The role of E-Government in the progress of statistical systems' goals (case study)

Saeed Fayyaz
Statistical Consultant at University of Northern Colorado (✉ Saeed.Fayyaz@unco.edu)

Sara Hosseini Farahani
Expert in setting the statistical yearbook and administrative system indicators (✉SaraHoseini665@gmail.com)

Abstract: E-government is an emerging phenomenon that has changed all aspects of the societies, and government authorities use this interactive platform to provide services for residents, enterprises, staffs and private sectors in the fastest and cheaper way. In the sub event of this platform, a lot of data and information has been producing in line with the e-government missions. In parallel, the statistical system has been renovating and in the modernization process, the statistical body tries to rely on more administrative data rather than the conventional sources. Administrative data and Meta data are unavoidable main outputs of the e-government and as a result the statistical system has a close connection with the structure, the processes, quality structure, timelines etc.

In this paper the structure of the Iran's E-government and statistical system are presented and their connections are investigated. The E-government is a key for data governance and vice versa. To take advantage of the e-government processes in the production of official statistics, an analytic model is developed to be employed by statistician and statistical experts in order to increase the quality of this mutual relations.

Keywords: Data governance, E-government, mutual relation, official statistics, analytical model

1. Introduction

Information and communication technology (ICT) plays a very important role in all aspects of national life (politics, economy, social and cultural development, etc.) of today's societies. Technology has always been and will be an essential tool in economic and social development. Today, it is clear to everyone that the main reason for the slowness of developing countries in social, economic and even cultural progress is their inability to recognize or develop the right technology and use it in production activities .In today's era, information technology (IT) has found a key role in defining the power and civilization of societies. Therefore, in the last two decades, advanced countries by employing technology have paid attention to it as the fundamental axis of development.

In the meantime, it should be mentioned that considering the fact that the purpose of the current research is to investigate the role of ICT in the speed, accuracy and precision of statistical centers, therefore, accuracy and precision are important parameters that should be considered. and these factors are very important in statistical centers and are very important in the quality and efficiency of work.

According to the structure and activities of the Bureau of Statistics, it can be stated that ICT can play an important role in the functions of statistical activities, which will improve accuracy, speed and accuracy. Therefore, in general, the problem investigated in this research is that with the technological advances in the field of information and communication technologies and their application in the organizations in charge of statistics, the processes and outputs of these centers in terms of speed, accuracy and accuracy, compared to their past.

Why ICT is important for producing the statistics? The category of quality, accuracy and accuracy of produced statistics is always one of the most important issues in the field of producing and publishing official statistics. In this century, it has affected many aspects of our daily life and today we are forced to use all kinds of it. Therefore, Information technology (IT) refers to computer or electronic hardware

and software that is used to retrieve, generate and share information. IT skills are skills that are defined by using hardware and software technology, receiving and evaluating data, organizing, maintaining, interpreting and sending information and using computers to process information. As a result, this paper investigates the role of ICT in the speed, accuracy and precision of statistical centers. In the other words, Investigating the role of using ICT (ICT) on increasing the speed, accuracy and precision of statistical centers. This refers to the examining the role of using ICT on increasing the speed, accuracy and performance of census and statistics, increasing the accuracy of census data and statistics in statistical centers.

2. Literature review

The study of e-government has increased in recent years and researchers are trying to develop conceptual and theoretical models to understand the different aspects of e-government and propose a three-stage model regarding the growth of e-government. In general, most research in e-government are categorized in two sections.

