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Increasing the Use of ASAN Signature in the e-Government Services in Azerbaijan

Master's Thesis

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TALLINNA TEHNIKAÜLIKOOL
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ASAN-allkirja kasutamise suurendamine e-valitsuse teenustes Aserbaidžaanis

Magistritöö

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Author’s Declaration of Originality

I hereby certify that I am the sole author of this thesis. All the used materials, references to the literature, and the work of others have been referred to. This thesis has not been presented for examination anywhere else.

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Abstract

In today's information society, developments in information and communication technologies affect both public institutions and citizens and cause change. Being an information society requires accessing, transferring, and using information. With the rapidly developing technology, society is entering a process of change in accessing, sharing, and using data and trying to act according to the changing conditions. Not only to provide services following these conditions, but public institutions are also driven to seek innovations and carry out various studies, increase the quality of services, meet renewed expectations with technology, reduce cost items and bureaucracy, and speed up business and transactions. Information and communication technologies come into play here, and various e-government applications use these technologies to realize what is desired. On the other hand, citizens are trying to improve themselves and ensure the necessary harmony by following information and communication technologies to use these applications and make the most of the services. This study hypothesized that e-signature is not used enough in Azerbaijan. In this regard, the main research question was determined as follows: What can be done to increase the usage of ASAN signatures in the Azerbaijan e-government? In this study, an inductive research approach was employed. The study followed the case study methodology. This research uses Azerbaijan as a case study because no work is available in the context of increasing the use of ASAN signatures in the e-government services in Azerbaijan. In addition, the structured interview technique as one of the qualitative research methods as a primary data collection process was used in the study. Research findings implied that e-signature is not used enough in Azerbaijan, which means that the hypothesis of this study was supported.

The thesis is written in English and is 85 pages long, including 7 chapters, 5 figures, and 1 table.

Keywords: ASAN, e-signature, e-government, Azerbaijan, electronic services.

Annotatsioon

ASAN-allkirja kasutamise suurendamine e-valitsuse teenustes Aserbaidžaanis

Tänapäeva infoühiskonnas mõjutavad info- ja kommunikatsioonitehnoloogia kiired arengud nii avalikke institutsioone kui ka kodanikke ning põhjustavad muutusi. Infoühiskonnaks olemine nõuab teabele juurdepääsu, selle edastamist ja kasutamist. Kiiresti areneva tehnoloogiaga on ühiskond sisenemas andmetele juurdepääsu, jagamise ja kasutamise kiirete muutuste protsessi ning üritab tegutseda vastavalt muutuvatele tingimustele. Neid tingimusi järgides mitte ainult ei paku teenuseid, vaid ka riigiasutused on ajendatud otsima uuendusi ja tegema erinevaid uuringuid, tõstma teenuste kvaliteeti, vastama uuenenud ootustele tehnoloogiaga, vähendama kuluartikleid ja bürokraatiat ning kiirendama äritegevust ja tehinguid. Siin tulevad mängu info- ja kommunikatsioonitehnoloogiad ning erinevad e-riigi rakendused kasutavad neid tehnoloogiaid soovitud realiseerimiseks. Teisest küljest püüavad kodanikud end täiendada ja tagada vajalikku harmooniat, järgides info- ja kommunikatsioonitehnoloogiaid, et neid rakendusi kasutada ja teenuseid maksimaalselt ära kasutada. Selles uuringus püstitati hüpotees, et Aserbaidžaanis ei kasutata e-allkirja piisavalt. Sellega seoses määrati põhiline uurimisküsimus: Mida teha, et Aserbaidžaani e-valitsuses ASAN-allkirjade kasutamist suurendada? Selles uuringus kasutati induktiivset uurimismeetodit ja juhtumiuuringu metoodikat. Selles uuringus kasutatakse juhtumiuuringuna Aserbaidžaani, kuna Aserbaidžaani e-valitsuse teenustes ASAN-allkirjade kasutamise suurendamise kontekstis pole tööd saadaval. Lisaks kasutati uuringus struktureeritud intervjuu tehnikat kui üht kvalitatiivset uurimismeetodit esmase andmekogumisprotsessina. Uuringutulemused viitasid sellele, et Aserbaidžaanis ei kasutata e-allkirja piisavalt, mis tähendab, et selle uuringu hüpotees leidis toetust.

Lõputöö on kirjutatud eesti keeles ning sisaldab teksti 85 leheküljel, 7 peatükki, 5 joonist, 1 tabelit.

Märksõnad: ASAN, e-allkiri, e-riik, Aserbaidžaan, elektroonilised teenused.

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Thank you all to be part of my journey!

List of Abbreviations and Terms

ASAN	Azerbaijan Service and Assessment Network
ECDL	European Computer Driving Licence
FIN	Federal Identification Number
ICT	Information and Communication Technologies
SIM	Subscriber Identity/Identification Module
PKI	Public Key Infrastructure
UN	United Nations

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1. Introduction

1.1 Research Problem and Motivation

The dizzying developments in information and communication technologies in recent years have penetrated every aspect of our lives, and their sphere of influence is expanding daily (Dawes, 2012). Along with the developments in information and communication technology, internet access and its use rate has increased since the 1990s, and the relationship between the state and the citizen has gained a different dimension (Zhou & Congyang, 2018). Information and communication technologies have not only affected individuals but also changed and transformed public administrations. The concept of e-government, which has become the symbol of the transformation in public administrations today, emerges as the dominant concept of restructuring and transformation in public administrations (Basu, 2004). E-government, which enables the rapid and easy provision of public services in the electronic environment, plays a vital role in the new public administration approach against the cumbersome and bureaucratic structure of traditional public administration (Dawes, 2012).

In the early 2000s, Azerbaijan made arrangements to provide public services electronically. The adoption of the "National Strategy for Information and Communications Technologies for the Development of the Azerbaijan Republic" in 2003 imposed significant requirements on the Azerbaijan Government for the implementation of e-government (Abbasov, 2020). After this, e-government was established to foster stronger ties between people and government agencies, aiming to encourage more openness and accountability by public servants. The growth of Azerbaijan's e-government may be attributed to the country's decision to implement the "State Program on Development of Communication and Information Technologies in the Azerbaijan Republic in 2005-2008" (Abbasov, 2020). The establishment of the e-Government Portal is a crucial first step toward establishing an electronic administration in Azerbaijan. The "National Strategy on Information-Communication Technologies for the Development of the Republic of Azerbaijan (2003-2012)" provided the blueprint for the E-Government Project, and its implementation within the "e-Azerbaijan" program ensured the openness of governmental bodies and fostered new channels of interaction with public servants (Abbasov, 2020).

ASAN Signature, which officially started its operation in September 2011, provides services to various segments of the population, i.e., ordinary citizens, legal and natural persons

engaged in entrepreneurial activities, and civil servants (Alakbarova, 2020). ASAN Signature is the mobile identity to verify a person's identity when accessing e-services and making digital signatures. ASAN Signature technology allows citizens to use the online electronic services of various state and private institutions and sign documents using a mobile phone as an electronic signature tool. ASAN Signature makes it possible to use all available e-services. It should be noted that more than 650 electronic services provided to citizens by various state and private organizations nationwide use ASAN Signature's enhanced mobile electronic signature service (Alakbarova, 2020). The E-government system reflects mainly on Azerbaijan's ASAN Signature and Electronic Signature services. ASAN Signature, also called mobile identity, is used to validate people's identity when using e-services or to make digital signatures. Using their ASAN Signature online, citizens may access the websites and online services of various government and commercial organizations. The whole suite of e-services is at citizens' disposal with ASAN Signature. It is essential to highlight that the ASAN Signature improved mobile electronic signature service is presently used in more than 650 electronic services supplied to people by different public and commercial institutions around the nation.[1] Similarly, the primary use of an Electronic Signature is to ascertain the identity of the information's originator for third-party verification (such as by a court or other authorities.[2] To utilize electronic services that need an electronic signature tool, it is necessary for the individual who generated the electronic document to confirm the record and submit it to the other party using an electronic signature tool (e-gov.az). With Electronic Signature, they may legally bind themselves to not just one but any number of files, whether texts, images, music, or videos.

