

Research Article

**FACTORS AFFECTING THE ADOPTION OF E-GOVERNMENT BY THE
SENIOR CITIZENS
(CASE STUDY: SENIOR CITIZENS IN ZAHEDAN)**

Hamid Taboli¹, *Vahid Pourshahabi² and Alireza Naderifar³

¹*Assistand Professor of Payam-E-Noor University, Tehran, Iran*

²*Member of Young Researchers and Elite Club, Zahedan Branch, Islamic Azad University, Zahedan, Iran
PhD Student in Public Administration, Department of Management, Science and Research Branch,
Islamic Azad University, Kerman, Iran*

³*PhD Student in Public Administration, Department of Management, Science and Research branch,
Islamic Azad University, Kerman, Iran*

**Author for Correspondence*

ABSTRACT

Today, the rapid development of information and communication technology, the need to reduce costs and bureaucracy and the increase in the quality and variety of services, has become an opportunity for governments to use e-government services to provide a better life for citizens. It should be noted that in terms of providing access to the community amenities tries; responsible organizations in the field of information technology should provide access for adults and senior citizens. In this study, the adoption of e-government by senior citizens has been studied in Zahedan in the southeast of Iran. This is a quantitative field study and a questionnaire was used to collect data. Results of analysis, obtained by SPSS software, show that the individual variables, organizational and community have a significant relationship with adoption of e-government. At the end, study variables in terms of importance were ranked via Friedman test, Research data has been analyzed in "Rose 2" Software using Rough set theory, and recommendations are presented on the subject.

Keywords: *Government, E-Government, Elderly, Rough Sets*

INTRODUCTION

In modern era, Information and Communication Technology (ICT) makes Massive and influential progress in different aspects of society. Nowadays, in developed countries the governments have taken steps to dramatically cut the costs and bureaucracy to a significantly increase the quality and variety of services via proper advantage of information and communication technology.

E-government initiatives have been rapidly increased in the last decades and the success of these activities will largely depend on their operation quality. These initiatives can be driven by the modernization and reforms in public administration and the development of the information society (Huai, 2012: 1159).

With the gradual widespread use of the internet in the public, delivering online and whole time public services through this new communication port has also been gradually generalized. Government agencies in different countries, according to independent perspectives they have, attempted to define projects in this case (Gooyabadi, 2006: 57).

Most governments have engaged into e-government initiatives, having different views of e-government including better public service delivery, better governance and participation as well as better public resources management. (Elkadi, 2013: 166).

While ICTs have been used universally in businesses and other fields, governments are beginning to apply ICTs into public sectors in order to improve capabilities and transform their relations with citizens and businesses. Such an implementation is called e-government. It is well recognized that e-government has the potential to run government more efficiently and effectively, and can, bring better public services to citizens, improve interactions with business, and empower citizens to access information and participate in public issues.

Research Article

ICTs can help governments to reinvent themselves, run cheaply, administrate faster and better, and produce new outcomes. Thus, many countries all over the world are pushing e-government enthusiastically. The introduction of ICTs into public sector is not only a technical issue but also a social one in which many factors are involved, such as politics, economy, organization, culture, and population. Hence, it is desperately necessary to study e-government in a broader social context (Guanghua, 2009: 1). An increasing ageing population and the relevance of e-government in current society convince us to further our knowledge about e-government and older people. In addition to social and ethical issues, having access to information and being able to perform daily tasks are two key elements of independence in later life. While governments are providing citizens with an ever-growing number of online services, the barriers of Information and Communication Technologies (ICT) for most of older people mean that they might not use it-(Righi et al., 2011: 132).

Appropriate virtual environment should be accessible based on the ability of its users even with physical disability. Many researchers believe that in the coming decades, Iran will become one of the oldest developing countries (Zarghami, 2011: 7). Therefore, officials and planners must be ready to face in with the severe aging conditions in the coming decades. In paragraph 30 of the Declaration of Principles, Excellent meeting of the world's leaders about the Information Society states: "Using information and communication technologies, all stages of education should be promoted specific to the needs of disabled people, marginalized and vulnerable" (Selsele & Baseri, 2009: 6).

While new generation will adapt daily with modern technologies, many middle-aged and senior citizens are still alien with modern technologies and a lot of terms related to these technologies, and failed to convince oneself that life in modern societies need to learn how to use modern technologies.

Given that one of the major challenges facing e-government is adoption and implementation of e-government services by citizens, the purpose of this study is to find the personal, organizational and societal variables influencing adoption of e-government by elders (aged 65 + years) in Zahedan. According to the results, the public sector can develop a defined strategy to invest in the implementation of e-government.

In this paper, in addition to defining the e-government, benefits and challenges of e-government is introduced and the explanation of the content on the e-government adoption by the elderly, factors considered in connection with the adoption of e-government, and research hypotheses were examined. In the end, according to the survey results, suggestions are offered.

