various methods in which public-sector managers use to communicate with citizens through the Internet, email, video conference, and other digital methods. (Criado and Ramilo)

E-government means taking advantage of information technology and in particular the Internet in order to increase accessibility level of citizens, public sectors, private sector employees to online services and information. [6],Gronland defines e-government as reconstruction procedures in order to reach better efficiency, better services, and democratic participation. [5], Montagna defines it as a method to merge all the Internet and computer potential networks within public sector management [7],According to above mentioned definitions, the main objective of e-government is integration and coordination between societies, business world, and social and civil organizations and citizens. However, according to the last valid report entitled "e-government development in 2014" published by the United Nations, Iran is not in a good position concerning e-government [10],Investigations on e-government indicator among 193 countries indicate that Iran ranked 105th with score of 4,508. South Korea scored the top with score of 9,462. Australia and Singapore took the next positions, meaning that these countries reached complete digitization maturity. According to this information, current condition of Iran in e-government replication stage indicates the fact that processes become electronic in accordance to what happens in physical world. Procedure re-engineering and improvement and then making them electronic are considered as the next steps, making Iran closer to e-government maturity. According to this information, integrity and distributed system, or providing integrated services are

some of e-government requirements. This issue has not happened in Iran, yet.

MATERIALS AND METHODS

Concerning goal, it is an applied study. It is mixed and descriptive research in terms of data and nature, respectively. This is mainly because desired concept or structure was initially explained according to qualitative studies. First, frame and factors of that structure as well as indicators were compiled. Previous qualitative meta-analysis was used to find main research elements (barriers).In this regard, some conducted studies and opinions of experts were taken into account. Integration barriers were extracted and classified. Finally, the researcher-made tool was assessed concerning the validity. Questionnaire validity was confirmed through face-content validity method using credible scientific texts and opinions of 14 e-government experts as well as faculty members in science and knowledge department. To check variable normality, Kolmogorov–Smirnov test was used. Then one sample t – test was used to study the variables. In analysis section, explanatory factor analysis was used to discover the major dimensions of designed structure in order to evaluate research variables. Two-stage confirmatory factor analysis (CFA) with the help of LISREL software was used to study the effect of integration-barrier components in e-government. Questionnaire validity was finalized through content and face validity as well as reliability through CVR test.

RESULTS

As it was mentioned, the aim of this paper was to study the integration barriers of e-government information systems. To this end, Kolmogorov–Smirnov test was done after data collection in order to clarify whether data (mentioned variables) are normal or not? In case the data are normal, parametric tests are used to study the hypotheses. Otherwise, non-parametric coefficient will be used.

The following table shows the results of variable normality in each group. If Sig. is less than 0.05, the data are not normal and if they are greater than 0.05, they are normal. As it can be seen, all variables are normal. Thus, parametric tests are used to compare them.

As it can be seen from table 1, all variables are normal. Consequently, parametric tests are used to examine the variables.

In this section, we study the variables descriptively before exploring the hypotheses. The following table shows descriptive indicators such as mean, median, mode, standard deviation, maximum, and minimum.

As it can be seen, mean, median, and mode are relatively more than 3 for research variables. The following information was extracted.

Designing barrier variable includes mean 3.55, median 3.62, mode 3, standard deviation 0.88, minimum 1, and maximum 5.

Human barrier variable: mean 3.36, median 3.37, mode 3, standard deviation 1.09, minimum 1, and maximum 5.

Technical barrier variable: mean 3.94, median 4, mode 4.63, standard deviation 0.72, minimum 2, and maximum 5.

Public- sector barrier variable: mean 3.46, median 3.57, mode 3.57, standard deviation 0.82, minimum 1, and maximum 5.

Strategy barrier variable: mean 3.42, median 3.50, mode 3, standard deviation 0.85, minimum 1, and maximum 5.

Information system integration (overall score of questionnaire): mean 3.55, median 3.56, mode 3.34, standard deviation 0.54, minimum 2.39, and maximum 4.71.