In the meantime, many public services have been transferred to the electronic environment. However, administrative and technical disruptions in public institutions/organizations have been essential obstacles in providing e-government services. In addition, the users' participation in the services offered via e-government needs to be sufficiently ensured (Abbasov, 2020). In this context, the problem of the study arises. E-government has transformed the processes and presentation of public services and the relations between the state-citizen, the state-private sector, and the state-non-governmental organizations and redefined it based on the information society (Carter & Belanger, 2005). E-government will be successful to the extent that it is adopted and accepted by the actors affected by this new

[1] e-gov.az
[2] e-gov.az

process. In other words, e-government applications will be successful if citizens adopt them, the private sector, non-governmental organizations, and all other institutions and organizations (Evens ve Yen, 2006). In this context, it is essential to know the attitudes, thoughts, and expectations of citizens, public employees, and the private sector, who are actors of e-government. There have been many scientific studies on e-government in the world and Azerbaijan. However, e-government research is primarily related to the supply dimension. However, there need to be more studies on users' attitudes regarding using e-government services in Azerbaijan. In this regard, e-government should be evaluated and handled as a whole with its supply and demand dimensions

1.2 Research Aims and Questions

This study aims to evaluate the use of the ASAN and electronic signatures provided by the e-government portal among Azerbaijani citizens. In this context, the studies on e-government in Azerbaijan and the opinions of citizens, who are one of the most important actors of e-government, will contribute significantly to the development of e-government in Azerbaijan and fulfill the existing gap in the literature. This study hypothesizes that e-signature is not used enough in Azerbaijan. In this regard, the main research question is as follows:

- How to increase the usage of ASAN signatures in the Azerbaijan e-government?

The following sub-questions were determined accordingly:

- What are the reasons for citizens to use or not use e-government services in Azerbaijan?
- What are the factors that affect the usage of ASAN signatures in the Azerbaijaon e-government?
- What are the reasons that the ASAN signature is not enough used?
- How can the usage of the ASAN signature system be improved?

1.3 Outline of the Remaining Chapters

This study consists of eight parts. In the first part of the study, the research problem, motivation, aims and questions are emphasized. In the second part, the implementation of

the electronic government system in Azerbaijan, approval of electronic transactions in the electronic government system, advantages of the electronic government to the citizen in Azerbaijan, challenges of e-government in Azerbaijan, determining the development prospects of electronic government in Azerbaijan, electronic government applications in the world are analyzed. In the third part of the study, the electronic government concept, the purposes of e-government applications, the interaction between electronic government and citizens, electronic government development models, and problems encountered in e-government applications are discussed. In the fourth part, the research design and methodology are described. In the fifth part, ASAN Signature in Azerbaijan as a case study is analyzed. In the sixth, the research findings as a result of primary data collection are summarized. In the seventh part, the proposal to improve the usage of the ASAN signature in Azerbaijan is made. In the last part, limitations and future work are described.

2. Literature Review

In this chapter, the implementation of the electronic government system in Azerbaijan, the approval of electronic transactions in the electronic government system, the advantages of the electronic government to the citizen in Azerbaijan, the challenges of e-government in Azerbaijan, determining the development prospects of electronic government in Azerbaijan are analyzed. In addition, examples of leading countries in e-government are examined as well in order to better understand the point e-government has reached from past to present by examining the experiences of different countries.

2.1 Implementation of the Electronic Government System in Azerbaijan

The electronic government system has been implemented in post-Soviet countries, including Azerbaijan, since the second decade of the XXI century. However, the development of the electronic government system is relatively fast in the Republic of Azerbaijan. For example, it can be stated that in 2014 and 2016, according to the "Electronic Government Monitor" published by the United Nations in different years, the Republic of Azerbaijan made significant progress in the use of e-government and the e-government development index (Madatli. 2017). In general, the formation of the electronic government system in the Republic of Azerbaijan is based on international experience. "The Decree on the approval of the State Program for the development of communication and information technologies in the Republic of Azerbaijan for 2010-2012 and the Decree "On some measures in the field of the provision of electronic services by state bodies" and other normative legal acts created a legal basis for its activity (Aliyev, 2019). At the same time, it should be noted that along with the aforementioned normative acts, the examples of other states were initially guided in order to implement the electronic government system across the country. This guidance is also ambiguous, considering that after the United States of America, the electronic government system was applied in Great Britain, Japan, and other countries since the mid-90s. It is important for Azerbaijan to further improve such a system by benefiting from the traditions of other countries. At the same time, all the principles and goals mentioned above have been reflected in the Electronic Government Portal of the Republic of Azerbaijan (Madatli, 2017). Since 2011, the number of services provided on the Electronic Government

Portal of the Republic of Azerbaijan has increased from 5% to 74% (Mammadov & Jafarova, 2021). The said services include issues related to the authority of various institutions; that is, it is possible to use the services of ministries, committees and commissions, departments and services, and administrations, as well as the services of newly created public legal entities (Mammadov & Jafarova, 2021).

Recently, as in all the leading countries of the world, a number of strategies and programs have been adopted in Azerbaijan in the direction of building and developing the information society, important work has been done in this direction, and relevant work is currently being continued. One of the important indicators of the development of the information society is the informatization of the activities of state bodies. In this regard, the electronic state concept, which is a new form of activity of state bodies, is being implemented with the wide application of information and communication technologies (ICT). One of the main goals in supporting this concept is to ensure the efficiency and convenience of citizens when using the services of state bodies, transparency and accountability in the activities of these bodies. The issues of building an electronic state in the country were reflected in the "National Strategy on Information and Communication Technologies for the Development of the Republic of Azerbaijan (2003 - 2012)" approved in 2003 (Abbas, 2019).

The main priorities of the "Electronic Azerbaijan" State Program for the citizen were: the active participation of the citizen in the administration of the state, the simplification of the citizen's communication with the state bodies, the full satisfaction of the information needs, the access to state services for persons with limited means, etc. The measures implemented in the direction of the establishment of the electronic state, in particular, bringing the services provided by the state to the citizens into the electronic environment, enable the relations between the state bodies and citizens to move to a new level. With this, wide opportunities arise in terms of improving the quality of services provided to citizens, ensuring transparency, eliminating bureaucracy, and reducing time loss. At present, a large number of electronic services have been placed both on the official websites of state institutions and on the electronic government portal. About 300 e-services from 41 institutions have been integrated into the portal, which allows citizens to access services offered by various ministries and committees from one window (Dadashov, 2017). At the same time, information about personal documents, property, social status, certain privileges, workplace, salary, etc. of a citizen registered on the portal is collected in his electronic profile. As a

result, the certificate needed by the citizen to submit to some institution can be sent by the e-government portal. It is possible to pay utility bills and other payments over the Internet.