DEFINITION OF E-GOVERNMENT

E-government is perceived as a tool to increase citizens' trust and confidence in their governments (Elkadi, 2013: 165). It can simply be considered as an additional service channel, among many, that citizens can use to interact with public administration and government entities (Teerling & Pieterse, 2010: 99).

The application of information and communication technology in an e-government environment is a complex, multidimensional issue involving people, technology and processes. (Huai, 2012: 1159).

E-government can be defined as the use of information and communication technology to improve the access and delivery of government services. (Huai, 2012: 1160).

In other definitions, E-government promises to make government more efficient, responsive, transparent and legitimate and also to create a rapidly growing market of goods and services, with a variety of new business opportunities. (Huai, 2012: 1159).

E-government can provide convenient access to information related to public services via the internet and facilitate public transaction services, encouraging citizens to participate in decision making process and provide a medium for democracy (Guanghua, 2009: 2).

UN E-Government Development Index for Iran is set 0.4876 in 2012 and in this classification Iran ranked 100 among 190 countries (UN, 2012: 26). In 2012, the Republic of Korea ranked first (E-Gov. Index: 0.9283) among developing countries in terms of e-government (Ibid, 25).

Research Article

If we can identify challenges and obstacles to the development of e-government and get them to adopt appropriate strategies, implementation of e-government will have several advantages to the society. One of the main challenges is the adoption and implementation of e-government services by the citizens. In case of non-acceptance and adoption of new technologies by users, investment in the domain of interest will be unsuccessful (Elahi et al., 2010: 42). In the following sections we will introduce some of the benefits and challenges of e-government.

BENEFITS OF E-GOVERNMENT

About the advantages of e-government, enterprises, consumer's financial and social benefits can be cited.

1- Agency benefits

With the creation and use of an e-government capability, agencies now have:

- **lower cost channels of communication with citizens and businesses** – e-business channels have offered an additional way of communication with people which often costs far less, per inquiry, than other forms of service delivery; and
- **Increased resource efficiency** – one of the earliest benefits for agencies has been their ability to share information with other agencies via electronic means. Electronic mail and the ability to send attachments has been a great boon for agencies, cutting back the cost of sending paper-based information by courier and reducing the time to transfer information (Commonwealth, 2003: 7).

2- Consumer financial benefits

User financial benefits are delivered as a result of:

- **Faster turn-around of information requests** – businesses can now access information directly from agencies' web sites or lodge an electronic request for information; and
- **faster access to documents and forms** – the old adage that 'time is money' has become increasingly relevant so that the capability of online service delivery channels speeding up turnaround of documents and forms is seen as extremely beneficial (Ibid, 8).

3- Social benefits

Social benefits includes more professional development opportunities obtained through using online forums and sharing information and bulletin boards within professional and trade groups. They also include awareness of commonwealth social programs and benefits. Specific areas benefit citizens such as increased community skills, knowledge, new business and work opportunities.

- **Faster turnaround of service delivery** – inclusion of online service delivery channels as a key component of an agency's service delivery strategy provides greater capacity to handle routine inquiries, thus freeing up counter and telephone staff to deal with more complex issues. People can access information directly from the internet without having to visit the agency, thus improving service levels significantly.
- **24-hour service delivery** – people are able to seek information outside of business hours. For example, many people are taking advantage of the ability to lodge taxation returns out-of-hours.
- **More self-service** – people can now access information on a self-serve basis, making the information available at the right time for decision making. This delivers a strong benefit expressed in terms of greater knowledge and enhanced decision-making capacity.
- **Improved ability to find information** – for some people, the ability to find information has been the greatest benefit. It has enabled them to understand more about their government and to find the support program that meets their specific needs.
- **Wider reach of information to the community** – people are generally demanding increased access to electronically published information, supported by email and electronic transactions. The penetration of information and transaction-based capability is increasing the reach of government to citizens and business and from the community to government.

Research Article

- **Better communication with rural and remote communities** – in past years people from rural and remote communities were relatively, with regard to access, disadvantaged in comparison to their metropolitan counterparts. Broadband infrastructure improves the possibility for regional and rural communities to have the same levels of access to information and government transactions, and their service expectations are aligned with the enhanced capability of the technology (Commonwealth, 2003: 7-9).