	Technology focus		**Public administration**	**Technology adoption**	**Citizen perception**
Research focus	***Information exchange***	***Transactions***	***Integration of functions***	***Adoption research***	***Service quality***
	-Cataloguing -Forms -Online information sharing	-Online services -Free payment -Automation of managerial tasks	-Linking various functions - integrate different services -offer single window operations	-Factor of adoption -Barriers to adoption -TAM&UTAUT	-e-government service quality -Citizen satisfaction
	Stage I	Stage II	Stage III	Stage IV	Stage V
	Positivist Studies			**Constructionist Studies**	

They are particularly interested in the description of electronic government as the process of distributing innovation in the technology of government cycles, and therefore they have emphasized the characteristics of the benefits of efficiency and effectiveness of the following steps:

1. initiative; providing the possibility of accessing government information and government payments based on the web; In other words, the realization of efficiency resulting from reducing the cost of government relations and greater effectiveness is achieved by making citizens more aware.

2. Promotion and expansion; At this stage, almost all government bodies have adopted the principles of electronic government, which includes mass representation, review and extensive use of "online" payments by citizens.

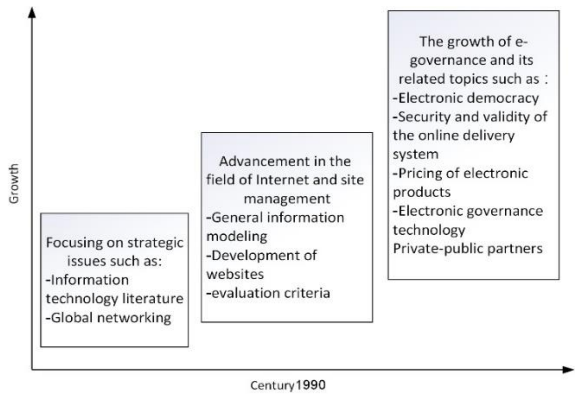

Fig1. The form of literature growth regarding e-government

Table. Recent research area of e-government and statistics

Name	Goal	method	Results
Davidi et al. (2021)	Empirical validation of the integrated model of e-government adoption (UMEGA)	An integrated model of e-government adoption (UMEGA) is developed and validated using data collected from 377 respondents from seven selected cities in India.	UMEGA is a short-term and context-specific model of e-government, while the structures of mainstream technology adoption models seem inappropriate to fit e-government. Using UMEGA, structures related to e-government were included.
Song et al. (2020)	Effective factors in the adoption of electronic government procurement by Malaysian small and medium enterprises	This study integrates e-public services into two acceptance theories (the Technology Acceptance Model [TAM] and the Unit Theory of Technology Acceptance and Use [UTAUT] framework) and direct measurement of the criterion. Both TAM and UTAUT models measure behavioral intention to use and indirectly measure actual use along with behavioral intention.	The results confirm that effort expectancy, performance expectancy and social influence have a direct effect on EGP adoption in the private sector. Rather than the original setting of UTAUT, behavioral intention influences user behavior.
Krishnan et al. (2017)	Investigating the determinants of e-participation and e-government maturity: Insights from cross-country data	Information sharing, electronic consultation and electronic decision-making in a country and the maturity of its electronic government (e-government); and the mediating role of government willingness to implement e-participation in a country in the relationships between TOE context factors and e-government maturity.	While ICT infrastructure and human capital were positively related to government willingness to implement e-participation and e-government maturity, governance was not significantly related to them. Also, the willingness of the government to implement e-participation had a significant relationship with the maturity of e-government.
Rana et al. (2017)	Examining Citizen Acceptance of an E-Government System: Towards a Unified Perspective	Using data collected from citizens of four selected districts in the Indian state of Bihar, this research tests nine alternative theoretical models of technology adoption in the context of an e-Gov system.	In response to the poor performance of alternative theoretical models to explain e-Gov system adoption, this research develops and tests an integrated model of e-government adoption using the same data.
Jacob et al. (2017)	End-user modeling of e-government services: the role of information quality, system quality and trust	In this study, a new model of e-government adoption services by extending the integrated theory of technology acceptance and use (UTAUT) through the integration of some variables such as system quality, information quality, and trust. This model is tested using a large-scale multi-site survey of 237 Indonesian citizens. This model will be confirmed using Structural Equation Modeling (SEM).	The result shows that system quality, information quality and trust variables have been proven to influence user behavior. This study extends the current understanding on the impact of system quality, information quality and trust factors to researchers, practitioners and policy makers.