According to the statistics of the last months, the most requested services on the e-government portal are the services "Registration of labor contract notices and providing information to the employer" and "Employee acquisition of information about labor contract notices" provided by the Ministry of Labor and Social Protection of the Population (Garashova, 2018). The service is very important in terms of ensuring the transparency of official-citizen relations and preventing the violation of the labor rights of citizens. providing information" and other services are among the most requested services. Purposeful steps are being taken to gradually increase the list of these services. The most commendable case is the study of citizens' attitudes to these services. For example, an opinion bank has been created on the portal, and here the main goal is to determine what services the citizens need more, to further improve e-services by taking into account their opinions and suggestions (Aliguliyev & Mahmudova, 2018). However, not all of the population can use the possibilities of modern information technologies, which makes it difficult for them to adapt to the new environment and, ultimately, negatively affects the pace of development of the information society in the country.

The Electronic Government Portal of Azerbaijan is important in determining the electronic government and its use mechanism. In the previous section, the foundations of the establishment of the Electronic Government Portal and the normative acts were mentioned in detail. Generally, the Electronic Government Portal of the Republic of Azerbaijan operates with specific goals and directions (Ismayilova & Ahmadova, 2021). Thus, according to Article 2 of the Regulation on the Electronic Government Portal, the operating principles of the Electronic Government Portal are as follows (Madatli. 2017):

Modularity and scalability: the possibility of developing software technical components of the portal without making severe changes;

Independence: the content and activity of the portal do not depend on the organizational, administrative, technical, and other changes made in the information systems and resources connected to it;

Systematicity: provision of mutual relations and coordination of existing or newly created information systems and resources to provide electronic services by state bodies;

Security: using certified software and software-technical tools; complying with the requirements of the law when exchanging information, including personal data; ensuring

information protection by implementing organizational, technical, and technological measures;

Ease of use: provision of multiple uses of data once entered into information resources on the basis of the "one window" principle;

Efficiency: implementation of information exchange in real-time, optimization of interactions, and reduction of time loss and financial costs;

Transparency: ensuring the transparency and accountability of the activity within the system, creating conditions for monitoring the implemented procedures and their results.

However, the services available on the E-Government Portal are also grouped into citizen, entrepreneur, and non-resident services, which means that people can use the Portal comfortably. Each mentioned service belongs to the authority of various executive bodies and public legal entities, which is reflected in the relevant normative acts. According to the Rules of "Provision of electronic services in specific fields by central executive authorities," the organization of services in specific areas determined by the said rules is carried out by the central executive authorities following the administrative regulations prepared for each service (Mammadova, 2017). At the same time, the Regulations determined that the provided services are of two main types - informational and interactive electronic services. Informational electronic services allow users to freely receive information on various issues electronically (Madatli, 2017). In interactive electronic services, mutual information exchange is ensured for users to apply to the information systems of central executive authorities with a request or task and to obtain relevant information, documents, or any required result (Madatli, 2017). Each of these services falls under the jurisdiction of different institutions.

2.3 Approval of Electronic Transactions in the Electronic Government System

Electronic signature: Although the idea of an electronic signature was introduced as the ideas of several authors in the 70s and 80s of the 20th century, the lack of information technology tools for that period was a big obstacle in realizing this idea. In the first decade of the 21st century, electronic signatures began to be used rapidly. An electronic signature is an authentication tool that can identify the signer with the given information and indicate that the signer approves the information contained in that information, added to said information, or logically defined in electronic form (Guluzade & Yusifova, 2019). The

concept of electronic signature is defined in the legislation of the Republic of Azerbaijan. In most cases, an electronic signature is used during electronic commerce transactions. However, this electronic signature can be easily used in commercial transactions, banking, financial, tax, insurance, leasing, concession, transportation, and other transactions (Mammadov & Jafarova, 2021).

Digital signature: One of the means of validating electronic documents is a digital signature. A digital signature is a type of electronic signature and is a unique sign used to confirm electronic documents and transactions. The main feature of digital signatures is that they are based on a certain mathematical foundation - an algorithm that includes special cryptographic symbols. Digital signatures in general (Madatli. 2017):

- They are easily recognized;
- It is almost impossible to be changed by someone else;
- Their owner cannot deny them.

The approach of various authors proves that no separate normative acts define the legal content of digital signatures. Usually, normative acts on electronic signatures also apply to digital signatures.

ASAN signature: ASAN signature is considered a new direction in the application of electronic signature in the Republic of Azerbaijan. ASAN Imza is a mobile authentication used to verify your identity when accessing electronic services and making digital signatures (Mammadova, 2017). ASAN Imza (Mobile signature) makes it possible to use all available e-services. Obtaining an ASAN signature consists of several procedures that are described below (Mammadova, 2017):

- In order to obtain a SIM card that enables ASAN Imza service, it is required to contact the relevant mobile operator.
- The subscription form for the ASAN Imza SIM card and services is signed. After signing the subscription form, the mobile operator provides a new PKI SIM card, which must be inserted into the mobile phone.
- One should contact the Ministry of Taxes' ASAN Certificate Services Center to activate the service. It should be noted that when an individual applies, he must bring his identity document (including the FIN number) and the documents required for obtaining an ASAN Signature certificate.

A certificate of easy signature is issued within one working day after applying to the ASAN Certificate Service Center. It is more appropriate to carry out all procedures related to the issuance of an easy signature at ASAN Service Centers. Easy signature is valid for three years (Madatli, 2017).

2.4 Advantages of the Electronic Government to the Citizen in Azerbaijan

One of the most important issues is the formation of the information culture of social groups belonging to different categories of the population in the efficient organization of the activities of the electronic state. In the "National Strategy for the Development of the Information Society in the Republic of Azerbaijan for the Years 2014-2020", approved by the Decree of the President of the Republic of Azerbaijan dated April 2, 2014, a special place is devoted to these issues and all members of the society, regardless of their age and place of residence, are provided with ICT opportunities. the issue of creating conditions for its use, increasing ICT literacy of the population, especially of low-income social groups, through targeted training programs, was mentioned as one of the main goals, and specific tasks were defined in this regard (Dadashov, 2017). In order to improve the information culture of public servants, people working in public enterprises or private enterprises, the enterprises themselves can carry out their involvement in special training. The dependence of employees' career advancement on their information culture can be regulated by a normative act (Mahmudova, 2018).

Some people are already used to using various internet services. Shopping on the Internet, booking a plane ticket, booking a hotel, using electronic payment systems, communicating with friends, etc. are services that most of us actively use. However, there are certain groups of the population that require comprehensive measures to ensure their access to these services. Pensioners, unemployed people, internally displaced people, children and teenagers growing up in large families, housewives, people with physical disabilities, and people living in prison can be attributed to these groups (Aliguliyev & Mahmudova, 2018). By increasing the computer literacy of citizens included in this category, their integration into society can be achieved. Of course, in this direction, certain works are being carried out at the expense of projects financed by state institutions, the private sector, and non-governmental organizations. It would be good if the process of forming the skills of citizens to use computers and the Internet should be carried out on a large scale and national standards

should be developed for the certification of their knowledge. For this, the ECDL standard, which is applied in most countries of the world, can be adopted (Abbas, 2019).

There are very few elderly people who are able to work on computers and the Internet. Elderly people can be considered the most vulnerable group of the population. Especially, people who have been engaged in labor for a long time are bored with unemployment after retirement, they feel unnecessary, and they need more communication. The Internet can be useful for them in this regard. Elderly people who learn to use Internet services can communicate with relatives who live far away, and at the same time, they can make new friends and communicate online (Mahmudova, 2016). If necessary, they can get medical consultations over the Internet. Most importantly, they can solve certain social and household problems using e-services provided by government agencies. Modern technologies open wide opportunities for the adaptation of people with limited physical capabilities to society. There are citizens who are completely mentally healthy, who are either not hired because of their physical disabilities, or are ashamed of these disabilities and isolate themselves from society. People in this category can be encouraged to become e-citizens by teaching them how to use computers and the Internet. Thus, such people will have the opportunity to study, work, communicate, and realize themselves remotely, which can have a positive effect on solving a number of their social problems (Mahmudova, 2016). At the same time, the transformation of people belonging to other social groups into e-citizens can play an important role in solving their specific problems.