CHALLENGES OF E-GOVERNMENT

In the realization and implementation of e-government, many obstacles, including the limitations of technology, economics and finance, the attitudes of managers and employees at different organizations and citizens is visible (Elahi et al., 2010: 45). Some of these barriers include:

- **Ensuring ability to use required technologies.** Electronic governance relies on the use of information technology. If a person is unable to use the technologies that e-government relies upon, for lack of education or limited ability, that person cannot be deprived from government information and services. If less-advantaged segments of the population are less able to access government on the Web, their other channels to government must not be closed off or contracted (Thomas & Streib, 2003: 99).
- **Educating citizens about the value of e-government.** Governments should make efforts to inform citizens from the benefits of e-government. Unless citizens know what is available from the e-government, they will not likely seek to use the e-government, defeating the purpose of the development of e-government information and services. The people who are more aware of and comfortable with an e-government initiative will be more likely to use that initiative (Jaeger & Thompson, 2003: 390).
- **Ensuring access to useful information and services.** In order for e-government efforts to succeed, there must be both universal service, which indicates the necessary level of telecommunications infrastructure, and universal access, which indicates a minimum standard of ability to access the services offered through the telecommunications infrastructure. The content available on e-government websites needs to be more than just a vast amount of information; e-government planning and implementation should focus on activities that use e-government to expand current services and promote new ones (Ibid, 391).
- **Coordinating local, regional, and national e-government initiatives.** The lack of coordination between different levels of government can have a significant impact on the success of e-government efforts. In order to achieve effective e-governance, different levels of government in a nation must work in cooperation to develop and implement an e-government strategy (Ibid).
- **Developing methods and performance indicators to assess the services and standards of e-government.** In order to create e-government services to meet the needs of citizens, assessments should examine citizens' needs, capacity to find, digest and use relevant information. Assessments of e-government should also investigate information behaviors that inhibit the use of e-government. The articles in this symposium all examine ways to measure and evaluate the effectiveness of e-government initiatives.
- **Providing consistent and reliable electricity, telecommunications, and internet access.** Often, the problems of internet access are common to the problems of access to other communication and information technologies. Tremendous gaps in availability to basic information technology exist in many areas of the world, both across national boundaries and within individual nations. For e-government to be effective within a nation, the necessary technological infrastructure must be provided to all citizens (Ibid).
- **Addressing issues of language and communication.** Many nations have more than one language spoken by the populace. Effective e-government requires standardization of spellings,

Research Article

word use, and a common language or languages in which citizens are comfortable communicating (Snellen, 2002: 197).

- **Preventing e-government from lessening responsiveness of government officials.** In many ways, it is easier to ignore a piece of email than it is a human being. Electronic interaction with a government cannot be allowed to become a way for government employees to be less responsive to citizens. If government officials become less responsive because they are not physically seeing or speaking to the citizens they serve, then e-government would become less transparent and responsive (Jaeger & Thompson, 2003: 392).
- **Including individuals with disabilities in e-government.** The Internet is an environment that is, for the most part, not designed to consider the needs of individuals with disabilities. Both e-commerce and e-government generally have very low levels of accessibility for individuals with disabilities (Ibid).

E-GOVERNMENT ADOPTION BY THE ELDERLY

Most developed world countries have accepted the chronological age of 65 years as a definition of 'elderly' or older person, however like many westernized concepts; this does not match well to the situation of Iran. While this definition is somewhat arbitrary, it is mainly associated with the age at which one can begin to receive pension benefits. At the moment, there is no United Nations standard numerical criterion, but the UN agreed cutoff is 60+ years to refer to the older population.

Although there are commonly used definitions of old age, there is no general agreement on the age at which a person becomes old. The common use of a calendar age to mark the threshold of old age assumes equivalence with biological age, yet at the same time, it is generally accepted that these two are not necessarily synonymous.

The ageing process is of course a biological reality which has its own dynamic, largely beyond human control. However, it is also subject to the constructions by which each society makes sense of old age. In the developed world, chronological time plays a paramount role. The age of 60 or 65, roughly equivalent to retirement ages in most developed countries is said to be the beginning of old age. In many parts of the developing world, chronological time has little or no importance in the meaning of old age. Other socially constructed meanings of age are more significant such as the roles assigned to older people; in some cases it is the loss of roles accompanying physical decline which is significant in defining old age. Thus, in contrast to the chronological milestones which mark life stages in the developed world, old age in many developing countries is seen to begin at the point when active contribution is no longer possible (Gorman, 1999: 4).

According to the censuses, the country's aging population index has reached from about 14 people in 1966 to about 35 in the year 2010.

In other words, for every 100 persons in the population under 15 years old, there are 35 people who are 60 and older in the country.

This means that the country is nearing middle age and joins the group of countries with elderly population (Strategic Data Center of Iran, 2012: 41).

From the perspective of sociology, given the current structure of the population, the number of elderly is increasing; and under such circumstances, certain social policies regarding the growing population must be developed and applied; otherwise, this phenomenon will be a social problem (Ibid: 37).

Looking at the studies indicate that a small percentage of the elderly tend to teach and learn new art after retirement. Training in the elderly is so low and very few of them in the community have the ability to uses the internet, computers and have facilities such as webcams. Because of their inability they need help to use telephone and internet stores, in hotel reservations, train and plane tickets and even paying bills. It even includes the senior citizens who are well educated.