The main goal of e-government is to provide a "digital environment" for providing information, establishing communication and providing services. Preparation and provision of complete and comprehensive information in the field of implementation processes, documents and forms available on the Internet in the field of providing information and facilities for registering and archiving electronic forms and official notifications provided through electronic mail and organizing round tables on current issues, and people's favorite are examples of making connections. Doing complicated things? Related to the general and commercial needs of the people (of course, to the extent permitted and legal), the demands and needs of the customers of public and government organizations and offices are examples of providing services. It significantly expands the level of services provided by an institution or government departments. With the changes that occur in the laws (of some countries), the executive processes that previously required the existence of physical documents will be processed electronically. For example, electronic signatures are valid and legally equivalent to manual signatures on paper. This means that there will be no obstacles in the creation of electronic government in order to provide public services. Some of the goals of electronic government includes providing better services, Positive impact

on price and service efficiency, Greater participation of people in government affairs, Presenting and applying appropriate methods for community management. Notably, an effective strategy significantly helps to improve the public sector. This strategy includes facilitating the provision of services to citizens, removing unnecessary layers of public administration, providing easy access to government information and services for citizens, businessmen and employees of other government levels, Facilitating the executive processes of institutions and reducing costs through integration and elimination of redundant systems etc., Making government operations more efficient to ensure quick response to citizens' needs.

Table1. The features of e-government

Feature	Description
Smallness	e-government should not be too extensive to avoid waste of capital and manpower. Therefore, it is better that big governments are divided into local and smaller governments
Bound by ethics	e-government must respect the information and privacy of society and be bound by ethics
Responsiveness	The e-government should be accountable for the various social, economic and political activities it performs so that people can be informed about the progress of the desired activities and developments
Accountability	e-government should be accountable to the people if problems arise in its activities
Transparency	e-government should have transparent positions in relation to citizens' affairs

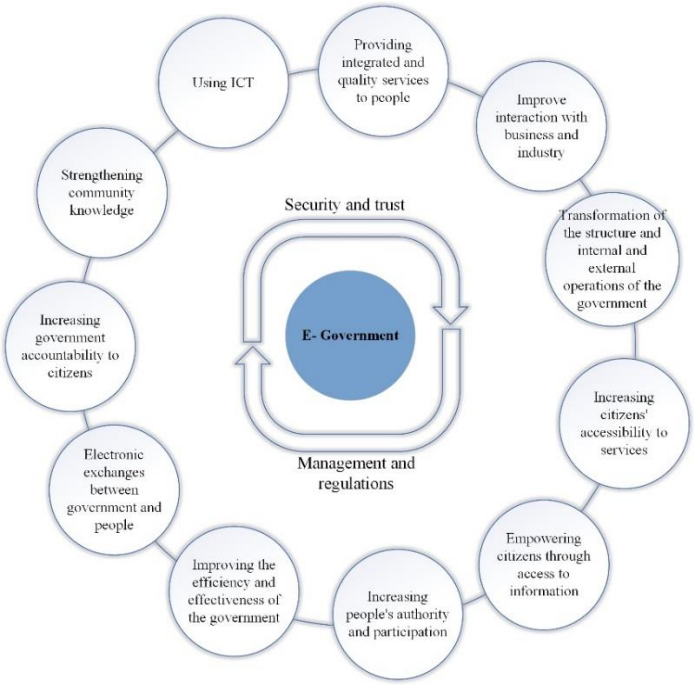

Fig2. Key parameters for E-Government definition

3. Challenges and obstacles facing electronic government

The most important challenge for the establishment of electronic government is the creation of a suitable infrastructure for this organization. The infrastructure of ICT is known as one of the fundamental challenges for electronic government.