Active Internet users today can be described as e-citizens living in cyberspace. They communicate with each other, share ideas, and information, participate in political and social discussions, develop their businesses, etc. Those who cannot use the Internet are deprived of these opportunities. Every e-citizen is an information consumer, and at the same time, by creating new content and placing it on the Internet, or by disseminating some information, he becomes an information producer (Abbas, 2019). Currently, ICT (social media, websites, smartphones) has given impetus to the emergence of citizen journalism. This leads to the fact that sometimes ordinary citizens spread information about the latest innovations faster than professional journalists. Citizens take photos and videos of the facts related to any violation of the law and send them to the e-mails of relevant state bodies and television stations, sharing them on social media, thereby publicizing negative situations and helping to eliminate such situations by state bodies. But it also has its downsides. So, sometimes ordinary citizens and even journalists unknowingly spread information that is considered a

state secret or that is not allowed to be distributed (Mahmudova, 2014). One of the reasons for this is the weak information culture.

In forming the information culture of citizens, it is necessary to pay attention to information security, correct use of security passwords, and other issues so that security-related problems do not arise. In addition to technical knowledge and skills in the field of information security, citizens should also be taught methods of protection from harmful information. Because the Internet is used as a powerful propaganda tool and an information weapon, and it is also used for the purpose of discrediting the national and moral values to which people belong (Garashova, 2018). The negative impact of information flows with negative content circulating in the information space on the human psyche makes it necessary to ensure the psychological safety of citizens in modern society. The threats that people are exposed to during the information processes they carry out to satisfy their information needs can damage their moral and psychological health and also damage the national security of the country. Manipulation of consciousness, promotion of harmful ideologies, disinformation, information wars and such information threats are skillfully used by certain states to destroy the system of national and moral values, which are the main pillars of the nation's existence (Mahmudova, 2018).

2.4 Challengers of E-Government in Azerbaijan

The problems that "electronic government" faces in Azerbaijani society can be characterized in the following way:

- In order to realize the main goals of e-government, the information society poses many new problems to the legislation, such as the identification of citizens and their identity confirmation, taxation in electronic commerce, legal relations in cyberspace, cyber-crime and cyber-terrorism. Based on this, the state should form a new flexible legislation, maintaining the necessary balance between trusting all types of electronic transactions, economic development and ensuring information confidentiality. This is a matter that requires both time and experience.
- The problem of fully providing the country with ICT infrastructure. According to accepted standards, one of the conditions for the effectiveness of e-government is the provision of broadband Internet to the population, and the UN has recognized access to the Internet as another type of human right. Although great work has been done in

this field in the country, the population in many remote villages and residential areas is still not provided with telephone lines and high-speed internet based on ADSL technology. The full provision of the population with ICT facilities, as well as the financial situation of the citizens, also depends on it. Because families with low social security, first of all, try to meet their food and household needs, which causes them to be isolated from the ICT infrastructure.

- Another important issue is the problem of ensuring information security in this area. Because citizens are not completely sure that they are free from electronic threats, it is not credible that they will fully use these services. The issue of ensuring the security of the electronic signature, which is intended for the identification of citizens and their identity confirmation, confidentiality and protection of indicators, especially for ensuring the authenticity of the signature, is of special importance. Experts consider it more appropriate to use European practice in this field. Thus, the electronic signature chips used in European countries are complemented by eye color, fingerprints and other biometric data, which guarantees security.
- Another problem is the training of qualified personnel in order to implement the "electronic government" project in Azerbaijan. Although a lot of work has been done in this field, because the project is new, there is currently a problem of lack of qualified personnel. In particular, this problem exists in the regions, to eliminate the problem, it is recommended to use international experience and to organize scientific and practical seminars for employees working in this field in different parts of the country, to increase their knowledge and experience in this field. Development prospects and expectations In order to organize management that meets modern requirements in the country, increase the efficiency of the activities of state bodies, ensure their transparency and eliminate bureaucracy, it is necessary to continue measures in the direction of the development and improvement of "electronic government" and the provision of electronic services.

2.5 Determining the Development Prospects of Electronic Government in the Republic of Azerbaijan

The establishment of the Ministry of Digital Development and Transport on the basis of the Ministry of Communications as a step that led to the rapid development and wider

application of ICT in the Republic of Azerbaijan and the ways to increase its efficiency and development prospects of the electronic government in the Republic of Azerbaijan. In addition, it can be noted that only six months after the formation of the ministry, 4 major international events were held during the year. In addition, the International "Telecommunications and Information Technologies" exhibitions, which are held every year and have already become a tradition, have a significant impact on the development of ICT in the country (Mahmudova, 2014). "Netty" National Internet Award, a rare and unique event held annually in the region since 2005, can also be shown here (Mahmudova, 2014). The best electronic sources of state infrastructures are selected every year in this competition called "State websites", which plays an important role in the development of the concept of "Electronic government" in this republic (Abbas, 2019). The security of the State, which is related to the wide-band spread of information technologies and the Internet in humanity, is also required. On this basis, with the decree of the President of Azerbaijan, concrete tasks were approved with the aim of ensuring security in the state bodies of the Republic of Azerbaijan during the implementation of information protection through information bases and networks, communication systems, including the Internet global information network (Abbas, 2019).

In order to implement the "National Strategy on Information and Communication Technologies for the Development of the Republic of Azerbaijan" on October 21, 2005, "State Proposition for the Development of Communication and Information Technologies in the Republic of Azerbaijan for the 2020-2020 Interval" has been confirmed (Aliguliyev & Mahmudova, 2018). In general, this program can be considered the 1st stage of the "Electronic Azerbaijan" project (Aliguliyev & Mahmudova, 2018). The main goal of the State Program was to ensure the development of communication and information mechanisms in Azerbaijan and, in this way, to provide services for the comprehensive development of the republic, at the same time to ensure the creation of the National Strategy for the development of ICT, to plan and implement projects in accordance with the established goals and directions of activity (Dadashov, 2017). Since it is necessary to adopt another state program for the implementation of the National Strategy for Information and Communication Technologies for the Development of the Republic of Azerbaijan, State Program for the years of 2020-2012 “Communication and Information Technology Development in the Republic of Azerbaijan" was approved. This program is the 2nd stage of the "Electronic Azerbaijan" project (Aliguliyev & Mahmudova, 2018).

In order to prevent the loss of manpower and resources in state administrations, there is a need for inter-departmental coordination mechanisms and an autonomous organization that will ensure this coordination (Mahmudova, 2018). There are mainly two styles in the attempts to form an electronic government. The first is the environment in which the e-government website is built separately and independently from the others. In this way, the state provides primitive, unrelated services of an information nature. A large number of government institutions have their own website. Coordination, information exchange and communication between institutions are at a low level. If such a structure is adopted permanently and is not gathered within a single coordination center, then the concept of electronic government is opposed only in a narrow sense. Another style is the environment in which the websites of government agencies operate in an integrated manner (Mahmudova, 2018) This constitutes the next stage in the construction of electronic government and requires long efforts, perseverance, leadership, and technology. This style ensures that citizens can access the website of state administrations from a single electronic government portal.