In fact, seniors are not aware of the benefits of using ICT because they are satisfied with their current facilities and they cannot imagine how ICT can improve their lives. They have a critical attitude towards

Research Article

the use of new technologies, because they have not used it in their lifetime. Senior citizens rely on face to face relationships and fear that new media will lead to further isolate them. In addition, because the elderly people have trouble understanding complex processes compliance with the necessary skills would be harder to find (Becker et al., 2009: 4).

Nowadays, personal contacts, especially contacts within their social circles, is the way older adults use mostly to access information (Righi et al., 2011: 133). Research results confirm that socialization, mutual support, face-to-face contact, and trust are important aspects in older people’s attitude towards e-services (Ibid, 140). Research findings indicate that some of the potential benefits of using ICT for enhancing the participation of older people in the social life of their neighborhood, reducing social isolation and promoting a more active role within their community. At the same time, ICT might be used to build a direct channel of communication between older citizens and their local organizations, facilitating the sharing of information and providing direct support (Ibid, 141).

Because every country is trying to provide access to the amenities of the community, authorities in the field of information technology should provide access the senior citizens in relation to the use of new technologies as well as other people benefited from the services.

Internet penetration is one of the most important indicators in the field of information technology among countries and the Millennium Development Goals Indicators which purpose of that is proportion of the population using the Internet in the country, to the total population multiplied by 100. The results of census of Internet users in January 2010 was carried out by the Statistical Centre of Iran, shows that internet penetration in the country in 2010 has reached 14.7%. Internet penetration in urban areas of the country was 18.9 percent and 4 percent in rural areas (Statistical Center of Iran, 2011: 18). Highest internet penetration in the country's urban areas related to Tehran province with 23.1 percent and minimum penetration related to Sistan and Baluchestan with 10.5 percent (Ibid: 19).

According to published statistics, in the census of 2011 the population of 65 years and above has given 5.72 percent of the total population (Statistical Center of Iran, 2012: 27). As Table 1 shows, the Internet penetration rate for this age group in 2010 was equal to 1.1.

Table 1 - Population according to age and status of the Internet (2010)

Description	SUM	0 to 9 years old	10 to 19 years old	20 to 29 years old	30 to 44 years old	45 to 64 years old	65 and older	Not stated
Total Population	74837792	9080729	14542115	16203467	15769548	14083169	4794546	364218
Internet usage	11002248	43546	2865025	4757316	2312386	961923	52431	9621
Penetration rate	14.7	0.5	19.7	29.4	14.7	6.8	1.1	2.6
% Of Total Users	100	0.4	26	43.2	21	8.7	0.5	0.1

Source: Statistical Center of Iran, 2011: 20

FACTORS CONSIDERED IN RELATION TO ADOPTION OF E-GOVERNMENT

In this section of the paper, the factors discussed in relation to acceptance of new technology by the elderly are introduced. As Table 2 figure 1 shows, the independent variables in three groups: individual factors, organizational factors, and social factors are examined. Elahi et al (2010) have developed these variables based on the technology acceptance model of Davis.

Research Article

Table 2 – Variables of Research

Independent Variables	Individual factors	1 – previous experience, 2 – individual innovation, 3 – self-reliance, 4 – Computer Anxiety, 5 – knowledge and awareness, 6 – individual characteristics
	Organizational factors	7 – Maintaining Security and Privacy, 8 – features of the web system, 9 – Availability of Services, 10 – Support for Members
	Social factors	11 – perceived risk, 12 – subjective norms, 13 – required infrastructure 14 – need to develop training programs, 15 – Trust
	Dependent variable	Behavioral intention to use IT (accepting E-government)

Source: Elahi et al., 2010: 49

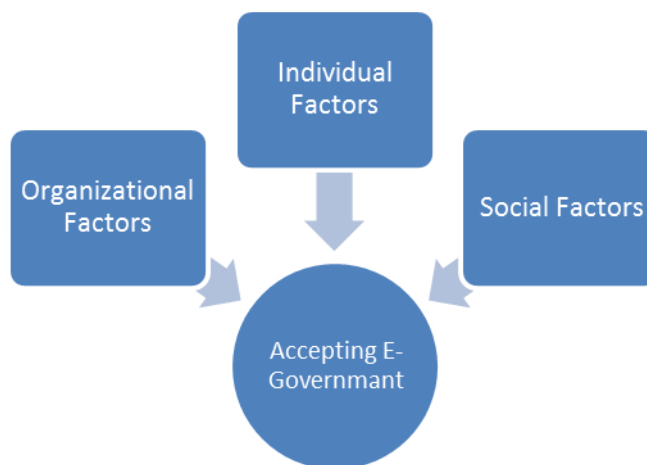


Figure 1- Factors considered in relation to adoption of e-government

RESEARCH METHODOLOGY

This is a quantitative research and Methodology of this study is descriptive survey. The population for this study included all men and women aged 65 years and older who were residing in Zahedan in the Fall 2013. The cluster sampling method was used for this research. Then among these clusters, using simple random sampling, the samples were chosen. Using Cochran's formula for calculating the sample size, by a factor of 95% and the error 0.06, samples has been determined 267 cases.