Table2. The main factor that effect on e-government

Factor	Description
Cultural	The studies conducted show that the first step for the creation and development of electronic government is not technology, but the main problem is whether the society's culture is ready to accept many changes or not? Rapid changes first affect the government employees, and as a result, some of the government employees oppose these rapid changes and some agree with them. On the other hand, in terms of these rapid changes, people are not used to it and some do not consider it appropriate. Therefore, the society should be convinced that the transfer of information is sufficiently safe and fully respects the privacy of individuals.
Organizational	There is no logical administrative relationship between the administrative units due to the lack of a suitable electronic network and most of the organizational managers are also used to their internal organizational field. The top-down decision-making method is also involved in this issue.
Lack of resources	The systems and tools that are currently used in government offices to provide services and information to citizens are old and the work process in government institutions is slow. They are not very successful in gaining the satisfaction of the citizens. On the other hand, significant investments are not made in the field of designing and using new systems in the public sector, but according to the goals that are intended for the electronic government, countries only in If the internal systems of the public sector, data and information and management tools are coordinated and compatible with each other, they will succeed in the desired implementation of electronic government. On the other hand, in e-government, the goal is that instead of devoting time and resources to pre-processing and entering information and organizing them, we can use the majority of available time and resources to solve problems, investigate and provide index solutions and provide services. to allocate directly to the users of government services.

Electronic government means providing services and exchanging information internally/externally through the use of technology-based tools and is defined as communication and mutual influence between the following elements:

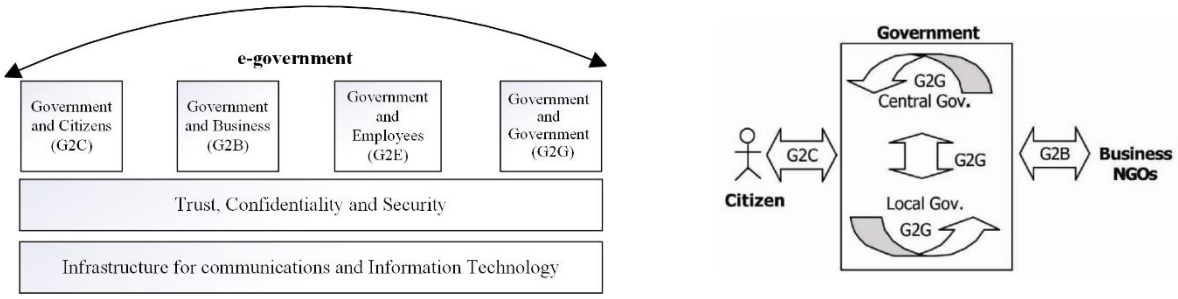

Fig3. The e-government structure and service and information exchange

4. E-government and its obstacles in Iran

The role of electronic government in the health of the administrative system (Iranian Statistics Center) is an important part of e-government on statistical part in Iran. As mentioned, electronic government has many advantages and benefits. In addition to forcing the managers of government agencies to review their affairs, they try to remove unnecessary administrative obstacles by reviewing their activities and programs and correct the process of affairs by re-engineering. One of the important advantages of e-government is that citizens can get the services they need without going to government agencies in person, and it avoids face-to-face contact between people and employees, which is one of the causes of administrative corruption in government agencies. In fact, the most important way to save from these harms is electronic services, and of course managers should not close the doors to people by relying on electronics. You should have face-to-face communication with people, and this communication and

respect for people should not be forgotten. Therefore, the creation of electronic government can play an important role in creating administrative health and reducing corruption in government institutions. The e-government structure is highly important to determine the focal points of main registers and the data flow. This structure has been designed based on main registers, unique identifier, data flow and service-oriented strategy.