Currently, the "Electronic government" portal (www.e-gov.az) is active in the country, and its activity is being paid attention to by the population. As envisaged, 40 central executive authorities have joined this portal. About 217 electronic services are provided by these institutions to our citizens (Abbas, 2019). All state institutions and central executive authorities joined this process and began to provide "services" more widely. The most used services are the Ministries of Taxes, Education, Justice and Labor and Social Protection of the Population, as well as the services of the Commission on Civil Service Affairs under the President of the Republic of Azerbaijan (Abbas, 2019). As a result of the implemented electronic government projects, it will be possible to serve more citizens at the same time and with the same quality, the state will be freed from excess burden by the elimination of staff redundancy in state affairs and the reduction of documentation costs, transparency in state bodies will be ensured, and thus the state will be trusted in the country.

E-government bulletins: a number of necessary documents regulating communication in the "electronic government" environment, as well as laws of the Republic of Azerbaijan, state standards have been adopted. Open Key Infrastructure and National Certificate Services Center were created to establish the use of e-signatures in the republic, and in September 2011, the issuance of e-signatures to state institutions, population and business entities was started (Garashova, 2018). The application of e-signature has helped to expand

the possibilities of using electronic services and provide them with more high-quality and reliable services, as well as the wide spread of e-government and e-commerce.

Currently, most of the twenty most basic types of electronic services provided to human society and the business sector in the European Union countries, as well as submission of official documents, tax and customs payments, statistical submission, job search through employment organizations, participation in certain test exams for admission to universities and civil service acceptance of e-applications and others are being developed and implemented in Azerbaijan (Mahmudova, 2016). The decree "On certain measures in the sphere of the organization of electronic services of state bodies" emphasizes the importance of the establishment of state administration on the basis of new principles, the increase of usefulness and impartiality in the work of state institutions, and the importance of the organization of electronic services in preventing situations that form an environment of bribery. In order to implement the works arising from the decree, laws were developed for the provision of electronic services by the central executive authorities based on international practice, and the types of services were specified and accepted by the Cabinet of Ministers (Dadashov, 2017). In many state institutions, it is possible to pay taxes and other payments in e-format in real-time.

The "electronic government" portal www.e-gov.az was created and put into use in order to create conditions for the organization of information integration between the information bases of state institutions and the use of electronic services provided by the population to state institutions based on the "one window" principle (Mahmudova, 2018). Currently, the information bases of thirty-nine state institutions have been connected to the "electronic government" portal, and the formation of the services of more than two hundred of these institutions has been ensured through the site. The "E-government" gateway allows the public to ensure the beneficial use of the information bases available in state institutions, to create secure exchanges between them, to send and answer requests, and to provide electronic services without being asked for their documents available in the information bases (Abbas, 2019). In order to implement all the means derived from the e-development, as well as e-services organization orders, the connected business activity is continued.

2.6 Electronic Government Applications in the World

Although the emergence of e-government applications does not have a very long history, it has come a long way and has been successfully maintained, especially in countries where

information and communication technologies are developed. Each state has determined its own goals and strategies regarding e-government applications. In general, developing countries aim to improve existing bureaucratic processes and strengthen network structures, while developed countries aim to establish information technology standards that eliminate the integration problems of electronic systems and facilitate interoperability (Adamali et al., 2006). In this part of the study, examples of leading countries in e-government will be examined. At this point, the aim is to better understand the point e-government has reached from past to present by examining the experiences of different countries.

2.6.1 Electronic Government Applications in the UK

Studies on e-government in England started with the "open.gov.uk" website created by the Central Computer and Telecommunications Authority (CCTA) in 1994. The website allowed citizens to access public institutions on the internet. With the Government Direct green book published in 1996, a framework for the electronic delivery of public services was presented. In October 1997, the Prime Minister targeted that 25% of all interaction with public institutions could be done via telephone, television or computers by 2002 (European Commission, 2014). With the report titled “Modernization of the State” prepared by the British Government in 1999, public institutions and organizations took information technologies to the focal point of modernization. The report set a target for all public institutions to provide their services online by 2008, and it was stated that in order to achieve this goal, improving the existing infrastructure, ensuring the security of transactions by popularizing digital signatures and making them more actionable. In addition, it is aimed to include private sector organizations in the system. The Office of e-Envoy was established in September 1999, and the work to be done after this date was carried out by this office.

In 2000, the UK's official e-government strategy "E-Government: Strategic Framework for Public Services in the Information Society" was published (European Commission, 2014). The e-government understanding of all public institutions is the focal point of this strategy. During the year, the website “UKonline.gov.uk” was launched to provide public services from a single source. In 2005, the UK's new e-government strategy titled "The State Transformed with Active Technology" was published. The document included a strategy to transform public services using ICTs. It outlined how the effective use of technology designed around the needs of citizens and businesses can transform people's daily lives

(European Commission, 2014). In 2006, it was possible to reach public services via mobile phones via the address “direct.gov”, and in 2009, Digital Britain: the Interim Report was published. The report made 20 key recommendations for the UK to maintain its leading position in digital applications. In addition, the report will determine the UK's strategy for the next ten years (European Commission, 2014). In accordance with the strategy put forward in 2009, the UK has implemented practices that include greater participation of citizens in public administration and their ability to convey their views to public authorities in the following years. The UK maintains its position as one of the leading countries in the world in the information society. It is above the European average in many indicators and the level of internet access is quite high (European Commission, 2020).

2.6.2 Electronic Government Practices in Australia

Initiatives for e-government applications in Australia date back to 1993. In line with the report titled “Networking the Future of Australia”, which was created on this date, a national strategy based on three basic elements: education, industry and the role of the state was adopted (Bannister & Connolly, 2014). In this context, it is aimed to make the necessary regulations, to ensure coordination in all sectors and to increase efficiency through better information management, as well as to benefit from the new communication services of public institutions and private sector. The next phase of the e-government vision was launched by the Ministry of Communications, Information Technology and Arts in November 2002 (Helbig et al., 2013). This new vision was announced as the "Strategic Structure for the Knowledge Economy", replacing the "Better Services, Better Government" approach introduced in July 1998 (Pardo et al., 2017). This new vision aimed to provide Australian citizens and businesses with easy access to public services and information, to offer the services they need by integrating, to integrate the gained gains with the citizens both in policies and processes by prioritizing honesty and trust in the use of new technologies, thus increasing more efficiency and the rate of return on investments.

Australians have embraced technology and the internet early. Studies conducted in the last 10 years show that the number of people who can use the internet and interact with public institutions has increased. While 37% of Australians had internet access in 2001, this rate increased to 52% in 2005 (Bannister & Connolly, 2014). In a study conducted by the Information Management Office in 2003, it was determined that 80% of internet users use

the online services of public institutions. On the other hand, 57% of workplaces are e-government users (Bannister & Connolly, 2014).

2.6.3 Electronic Government Applications in South Korea

Korea, which has shown significant developments in e-Government and information technologies, has become one of the leaders of e-government in the world. Korea, which was 15th in the United Nations e-government development index in 2001, ranked first in 2010, 2012 and 2014 (Kim, 2018). Korea has taken important steps in terms of both e-government applications and information and communication technologies. While it had a phone rate of 0.36% in 1960, it was well behind the world average with this rate (Kim, 2018). By 1981, Korea has caught the world average (Lee, 2018). Today, Korea is a rising example of ICTs. In addition, Korea's economic growth is called a miracle. While the per capita income in Korea was below US$ 100 in 1960, having grown by more than 8% in the last 50 years, Korea was among the thirteenth largest economy in the world with a per capita income of US$ 20,000 in 2010 (Lee, 2018).