After providing descriptive indicators of research variables and normality test of variables, we study the current situation of research variables. One sample t-test is used to study the research variables. Since the questions were designed based on 5-option Likert test, the mean for each of variables is compared to fixed value of 3 (mean, median). Zero hypothesis in this test equals to fixed value of 3. When t or Sig. value is less than 0.05, equality hypothesis is rejected and if mean is less than 3, it means that the value is less than medium level and if the mean is more than 3, it means that it is more than medium level. If Sig. value is more than 0.05, it means that the mean is in medium level.

Studying current situation of research variables:

As it can be seen, designing barrier has the mean of 3.55. According to t statistics which is equal to 7.28 and less-than-0.05 prob. value, it leads to rejection of zero hypothesis. Responders believe that the level of designing barrier is more than medium. Human barrier has mean value of 3.36. According to t statistics which is equal to 3.90 and probability value which is less than 0.05, it results in rejection of zero hypothesis. It means that human barrier is more than medium level. Technical barrier has mean of 3.94. According to t statistics which is equal to 14.91 and probability value which is less than 0.05, it results in rejection of zero hypothesis. It means that technical barrier is more than medium level.

Public sector barrier has mean of 3.46. According to t statistics which is equal to 6.52 and probability value which is less than 0.05, it results in rejection of zero

hypothesis. It means that public sector barrier is more than medium level. Strategy barrier has mean of 3.42. According to t statistics which is equal to 5.68 and probability value which is less than 0.05, it results in rejection of zero hypothesis. It means that strategy barrier is more than medium level. Information system integration (overall score of the questionnaire) has mean of 3.55. According to t statistics which is equal to 11.89 and probability value which is less than 0.05, it results in rejection of zero hypothesis. It means that information integration barrier is more than medium level. Now, we study the share of each of following variables to determine model of endogenous and exogenous variables.

Question 1: Is "designing factor" effective on lack of integration for e-government information system?

According to table 4 and results of confirmatory factor analysis, the value of factor load of each of designing barrier indicators from information system integration main dimensions are significant while determining barriers in designing barrier section.

Question 2: Is" human factor" effective on lack of integration for e-government information system?

According to table 5 and results of confirmatory factor analysis, the value of factor load of each of human barrier indicators from information system integration main dimensions are significant while determining barriers in human barrier section.

Question 3: Is" technical factor" effective on lack of integration for e-government information system?

According to table 6 and results of confirmatory factor analysis, the value of factor load of each of technical barrier indicators from information system integration main dimensions are significant while determining barriers in technical barrier section.

Question 4: Is" public- sector factor" effective on lack of integration for e-government information system?

According to table 7 and results of confirmatory factor analysis, the value of factor load of each of public-sector barrier indicators from information system integration main dimensions are significant while determining barriers in public-sector barrier section.

Question 5: Is" strategy factor" effective on lack of integration for e-government information system?

According to table 8 and results of confirmatory factor analysis, the value of

factor load of each of strategy barrier indicators from information system integration main dimensions are significant while determining barriers in strategy barrier section. Now, we present co-variance matrix of endogenous and exogenous variables.

After confirmatory factor analysis, we study the adequacy of the fitted model. It is noteworthy that root-mean-square error (RMSE) and goodness of fit are the best and the most famous indicators among various and frequent indicators and they can determine goodness of fit. The following table shows the analysis pattern fitness in research casual model.

As it can be seen in table 10, Chi-square value is 1039.40, freedom degree is 660 in that ratio is 1.57 which is relatively acceptable. On the other hand, other indicators such as NNFI, NFI, AGFI, GFI, CFI, and IFI are all in acceptable and appropriate level. RMR indicator is reported 0.13.

Table1: Normality test of questionnaire variables

Variables	Kolmogorov–Smirnov statistics	Sig.	Result
Designing barrier	0.834	0.491	Normal
Human barrier	1.023	0.246	Normal
Technical barrier	1.304	0.067	Normal
Public-sector barrier	0.768	0.596	Normal
Strategy barrier	1.202	0.111	Normal
Information system integration	0.573	0.898	Normal

Table 2: Descriptive indictors of research variables

Variables	Number	Mean	Median	Mode	St. Deviation	Minimum	Maximum
Designing barrier	134	3.55	3.62	3.0	0.88	1	5
Human barrier	134	3.36	3.37	3.0	1.09	1	5
Technical barrier	134	3.94	4.0	4.63	0.72	2	5
Public-sector barrier	134	3.46	3.57	3.57	0.82	1	5
Strategy barrier	134	3.42	3.50	3.0	0.85	1	5
Information system integration	134	3.55	3.56	3.34	0.54	2.39	4.71