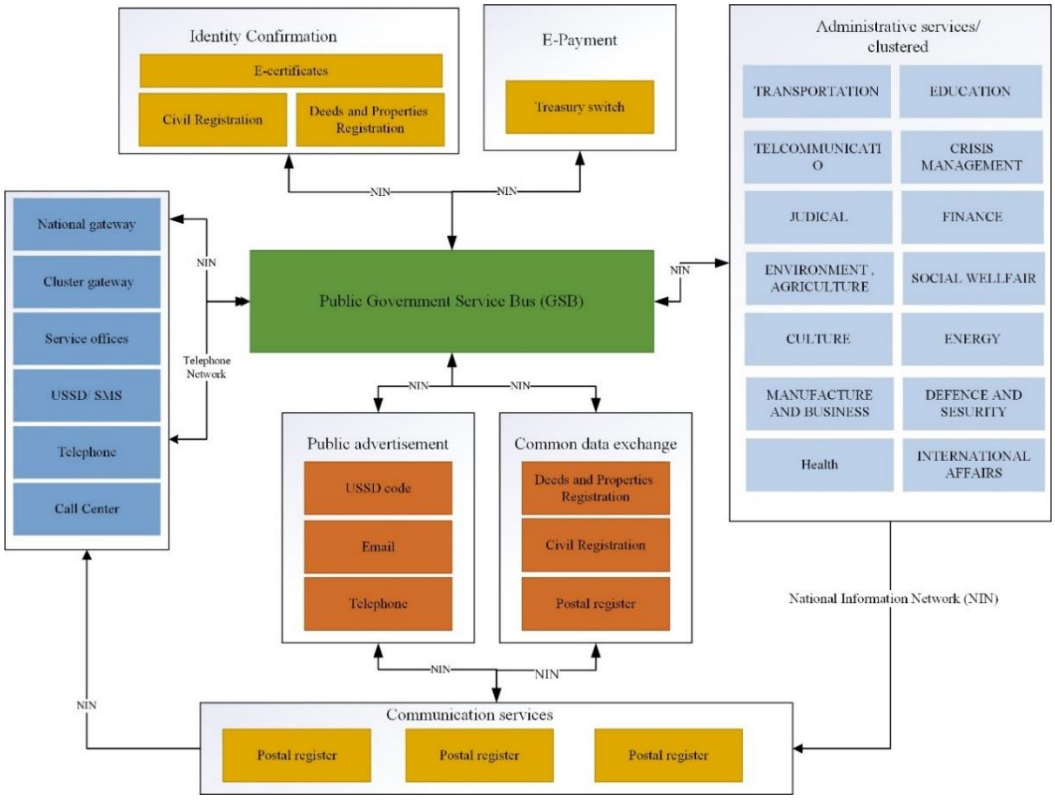

Fig4. The E-Government structure of Iran

The goal of e-government regarding registration statistics is on administrative records, which instead of collecting data through sample surveys and censuses, adjusts and processes administrative records using different sources. ,in order to make the data suitable for statistical purposes. Information systems in electronic government have different functions in administrative and statistical applications. A number of information systems are created only to provide statistical purposes; These systems are completely based on statistical principles, while other information systems have both administrative use and statistical use (of course, secondary purpose). The important output from the e-government would be timely, high quality, standard, full coverage and easily transformable administrative data. administrative data is used for statistical purposes, because the connection between records will be possible and important statistical comparisons will be made, not only the government will be efficient, but also the statistical production system will be efficient.

5. Iran's statistical center in electronic government

Explaining the causes of the resistance of the managers of the organizations against electronification and data sharing, we can mention things such as fear of losing power, fear of transparency and being questioned, conflict of interests, etc. Basically, having data is power, and for this reason, many organizations resist sharing their data in the path of becoming electronic. On the other hand, data sharing opens the way for organizations to be questioned, and this increase in transparency causes some managers to take a stand against this. Apart from these, sometimes even "preservation of privacy" has

been among the reasons given to justify these resistances. In the recent era, when there was a discussion of limiting some public access for corona patients, some managers stated that citizens' corona test data is part of their privacy and should not be used. However, this justification is not acceptable when there is a discussion of collective interests. Experts believe that any development is costly. Sometimes these costs are financial and economic, and sometimes they are questioned and challenged by populism. In order to pass this path and realize the goals, these costs must be paid once and for all so that the society will benefit.