Data collection instrument for this study was a questionnaire that designed according to the study variables. To design the questionnaire, we used the expert opinions and corrective IT experts and university professors. As Table 3 shows, the Cronbach's alpha coefficient was used to assess the reliability of the questionnaire and with the value of 0.95 has been approved.

Table 3 - Cronbach alpha test

Reliability Statistics	
Cronbach's Alpha	N of Items
0.95	15

Research Article

RESEARCH HYPOTHESES

According to the research variables shown in Table 2, research hypotheses are defined as follows:

- The first hypothesis of the research: personal factors in Zahedan elderly have a significant relationship with the adoption of e-government.
- The second hypothesis of research: organizational factors in Zahedan elderly have a significant relationship with the adoption of e-government.
- The third hypothesis of the research: social factors in Zahedan elderly have a significant relationship with the adoption of e-government.

RESEARCH FINDINGS

In order to analyze the data from the questionnaire of this research, by the SPSS software the T-test was used.

Table 4 - Results of T-test for individual variables

	Test Value = 15					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Personal	20.188	266	.000	2.50187	2.2579	2.7459

Table 5 - Results of T-test for organizational variables

	Test Value = 10					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Organizational	7.234	266	.000	.49813	.3626	.6337

Table 6 - Results of T-test for social variables

	Test Value = 12.5					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Social	48.607	266	.000	6.76592	6.4918	7.0400

After the research hypotheses were tested and confirmed, ranks of relevant questions have been determined using the Friedman test (Table 7). This test is used to compare mean scores.

Table 7 - Results of Friedman test

Question	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Mean Rank	10.17	8.64	7.71	10.52	6.34	10.23	12.94	9.81
Question	Q9	Q10	Q11	Q12	Q13	Q14	Q15	
Mean Rank	5.15	5.31	11.15	4.90	2.40	3.01	11.72	

According to Table 7, based on respondents' opinions regarding important variables are the following priorities:

1. Maintaining privacy and security (the trust in relation to security of reliable information and communication technologies is essential. Again, if privacy is violated, it will have the negative impact on citizens' trust and use of services).

Research Article

2. Trust (public acceptance of e-government services depends on the level of trust citizens have in government).
3. Perceived risk (risk perceived by users in implementing e-Services or in other words, benefits and loss they will notice is one of the factors affecting the adoption of electronic services).
4. The computer anxiety (feeling anxious when facing computer).
5. Demographic characteristics (age, sex, education): The results indicate that elderly women are more educated than men; they are more willing to use new technologies.
6. Previous experience of using similar systems.
7. Features of the web system (effective communication, design and content).
8. Individual innovation (refers to the extent that a person is willing to test a new technology).
9. Self-Reliance (perception of citizens from their own ability to update one's behavior affects his perceived results).
10. Knowledge and awareness (one of the most important problems in the adoption and application of new IT systems, lack of knowledge of the system).
11. Supporting the users (support mechanisms in the absence of awareness of the technology, or in case of unforeseen events come to their aid).
12. Availability of services (in this context, access to computer networks, especially the internet, is very important. Availability of services provokes the users and leads them towards the use of technology).
13. Subjective norms (the people who are important to a person, they think that he/she should express this behavior or not).
14. The need for educational programs (training has a clear impact on both perceived usefulness and training role in acceptance of technology has been confirmed.)
15. The existence of required infrastructure (establishment of electronic systems and their application requires the availability of the required infrastructure).

ROUGH SETS

Rough set theory is a new mathematical approach to imperfect knowledge. The problem of imperfect knowledge has been tackled for a long time by philosophers, logicians and mathematicians. Recently it became also a crucial issue for computer scientists, particularly in the area of artificial intelligence. There are many approaches to the problem of how to understand and manipulate imperfect knowledge. The most successful approach is based on the fuzzy set notion proposed by L. Zadeh.

Rough set theory proposed by Z. Pawlak presents still another attempt to this problem. The theory has attracted attention of many researchers and practitioners all over the world, who contributed essentially to its development and applications (Suraj, 2004: 2).

This theory proposes a new mathematical approach to imperfect knowledge, i.e. to vagueness (or imprecision). In this approach, vagueness is expressed by a boundary region of a set (Pawlak, 1982).

Rough set concept can be defined by means of topological operations, interior and closure, called approximations.