Table 3: Current condition of research variables according to t-test

Variables	Fixed value of 3					Test result	Situation
	Mean	St. Deviation	t statistics	Freedom degree	Prob. Value	Zero hypothesis Rejection	Greater than medium
Designing barrier	3.55	0.88	7.28	133	0.0001	Zero hypothesis Rejection	Greater than medium
Human barrier	3.36	1.09	3.90	133	0.0001	Zero hypothesis Rejection	Greater than medium
Technical barrier	3.94	0.72	14.91	133	0.0001	Zero hypothesis Rejection	Greater than medium
Public-sector barrier	3.46	0.82	6.52	133	0.0001	Zero hypothesis	Greater than

						Rejection	medium
Strategy barrier	**3.42**	**0.85**	**5.68**	**133**	**0.0001**	**Zero hypothesis Rejection**	**Greater than medium**
Information system integration	**3.55**	**0.54**	**11.89**	**133**	**0.0001**	**Zero hypothesis Rejection**	**Greater than medium**

Table 4: Condition of determinant variables of designing barrier element

Sub-dimension (sub-element)	Standard factor load	Determination coefficient R^2	Result
Question 1	1	0.98	Significant
Question 2	0.83	0.53	Significant
Question 3	0.89	0.62	Significant
Question 4	0.81	0.51	Significant
Question 5	0.75	0.40	Significant
Question 6	0.87	0.68	Significant
Question 7	0.76	0.47	Significant
Question 8	0.88	0.63	Significant

Table 5: Condition of determinant variables of human barrier element

Sub-dimension (sub-element)	Standard factor load	Determination coefficient R^2	Result
Question 9	1.36	0.99	Significant
Question 10	0.85	0.42	Significant
Question 11	1.11	0.73	Significant
Question 12	1.07	0.57	Significant
Question 13	0.95	0.51	Significant
Question 14	1.21	0.79	Significant
Question 15	1.09	0.68	Significant
Question 16	0.80	0.37	Significant

Table 6: Condition of determinant variables of technical barrier element

Sub-dimension (sub-element)	Standard factor load	Determination coefficient R^2	Result
Question 17	0.91	1	Significant
Question 18	0.69	0.44	Significant
Question 19	0.71	0.38	Significant
Question 20	0.71	0.52	Significant
Question 21	0.68	0.39	Significant
Question 22	0.69	0.33	Significant
Question 23	0.75	0.50	Significant
Question 24	0.28	0.079	Significant

Table 7: Condition of determinant variables of public-sector barrier element

Sub-dimension (sub-element)	Standard factor load	Determination coefficient R^2	Result
Question 25	0.79	0.50	Significant
Question 26	0.91	0.72	Significant
Question 27	0.82	0.49	Significant
Question 28	0.79	0.54	Significant
Question 29	0.67	0.39	Significant
Question 30	0.70	0.38	Significant
Question 31	0.69	0.34	Significant

Table 8: Condition of determinant variables of strategy barrier element

Sub-dimension (sub-	Standard factor	Determination coefficient R^2	Result

element)	load		
Question 32	**0.99**	**0.95**	**Significant**
Question 33	**0.83**	**0.55**	**Significant**
Question34	**0.79**	**0.46**	**Significant**
Question 35	**0.76**	**0.45**	**Significant**
Question 36	**0.73**	**0.47**	**Significant**
Question 37	**0.87**	**0.68**	**Significant**
Question 38	**0.72**	**0.43**	**Significant**

Table 9: co-variance matrix of endogenous and exogenous variables

	Designing	Human	Technical	Public sector	Strategy	Information system integration
Designing	**1**					
Human	**0.16**	**1**				
Technical	**0.16**	**0.20**	**1**			
Public sector	**0.19**	**0.24**	**0.24**	**1**		
Strategy	**0.20**	**0.25**	**0.25**	**0.30**	**1**	
Information system integration	**0.35**	**0.45**	**0.45**	**0.54**	**0.57**	**1**