E-government studies carried out in Korea can be examined in five periods. The first period (Establishment) National Basic Information Systems (NBIS) was established in this period covering the years 1980-1995 (Lee & Kwak, 2016). In the second period covering 1996-2002, nationwide broadband networks were established and the necessary preparations for e-government services were completed (Lee & Kwak, 2016). In the third period, which covers the years 2003-2007, 31 important e-government projects such as home tax service, electronic trading, Public Service 24 (G4C) and administrative information sharing system were implemented (Lee & Kwak, 2016). In the fourth period (Integration) covering the years 2008-2012, the information systems of public institutions were integrated. The fifth period (Maturity and Co-production) covers the years 2013-2017 (Lee & Kwak, 2016). In this period, growth and employment interacting with information technologies are targeted.

In 1987, Korea began its first comprehensive program to increase its collective knowledge base. After the IT Development Framework Law went into effect in August 1995 (Lee & Lee, 2018), the government enacted the First Master plan for IT Development in June 1996. In this light, the Government has set up a national institution with the first plan's goals in mind. Cyber Korea 21, the government's second master plan, was implemented a year later with the goal of overcoming the Asian economic crisis and transforming the country's

economy into a new information society of the 21st century (Kim, 2018). Thirdly, "E-Korea Vision 2006" was developed by the conviction that advancing IT throughout all sectors of society will improve the quality of life for all Koreans (Kim, 2018). Korea has effectively used the world's best information and communication technology tools, including the Internet, to make e-government work better. Besides these factors, Korea's e-government success can be summarized as strong political leadership, clear vision, policy targets, and human and financial resource allocation.

2.6.4 Electronic Government Applications in Singapore

The development of e-government applications in Singapore can be examined in four periods. The first period (Efficiency in the Public Sector), covering the years 1980-1999, is the computerization of public services (Tan & Pan, 2013). In this period, automation was provided in public services and basic information technology infrastructure was established. In the second period (Excellence in Public Services), covering the years 2000-2006, the first and second action plans were put into effect (Tan & Pan, 2013). During this period, 1,600 e-services were put into practice (Tan & Pan, 2013). The main target in this period is the integration of public services. In the third period (Full E-Government Integration), covering the years 2006-2010, 300 mobile government applications were added (Tan & Pan, 2013). The main target in this period is the integration of data processing and systems for public institutions. The fourth period (Public-Private Sector Value Innovation and Economic Competitiveness) covers the years 2011-2015 (Tan & Pan, 2013). The main goal of this period is to increase cooperation for e-government applications within and outside the government.

By the end of 2001, Singapore was able to offer 92% of the country's public services online to its citizens (Huang & Cho, 2015). Singapore's success can be attributed to the reality of the vision promised by the government and, more importantly, the focus on the full implementation of the strategies it has adopted. Based on Singapore's experience, three inferences can be made about e-government success. First, strong leadership with a good vision is crucial to e-government success (Chan & Looi, 2018). The government should involve all stakeholders in this vision and clearly state the e-government vision. Through a clearly articulated vision, the Singapore government has inspired a mindset change and made public institutions understand the e-government transition. Second, the government should

support e-government initiatives by strengthening the information infrastructure and reducing the digital divide (Chan & Looi, 2018). The Singapore government has allocated resources primarily to disadvantaged groups and has initiated training programs that can benefit all segments of society. Finally, the integration of the state's public institutions operating in different service areas is necessary in order to provide more services to the citizens (Chan & Looi, 2018). In order to achieve this integration, it is necessary to establish coordination centers. In addition to various coordination centers in Singapore, meetings and forums were organized to facilitate communication between public institutions in order to create a culture of information sharing (Zhang et al., 2017).

2.6.5 Electronic Government Practices in the United States

Although the first attempts towards e-government in the United States date back to the 1960s, it started to appear mainly in the 1990s (Burke et al., 2019). The emergence of the Internet in the 1990s prompted the US government to offer web-based public services to meet societal and economic expectations. Within the context of the "Access America" e-government project, which began in 1993 with the intention of making all government services available online in a centralized location, the US e-government portal "firstgov" was launched in 2001 (Kim & Lee, 2014). In 2002, the first e-government strategy was published in the USA (West, 2014). The e-government strategy has been determined as the primary goal of citizens to receive services through e-government and to facilitate their interaction with the federal state, to increase the efficiency and effectiveness of the state, and to increase the responsiveness of the state to the citizens. In this period, resources of 48 billion dollars in 2002 and 52 billion dollars in 2003 were allocated to information and communication technologies (West, 2014). These expenditures are to transform the state into a citizen-centered e-government. The expected results from this strategy can be expressed as follows (West, 2014):

- Facilitating service delivery to citizens,
- Reducing the levels in the state administration,
- Citizens, businesses and other public institutions have easy access to information and services offered by the federal government,
- Ensuring the achievement of other targets on the agenda of the Presidency,

- The acceleration of processes in order to respond quickly to the needs of the citizens.

"firstgov", the e-government portal of the USA, was transformed into "USAgov" in 2007, and the portal is a comprehensive database of over one hundred online services that connect state and federal administrative units (Kontos & Zimmermann, 2018). In addition, USAgov is frequently updated and customizable according to user type and search characteristics. The existence of privacy policies and compliance with access standards are common features of US sites. In addition, audio and video content opportunities were also offered to those who benefit from public services (Burke et al., 2019) The Digital Government Strategy was published in 2012 under President Obama (Burke et al., 2019). With this strategy, it is aimed to ensure that American citizens can access public services without time and place restrictions, to increase the mobile workforce, to make public services more rational, to increase the quality of services and to encourage innovation in all segments of society.

3. Theoretical Framework

In this chapter, the e-government concept from a theoretical perspective is analyzed in order to make some proposals for the Azerbaijani case of e-government in the next chapters.

3.1 Electronic Government Concept

E-government, often known as electronic government, implements ICTs in governmental management. Concepts expressing the use of information and communication technologies in public administration, together with the concept of e-government, "digital government," "virtual government," and "wired government," are used interchangeably. However, the concept of e-government dominates the field and is used more sedentarily (Fang, 2002). It is not possible to find a universally accepted definition of the concept of e-government in the literature. Each area looks at and defines the concept from its perspective. Definitions differ not only regarding meaning but also at national and international levels in terms of reflecting the technical point of view and the premises of e-government. These differences make it difficult for the concept of e-government to reach a definition everyone accepts. However, e-government definitions generally include one or more elements such as technological tools, application areas, citizens and stakeholders, and the active role of the state (Garcia & Pardo, 2005). Developing e-government applications worldwide under the leadership of developed countries contributes to realizing public services in the digital environment and increases efficiency and transparency in services. In this way, it is ensured that citizens can do most of their work and transactions over the digital environment independently of time and space, and time losses due to bureaucracy can be prevented.

3.2 Purposes of E-government Applications

The primary purposes of e-government applications are to make the services offered to the public more transparent and to operate in less time and effectively, not to discriminate in the participation of people in management, to prevent information pollution by ensuring the smooth flow of information between institutions and organizations, to facilitate life with technology and to make decisions based on data. Developing and accelerating the acquisition

steps (Janssen et al., 2019). The expected benefits, if these are realized, are as follows (Alzahrani et al., 2019):

- Saving time by accelerating processes,
- Reducing costs and increasing efficiency,
- Increasing the satisfaction of employees and users,
- Providing support to economic growth and development,
- Improving the quality of life and increasing the individual participation of the citizens,
- Reduction in stationery costs,
- Reducing human-induced errors to the lowest level,
- Developing the relationship between citizens and the state, creating an environment of mutual trust, and developing a citizen-oriented service understanding

As seen above, with the transition to e-government applications, it is expected that the speed and efficiency of business processes will increase as a result of the communication between the state, citizens, and other institutions, the provision of services, and the active use of information technologies in information flow (Baroudi & Al-Dabal, 2019). However, it is seen that it provides significant economic savings in many items.