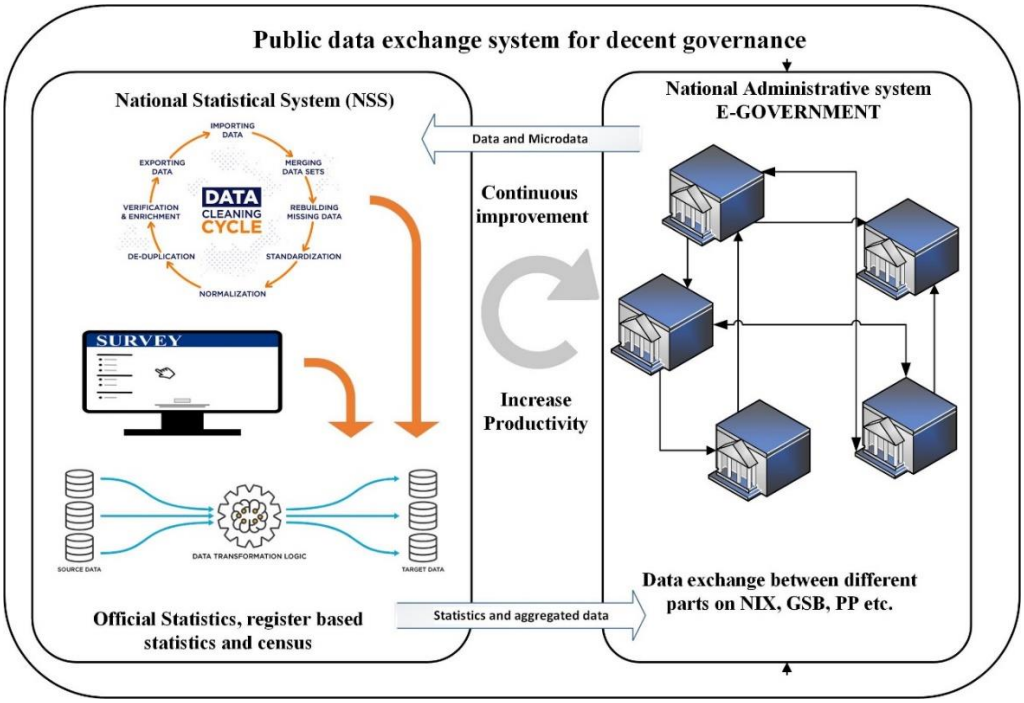

Fig5. the interaction and position on the statistics and e- government in Iran

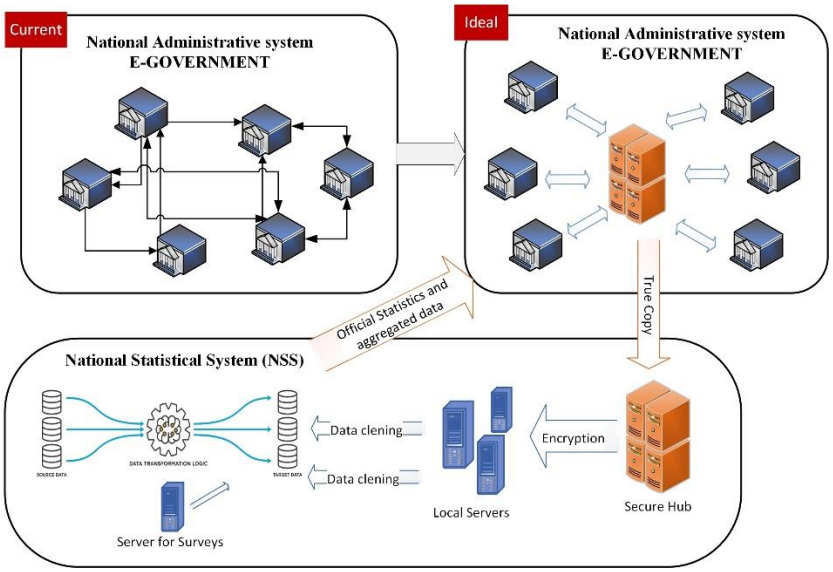

Fig6. The ideal e-government and statistics

6. Survey at Iran's NSO

In order to assess the role of ICT in three dimensions of speed, accuracy and precision in the production of official statistics products in the Iran's NSO, a survey was conducted by using two standardized surveys in the first 6 months of 2022.