Let a finite set of objects U and a binary relation $R \subseteq U \times U$ be given. The sets U, R , are called the universe and an indiscernibility relation, respectively. The discernibility relation represents our lack of knowledge about elements of U . For simplicity, we assume that R is an equivalence relation. A pair (U, R) is called an approximation space, where U is the universe and R is an equivalence relation on U .

Let X be a subset of U , i.e. $X \subseteq U$. Our goal is to characterize the set X with respect to R . The indiscernibility relation R describes - in a sense - our lack of knowledge about the universe U . Equivalence classes of the relation R , called granules, represent an elementary portion of knowledge we are able to perceive due to R . Using only the indiscernibility relation, in general, we are not able to observe individual objects from U but only the accessible granules of knowledge described by this relation.

Research Article

The set of all objects which can be with certainty classified as members of X with respect to R is called the R-lower approximation of a set X with respect to R, and denoted by $R_*(X)$, i.e.

$$R_*(X) = \{x: R(x) \subseteq X\}.$$

The set of all objects which can be only classified as possible members of X with respect to R is called the R-upper approximation of a set X with respect to R, and denoted by $R^*(X)$, i.e.

$$R^*(X) = \{x: R(x) \cap X \neq \emptyset\}.$$

The set of all objects which can be decisively classified neither as members of X nor as members of \bar{X} with respect to R is called the boundary region of a set X with respect to R, and denoted by $RN_R(X)$, i.e.

$$RN_R(X) = R^*(X) - R_*(X).$$

Now we are ready to formulate the definition of the rough set notion.

- A set X is called crisp (exact) with respect to R if and only if the boundary region of X is empty.
- A set X is called rough (inexact) with respect to R if and only if the boundary region of X is nonempty.

The definitions of set approximations presented above can be expressed in terms of granules of knowledge in the following way. The lower approximation of a set is union of all granules which are entirely included in the set; the upper approximation – is union of all granules which have non-empty intersection with the set; the boundary region of a set is the difference between the upper and the lower approximation of the set (Suraj, 2004, 10).

Figure 2 presents the graphical illustration of the set approximations defined above.

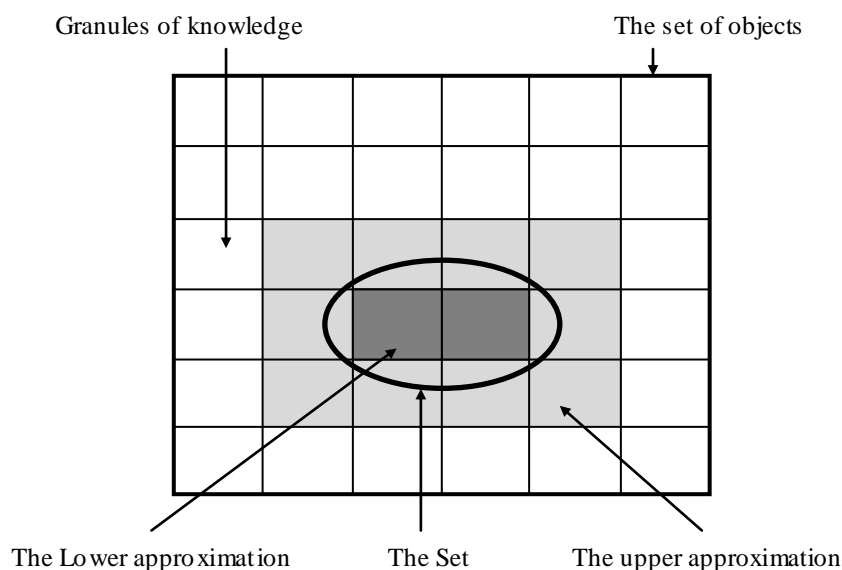


Figure 2 – Rough Set

**ROUGH SETS IN DATA ANALYSIS
 INFORMATION SYSTEMS**

A data set is represented as a table, where each row represents a case, an event, a patient or simply an object. Every column represents an attribute (a variable, an observation, a property, etc.) that can be measured for each object; the attribute may be also supplied by a human expert or the user. Such table is called an information system.

Research Article

To analyze the data for this study using Rough set theory, Rose2 software has been used. For this purpose, the data obtained from the questionnaires classified and then entered in the information system. The information system of this study is shown in Table 8. The set of objects U consists of twenty objects that Obtained from 20 experts in IT, and the set of attributes includes three attributes.