Accessing the government in the environmental environment in the traditional state can be a problem, especially for citizens in some remote areas. E-government can significantly increase citizens' access to government information and services (García-Peñalvo & Álvarez, 2020). For example, in the e-government approach, citizens can receive various information regardless of geography through the government website and easily convey their opinions via e-mail. In addition, citizens can easily express their views in online meetings and forums (Demirkan & Spohrer, 2019).

3.3 Interaction Between Electronic Government and Citizen

In particular, the development of information and communication technologies, the internet, has significantly contributed to the capacity of citizens, the business world, and the state to communicate and interact with each other. With the increase in information and sharing,

citizens become aware of the developments around them more intensely and quickly compared to the past. They can make detailed assessments of the activities of the state. Thanks to the opportunities provided by technological developments that prevent states, citizens, and the business world from being indifferent to their expectations, wishes, and needs and enable them to turn to new structures based on interaction (James & Koon, 2020). Although it benefits governments and businesses, citizens benefit most from e-government services (Evans & Yen, 2006). Government-to-citizen apps are designed to facilitate government and citizen interactions (Dawes, 2012). These practices focused on the potential of government and citizens to communicate information effectively and electronically with each other (Jeager, 2020). State-to-citizen practices are one of the areas on which the state, which wants to provide effective and efficient services to its citizens residing in different parts of the country, focuses the most (Ndou, 2020).

The state and citizens are in constant interaction in all areas of life. Citizens interact with different service institutions, from judicial services to land registry services, education services to tax procedures, and military service to civil registration (Rana et al., 2013). The relations between all units providing public services and citizens can be considered (Woiceshyn & Daellenbach, 2018). The concept of e-government means delivering public services in a higher quality, effective and efficient manner. Increasing the quality of public services, providing services to all segments of society at the same standard, and sharing all publicly available information with its citizens will strengthen the state-citizen relationship as an indicator of the development of transparency (Zhou & Congyang, 2018).

3.4 Electronic Government Development Models

The fact that e-government has passed through different stages and reached its current position indicates a process. In this development process, which is called the "evolution model" or "maturity model," each stage represents a more complex and comprehensive service provision for citizens (Schwester, 2009). There has yet to be an agreed model for the development stages of e-government in the literature. It is possible to extend the list of academics and organizations working on the development stages of e-government. However, this study examines various developmental models generally accepted in the literature. Reddick's (2004) e-government development model consists of two phases: "information cataloging" and "processing ."The first growth stage, information cataloging, involves

providing non-transactional information about government activities online (Reddick, 2004). In this way, public officials save time and money by delivering the answers to the fundamental questions they answer about the procedures of permanent service to the citizens (Reddick, 2004). It is the stage where citizens can pay their taxes, penalties, and fees through online databases at the transaction stage (Reddick, 2004). At this stage, which provides a more effective service to the information cataloging stage, citizens can perform their transactions without going to public institutions and waiting in line (Reddick, 2004).

Based on its technical, organizational, and managerial feasibility, Layne and Lee (2008) proposed a four-stage model that views e-government as an evolutionary phenomenon. The four phases are catalog, transaction, vertical integration, and horizontal integration, as discussed below (Layne & Lee, 2008). During the catalog phase, some static and fundamental information is provided through their website. The transaction phase enables people to execute certain basic operations online, such as submitting government forms and increases the catalog's search capabilities (Layne & Lee, 2008). Rather than just automating current procedures, it begins restructuring government services at the start of the vertical integration stage. Its primary goal is coordinating emergency services across jurisdictions (Layne & Lee, 2008). During the horizontal integration stage, the process focuses on bringing together disparate parts of the infrastructure to finally work together to provide the end users with a seamless experience (Layne & Lee, 2008).

The United Nations considers the development of e-government with a five-stage model. These stages are "emergence," "enhanced entity," "interactive entity," "transactional entity," and "networked entity" (Schwester, 2009). Emergence is the first preparation stage for e-government services representing limited and simple information (Schwester, 2009). At this stage, access is provided to various government agencies through an official web page, a national portal, or an official page (Schwester, 2009). In the enhanced existence stage, e-government is limited to providing one-way information to citizens, although it offers some new services. The third interactive presentation stage is a relatively more advanced stage. At this stage, audio and video facilities are provided for easy downloading of information over the internet, secure access, digital signature, and public information (West, 2004). In the operational entity stage, the fourth stage of e-government development, citizens can perform their transactions 24 hours a day, seven days a week. At this stage, it is possible to carry out transactions such as tax transactions and traffic fines over the internet (West, 2004). The

networked entity stage, the last stage of e-state development, is the highest development mode. At this stage, there are also consultation and collective decision-making mechanisms (Zhou & Congyang, 2018)

3.5 Problems Encountered in E-Government Application

While e-government offers various advantages to public institutions and citizens, it also contains multiple problems. For a successful e-government initiative, undoubtedly, problems must be correctly identified and overcome. The issues related to e-government vary from country to country and also differ in different regions within the same country. At this point, the question of the problems associated with e-government arises. In the literature, various academicians have handled and examined the issues related to e-government in different dimensions. Garcia and Pardo (2005) describe the main problems in electronic government applications as 1) information and data challenges, 2) information technology challenges, 3) organizational and managerial challenges, 4) legal and regulatory challenges, and 5) organizational and environmental challenges. It is possible to extend the list of studies on the problems of e-government. However, this approach makes it difficult to draw a general framework. Each researcher has found and focused on different vital points regarding the problems from their perspective. Rana et al. (2013) systematically analyzed the critical challenges and barriers to e-government adoption. From a total of 448 papers on e-government acceptance research, 78 were chosen for this study because they were the most relevant in examining and analyzing pertinent issues, hurdles, and essential success elements (Rana et al., 2013). Articles published between 2000 and 2011 were analyzed to identify the most significant supply- and demand-side issues, barriers, and crucial success factors (Rana et al., 2013). The most common challenges and barriers encountered throughout the related studies were about three times the supply-side (i.e., implementation) challenges and barriers to demand-side challenges (Rana et al., 2013).

Barriers were found in the form of technology, lack of security and privacy, lack of trust, lack of resources, digital fragmentation, inadequate management and infrastructure, a lack of knowledge, legal hurdles, a lack of IT infrastructure, and a lack of adaptability (Schwester, 2009). Further, it has been discovered that aspects such as citizen happiness, information veracity, security, and privacy are crucial to the success of e-government programs (Rana et al., 2013). In this context, the problems related to e-government can be listed as follows;

Technological and Infrastructural Problems: Technological and infrastructural problems are among the most critical issues for e-government applications. There needs to be more infrastructure for e-government programs in many underdeveloped nations. Because of this problem, e-government projects often fail, sometimes spectacularly. When attempting to adopt an e-government system developed in a developed nation in a developing country, Heeks (2003) argues that failure is widespread. Massive expenditures in infrastructure are needed for e-government projects. E-government is not only about equipping public institutions and organizations with simple technological tools such as computers and faxes (Heeks, 2003). Only when the developments in information technologies lead to new opportunities in political and decision-making processes, do investments in information technologies, lose their functions quickly, and make it necessary for the public to keep up with the changes (Dawes, 2012).