The studied population of the current research is people from the its department in Iran's statistics center, as well as experts with related positions, and they should have more than 10 years of work experience and a master's degree or higher. According to the conditions mentioned in the previous section, the number of accessible people in the Iranian Statistics Center were 112 people, and the whole population was considered as a statistical sample. Therefore, the number of statistical sample equal to 112 people was considered. In this study, collecting information through library sources and field method (questionnaire) were considered. For this survey two standard questionnaires were used to collect information (ICT standard questionnaire and researcher made questionnaire of speed, accuracy and precision in the organization).

Table3. The questionnaire

questionnaire	Attribute	dimension	Reliability
standard ICT	18 items and 7 dimensions and the questionnaire questions are designed based on the five-choice Likert scale (very little to very much) and Cronbach's alpha is equal to 0.811. is.	Individual characteristics Motivational factors Educational factors Technical factors Economic factors Environmental factors Human and managerial factors	0.814
Research	This questionnaire has 18 questions in three dimensions	Speed correctness precision	0.811

7. Data analysis

There were 112 participants in the survey and their distribution in different aspect were as below:

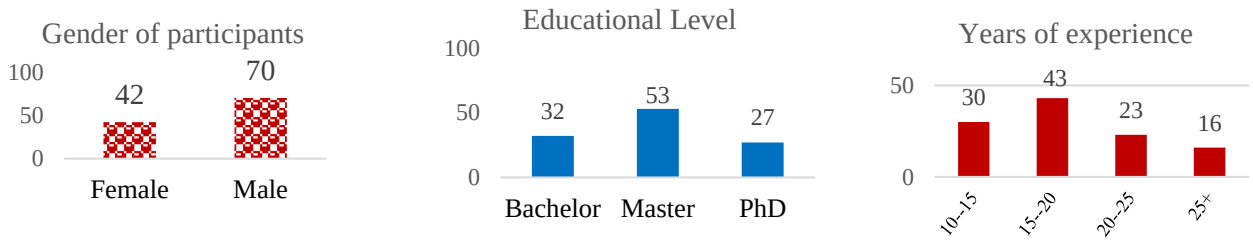

Fig7. distribution of participant in the survey

The Kolmogorov-Smirnov test is used and all the variables were significant, then structural equation modeling with partial least squares approach in Smart PLS software were used.

Table4. the variables and factor load

Observable variable	factor load
Observable variable	0.728
Individual characteristics	0.872
Motivational factors	0.957
Educational factors	0.901
Technical factors	0.846
Economic factors	0.867
Environmental factors	0.882

Based on the results of Table, the factor loadings of the observable variables of the hidden variable of information and communication technology are greater than 0.7. Therefore, it can be said that the observable variables corresponding to the hidden variable have been able to explain their variable well. To testify the Reliability and validity of the model, the Mean variance was extracted and the compound reliability calculated.