Table 10: Model fitting indicators

Indicators	Acceptable value	Value found by research	Utility
Chi-square	**-**	**1039.40**	**Model confirmation**
P-value	**-**	**0.0000**	**Model confirmation**
Degree freedom(Df)	$df \geq 0$	**660**	**Model confirmation**
χ^2/df	$\chi^2/df < 3$	**1.57**	**Model confirmation**
RMSEA	**RMSEA < 0.1**	**0.066**	**Model confirmation**
NNFI	**NNFI> 0.8**	**0.89**	**Model confirmation**
NFI	**NFI > 0.8**	**0.82**	**Model confirmation**
AGFI	**AGFI> 0.8**	**0.87**	**Model confirmation**
GFI	**GFI> 0.8**	**0.91**	**Model confirmation**
CFI	**CFI > 0.8**	**0.90**	**Model confirmation**
IFI	**IFI > 0.8**	**0.90**	**Model confirmation**
RMR	**The closer to zero**	**0.13**	**Model confirmation**

CONCLUSION

Generally, five factors including technical, designing, public sector, strategy, and human were identified which were considered as e-government integration. Each of these factors has sub-elements determining overall condition.

Technical barriers were those ranked top. According to the findings, sub-element of "using various and special technologies" with standard load factor of 0.91 was the most important priority of responders. Since such projects use different technologies, sometimes they have contradictive goals which might lead to resource loss. Sub-element of "weak technical documents and unclear product weak and strong points during implementation phase" with factor load of 0.75 scored the second. Technical documents and identifying various dimensions of system are highly important. The idea of an expert team within organization who will be able to help the

system by extracting everything through investigating it by error and trial along with learning while working is possible.In this study, system designers and providers are legal and natural persons who are in charge of planning, designing, and directing the project of information system establishment. Failures and difficulties of this research are as following:Although, nowadays, a considerable number of management techniques and methods are applicable in general projects, complexity and flexibility of software projects make them different from general projects. Despite general sensitivity and differences of computer companies and institutions to select project manager, they do not pay attention to integrated information system establishment. On the other hand, some ministries, despite existence of work committee, do not have an equal definition for integrated information system. Consequently, designing a part of integrated information system in Iran is done while implementing and even maintaining the system, leading to reduced work quality as well as long establishment period.In this study, public-sector and professional institution barriers are also considered as important barriers of e-government integration information system. Public sector and professional institutions are those who are not directly involved in e-government information system establishment. They play important role for training and supervision. According to this study, the most important problems are:

- Concerning integrated information system introduction and its application, appropriate announcement was not done by scientific centers in the country and suitable cultural attempt to increase the managers` level of attitude was not made about mentioned systems.
- There are not sufficient number of analysts and designers in the society. Although partial designing complexity requires analysts and designers of integrated information systems who are aware of different knowledge such as information technology, knowledge management, information and knowledge science, and a collection of related majors, scientific centers and professional institutes do not play their correct role.

Findings showed that “strategy barrier” play an important role on information system integration as an important barrier. Concerning strategy and planning barriers, sub-element of “absence of common goals due to lack of contradiction in role and responsibility definitions” with factor load of 0.00 scored the top importance from responders` point of view. Other sub-elements are as following, respectively: “wrong estimation of time and expenses of information system integration” with standard factor load of 0.87. Long implementation period of integration systems might change strategic goals.

Likewise, the project will not be justifiable, - leading to failure. This is an important issue concerning production, development, and even implementation. Then sub-element of " lack of supervision and ownership" with standard factor load of 0.83 and "lack of guidance to interpret real perspective of e-government services" with standard factor load of 0.79 took the next positions, respectively.

In this study, human section is final people who use or work with the system and they are known as users and mangers. According to findings, plan, establishment, and development problems in human section are as following:

Some managers still believe in hardware and purchasing ready programs due to lack of inappropriate training in public sector in terms of integrated information systems. This way, information needs of internal and external users of organization will not be met.

- According to findings, the belief in creating communication system instead of appropriate and integrated information system exists. This means that organizational relationships outweigh system thought. On the other hand, users emphasize on involving personal tastes while establishing integrated information systems and they insist on information procedure mechanization according to exceptions rather than systematic thinking. Some managers in public sector consider illogical and expensive budget for such project and implementation despite the need. That is why they are trying to implement information system integration through internal human resource.

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