Table 8 – Information System (classified data)

No.	Personal	Organizational	Social	E-Government Acceptance (Decision)
1	2	2	2	2
2	2	2	3	2
3	2	2	4	3
4	2	2	3	2
5	3	2	3	3
6	3	2	3	3
7	3	3	3	3
8	3	2	3	3
9	2	2	3	2
10	3	2	3	3
11	2	2	3	3
12	2	2	3	3
13	2	3	3	3
14	2	2	3	3
15	3	2	3	3
16	3	2	3	3
17	3	3	4	3
18	3	2	3	3
19	2	2	3	3
20	3	2	3	3

REDUCTION OF ATTRIBUTES

A reduct is a set of attributes that preserves partition. It means that a reduct is the minimal subset of attributes that enables the same classification of elements of the universe as the whole set of attributes. In other words, attributes that do not belong to a reduct are superfluous with regard to classification of elements of the universe. There is usually several such subsets of attributes and those which are minimal are called reducts (Skowron & Rauszer, 1992).

As Tables 9 & 10 shows, to get reduction, the atoms and core features are first generated. In Table 10 we can see that each individual and organizational and social factors are the core features and thus in the acceptance of e-government are effective (This result is consistent with the results of the hypothesis test).

Research Article

Table 9 - Atoms

Quality of classification: 0.6500				
Approximations:				
Class	# of Objects	Lower Approximation	Upper Approximation	Accuracy
2	5	1	8	0.1250
3	15	12	19	0.6316
Number of Atoms:7				

Table 10 - Attributes in core

Attributes in core:	
Core Personal	
Core Organizational	
Core Social	
Number of attributes in core: 3	Decision: eaccept

The next step involves reduction operation. Table 11 displays the number of reduction. The results of the analysis of this study indicate that the number of reduction is 1.

Table 11: Number of reducts

#	Reduct	Length
1	Personal, Organizational, Social	3
Number of reducts: 1		

Decision Rule Synthesis

The reader has certainly realized that the reducts (of all the various types) can be used to synthesize minimal decision rules. Once the reducts have been computed, the rules are easily constructed by overlaying the reducts over the originating decision table and reading off the values. Figure 3 shows the rules generated by the software.

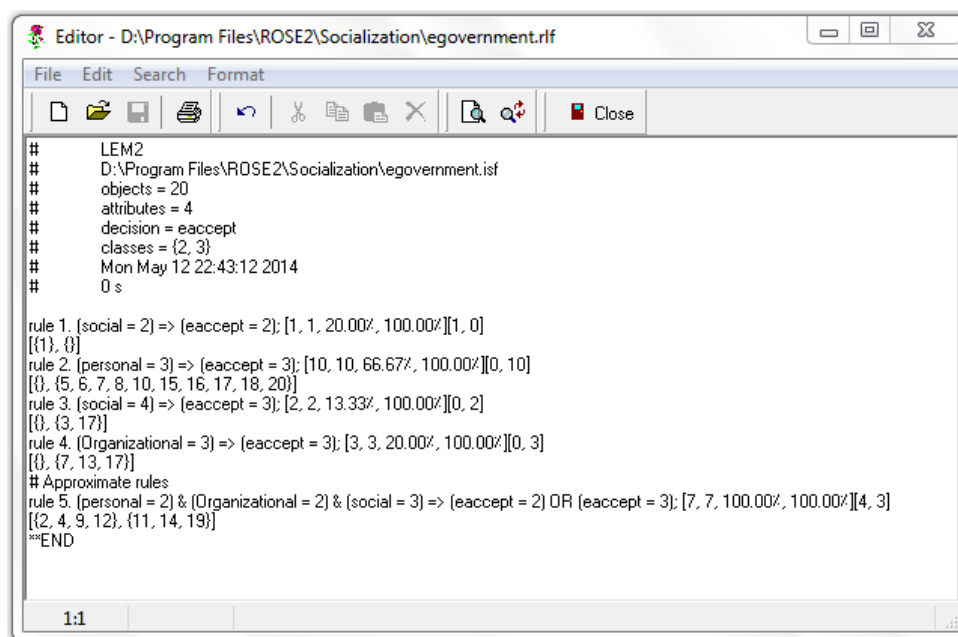


Figure 3 - Rules

Research Article

As Figure 3 shows, in accordance with the laws, rules 2 and 4 are the most frequently. As a result, personal and social factors have more impact on the acceptance of e-government by the elderly.

CONCLUSIONS AND RECOMMENDATIONS

Nowadays, information and communication technologies has been proposed as the main axis of development in the world and benefits arising from it, including e government, associated with the lives of people who lack access in every stratum of society will lead to further underdevelopment. On the other hand, it will benefit the lower layers (including the elderly) can empower them.

The results of this study indicate that in the studied sample, individual, organizational, and societal variables with acceptance of e-government by Zahedan elderly have a significant relationship. According to Friedman ranking tests using Questionnaire, respondents identified the importance of the study variables. According to the survey results, "security and privacy", then "trust" and "perceived risk", has been the main concerns for the adoption of e-government for Zahedan elderly.