Table5. Reliability and validity of the model

Variable	Mean variance extracted	composite reliability
Information and Communications Technology	0.797	0.993
Organizational speed	0.761	0.950
The health of the organization	0.714	0.937
Accuracy of the organization	0.767	0.952
organization `s performance	0.780	0.986

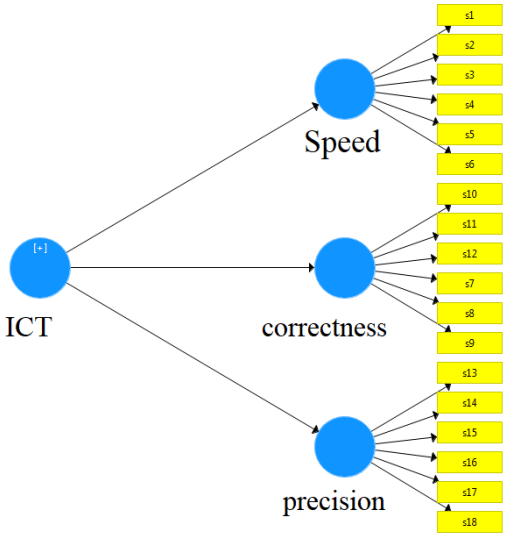

Fig8. Implementation of the research conceptual model in Smart PLS software

Table6. the model results

Variable	Coefficient	Cohen Coefficient[1]	t statistic	Significant level
ICT → the speed of the organization	0.975	0.474	6.918	0.001
ICT → health of the organization	0.971	0.366	6.652	0.001
ICT → accuracy of the organization	0.973	0.373	6.704	0.000
ICT → organization performance	0.964	0.510	4.291	0.003

According to the results of Table 16, it has been observed that the information and communication technology variable has a greater impact on the performance of the organization.

8. Conclusion and suggestions

[1] For each effect in the path model, the effect size can be evaluated using Cohen's f square. The size of the f^2 effect is a ratio of R^2 changes to a part of the variance of the endogenous variable that remains unexplained in the model. According to Cohen, values of 0.02, 0.15, and 0.35 for f^2 represent small, medium, and large effects, respectively.

Electronic government requires the background and arrangements that are based on having advanced information and communication technologies. And that it is a way to ensure that all citizens have the same opportunity to participate in decisions that somehow affect their condition and quality of life. E-government can provide the causes of economic, social, cultural and political development and growth in the country, the centralization of government activities in economic affairs, the transparency of rules and regulations, which will reduce nepotism, rent seeking and administrative corruption to a significant extent. It mediates and causes administrative health. In addition to the fact that e-government covers a large part of the communication between Real and legal entities

and government institutions, it has a positive effect on people's lives, it is closely related to governance (some experts believe that if e-government leads to good governance has not fulfilled its mission), transforming citizens from passive consumers to active actors, improving service delivery processes in different sectors, reducing the distance between people and government officials, and expanding social justice by creating equal opportunities for all members of society. Furthermore, in terms of two-way communication between people and officials and lack of face-to-face contact between citizens and employees, in addition to re-engineering processes will reduce methods and reforming affairs, it reduces corruption and ultimately lead to administrative health in government institutions.

9. References

Dwivedi, Y. K., Rana, N. P., Janssen, M., Lal, B., Williams, M. D., & Clement, M. (2017). An empirical validation of a unified model of electronic government adoption (UMEGA). Government Information Quarterly, 34(2), 211-230.

Factors influencing Malaysian small and medium enterprises adoption of electronic government procurement (2022).

Krishnan, S., Teo, T. S., & Lymm, J. (2017). Determinants of electronic participation and electronic government maturity: Insights from cross-country data. International Journal of Information Management, 37(4), 297-312.

Jacob, D. W., Fudzee, M. F. M., Salamat, M. A., Kasim, S., Mahdin, H., & Ramli, A. A. (2017, August). Modelling end-user of electronic-government service: the role of information quality, system quality and trust. In IOP Conference Series: Materials Science and Engineering (Vol. 226, No. 1, p. 012096). IOP Publishing.

Rana, N. P., Dwivedi, Y. K., Lal, B., Williams, M. D., & Clement, M. (2017). Citizens' adoption of an electronic government system: towards a unified view. Information systems frontiers, 19(3), 549-568.

Soong, K. K., Ahmed, E. M., & Tan, K. S. (2020). Factors influencing Malaysian small and medium enterprises adoption of electronic government procurement. Journal of Public Procurement.