According to the results of the Rough set theory, the impact of three factors on the adoption of e-government by the elderly, and the results of hypothesis testing has been confirmed. Therefore, according to the results of the investigation, the following suggestions are offered:

- Building Trust in connection with the security of reliable information and communication technologies through the mass media, especially radio and television; training and usage of e-government services should be promoted.
- E-Government training programs for officials and key decision makers and senior executives should be established. If the importance and unique benefits of e-government be clear to this level of management, education plans would be developed for other levels.
- In planning for e-government, the needs of elderly and disabled should also be noted and geographic differences in the use of information and communication technologies between different areas, such as differences in socioeconomic gaps in employment, income, and education and cultural and ethnic gaps should be identified and barriers must be removed.
- Customization of the websites should be done for older people. Measures such as the use of black and white for color blind people to use the content short, simple text, large fonts and, customization of the websites to people with movement impairment, use of low text density on the Web, using the colors high resolution in the website, designing keyboards with bold letters, proper use and plenty of graphics to help in this regard is essential.
- E-government is not meant to replace the current method of computer procedures and contact with the government, but also provide a new option in contact with the government. People should be able to go directly through their work, make phone calls or even send a letter. The government should think about solutions for people who do not have the ability to use new technology.

REFERENCES

Becker, Jorg. & Niehaves, Bjron. & Ortbach, Kevin (2009). Does the Answer Lie in Collaboration?-A Case Study on E-Government and Societal Aging. 17th European Conference on Information Systems.

Commonwealth (2003). E-Government Benefits Study. National Office for the Information Economy, Commonwealth of Australia.

Elahi, Shaban. & Abdi, Behnam. & Daanaayi Fard, Hassan (2010). Acceptance of e-government in Iran: explain the role of individual variables, the social organization and technology adoption. Vision for Public Administration No. 1 67-41.

Elkadi, Hatem (2013). Success and failure factors for e-government projects: A case from Egypt. Egyptian Informatics Journal 14 165–173.

Gooyabady, Ali Akbar (2006). E-government. Journal of Business development No. 51 Vol. IX 73-35.

Research Article

Gorman M (1999). Development and the rights of older people. In: Randel J, et al., Eds. The ageing and development report: poverty, independence and the world's older people. London, Earthscan Publications Ltd. 3-21.

Guanghua, Luo (2009). E-Government, People and Social change: a case study in China. *EJISDC* **38** 3 1-23.

Huai, Jinmei (2012). Apply TQM to E-Government Outsourcing Management. *Physics Procedia* **24** 1159 – 1165.

Jaeger, Paul T. & Thompson, Kim M (2003). E-government around the world: Lessons, challenges, and future directions. *Government Information Quarterly* **20** 389-394.

Z. Pawlak (1982). Rough sets. *Int. J. of Information and Computer Sciences* **11** 341-356.

Righi, Valeria & Sayago, Sergio & Blat Josep (2011). Towards Understanding E-Government with Older People and Designing an Inclusive Platform with them. *International Journal of Public Information Systems* 2011:**3** 131-142.

Selsele, Mohsen. & Baseri, Ali (2009). Empowering people with disabilities to access electronic digital cities. Second International Conference on Electronic City.

Skowron, C. Rauszer (1992). The discernibility matrices and functions in information systems, in: R. Słowiński (ed.), *Intelligent Decision Support. Handbook of Applications and Advances of the Rough Set Theory*, Kluwer Academic Publishers, Dordrecht 311-362.

Statistical Center of Iran (2011). 2010 Survey results of Internet users. Presidential, vice president, strategic planning and monitoring the Statistical Center of Iran, Tehran, Iran Statistical Center.

Statistical Center of Iran (2012). Selection of General Population and Housing Census 2011. Presidential, vice president, strategic planning and monitoring the Statistical Center of Iran, Tehran, Iran Statistical Center.

Strategic data center of Iran (2012). Statistical excerpt. Department of Cooperatives, Labor and Social Welfare, Tehran, No. XI.

Snellen, I (2002). Electronic governance: Implications for citizens, politicians and public servants. *International Review of Administrative Sciences* **68** 183-198.

Teerling ML, Pieterse W. Multichannel (2010). Marketing: an experiment on guiding citizens to the electronic channels. *Gov Inform Quart* 2010 **27**(1) 98–107.

Thomas, J. C. & Streib, G (2003). The new face of government: Citizen-initiated contacts in the era of e-government. *Journal of Public Administration Research and Theory* **13**(1) 83-102.

United Nations (2012). United Nations E-Government Survey 2012: E-Government for the People, Department of Economic and Social Affairs, United Nations, New York.

Zarghami, Hussein (2011). A look at developments in aging. Trends analysis conference on population, Tehran, Tarbiat Modarres University.

Zbigniew Suraj (2004). An Introduction to Rough Set Theory and Its Applications. University of Information Technology and Management, H. Sucharskiego Str. 2, 35-225 Rzeszów, Poland.