Security and Privacy Issues: Security is at the forefront of the issues to be considered in all processes, from the e-government initiative's planning to its implementation. It is emphasized that all stakeholders, including e-government, public institutions, the private sector, and citizens, are successful when they feel comfortable performing confidential and sensitive transactions (Torres et al., 2005). Security problems arise both in e-government transactions and in all other transactions made in the electronic environment. Moreover, developing nations confront security threats, unlike those in more industrialized countries. In this context, the state should effectively structure security measures to prevent third parties from using the personal information of its citizens. Another problem area for e-government is privacy (Siau & Long, 2005). Many nations' constitutions, international treaties, and conventions protecting human rights and the right to privacy recognize the privacy of an individual's personal information as a fundamental right in a democratic society (Siau & Long, 2005). The slightest concern about who will see their personal information and how they will use it means that individuals who carry out their transactions in the electronic environment have lost their fundamental freedom. Third parties privy to a person's personal information are better positioned to steer their decisions and pass judgment on them. Knowing and managing how personal information is shared, transported, and utilized is crucial to safeguarding privacy (Rahman, 2007)

Insecurity: The phenomenon of trust is the basis of all social relations. In this context, therefore, faith also plays a crucial role in state-citizen relations. Since the 1960s, it has been

claimed that citizens' trust worldwide has decreased in the state, indirectly in public institutions and organizations (Jeager, 2020). In this context, it can play a leading role in regaining trust with the transparent management approach offered by e-government. However, transactions made on the internet, especially in the electronic environment, bring various risks. Reducing these risks can reduce citizens' lack of confidence. To establish trust in e-government, citizens' perceptions of various factors that feed their trust should develop in a way that will increase trust (Rana et al., 2013).

Insufficient Resources: The state, which is struggling to meet social needs with scarce resources, is to meet all needs, from education to health, from security to justice, through the budget consisting of taxes collected from citizens and other incomes (Fang, 2002). The delivery of government services is just one area affected by the proliferation of digital media. Developing or developed countries are open to this change and transformation and invest in this area. Developed countries are more advantageous than developing countries in terms of their economic and knowledge and technology production skills, and they make significant investments in this field (Carter & Belenger, 2005). In this context, the start of e-government initiatives in the USA and the excellent level of economy and technology of the countries that have made progress in the provision of public services in an electronic environment can be given as examples (Carter & Belenger, 2005). Although there are various advantages, the need for more resources for information and communication technologies, especially e-government initiatives, has become a common problem for all states. E-government applications require advanced infrastructure and technology to provide security; therefore, the cost of infrastructure, software, and hardware for public institutions is still a big problem (Evens & Yen, 2006). In addition, the maintenance and repairs of the investments also create additional costs. For this reason, public institutions evaluate the price according to the benefit, and adopting the technology with a lower cost is likely. In addition, public institutions may decide to use outsourcing if their resources are insufficient to implement e-government applications (Evens & Yen, 2006).

4. Research Design and Methodology

This study aims to answer the research question: "How to increase the usage of ASAN signature in the Azerbaijan e-government?" In this study, an inductive research approach was employed. Inductive research aims to generate and evaluate hypotheses about a problem or condition via careful observation. Inductive research commences with obtained data and utilizes it to form a theory on what contributed to the data (Woiceshyn & Daellenbach, 2018). Because of this, inductive research could be a valuable tool for understanding patterns that impact certain attitudes. Sharp observations are frequently the starting point for inductive study, which develops into an overarching concept or hypothesis. The purpose of inductive research techniques is to construct a hypothesis (Woiceshyn & Daellenbach, 2018). Researchers have greater leeway in inductive research since they are not constrained by a theory when they evaluate the evidence. As new information is uncovered in research, adjustments may be made if necessary.

The research design of this study is described below:

According to Figure 5, this research uses ASAN Signature in Azerbaijan as a case study. In addition, inside the case study research methodology, the structured interview technique as one of the qualitative research methods as a primary data collection process was used in the study.

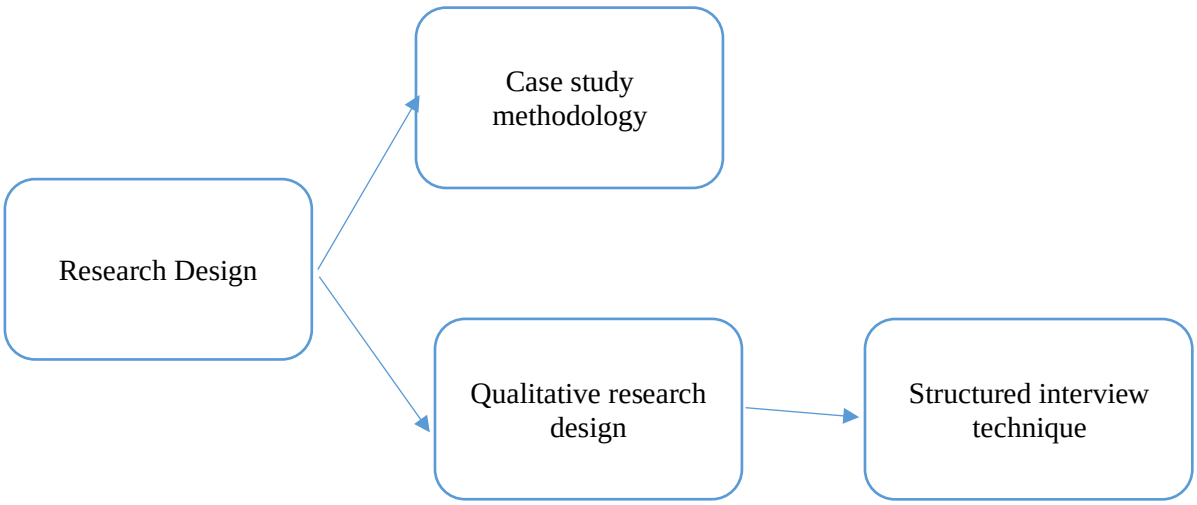


Figure 1: Research Design

Case studies are a kind of study that, by looking at a topic from several perspectives, might potentially shed light on it. It's a common research technique in many disciplines, notably

the social sciences (Yin. 2018). When the researcher wants to learn more about a certain topic, event, or phenomena in his own right, the case study method is an excellent tool to utilize (Runeson et al., 2012). The majority of it is biographical, dealing with the person's life up to the present and the major events that have shaped it. Researchers choose techniques of data collecting and analysis that will yield content that is ideal for case studies. Researchers do choose case studies as an end product of their research. This research uses ASAN Signature in Azerbaijan as a case study because ASAN signature is the only e-signature solution of its kind in Azerbaijan, then the researcher focused on that particular solution and its potential. As it was mentioned before, inside the case study research methodology, the structured interview technique as one of the qualitative research methods as a primary data collection process was used in the study. Qualitative interviews are a type of research method that involves the collection of in-depth data through personal conversations with research participants. Qualitative interviews help explore complex issues, gain insights into people's experiences and perspectives, and understand the meanings of their behaviors and attitudes (Guest et al., 2013). The reasons for using the qualitative interview technique are described below:

- Qualitative interviews are useful in exploring participants' experiences and perspectives in-depth.
- Qualitative interviews allow participants to describe their experiences and perceptions in their own words, providing rich and detailed data that can lead to a deeper understanding of the phenomenon under investigation (Rubin & Rubin, 2012).
- By asking open-ended questions and allowing participants to elaborate on their responses, qualitative interviews enable researchers to gain insights into participants' lived experiences and the meanings they attach to their behaviors and attitudes.

Interviews are more suitable than surveys in certain situations, particularly when exploring complex or sensitive topics that require in-depth exploration of participants' perspectives. According to Robson (2011), interviews allow researchers to ask follow-up questions and probe deeper into participants' responses, providing a more detailed understanding of their experiences and attitudes. Additionally, Bernard (2011) notes that interviews may be more appropriate for studying cultural phenomena or social relationships, as they allow for greater flexibility in data collection and analysis. Therefore, depending on the research

question and the population being studied, interviews may provide a more comprehensive and nuanced understanding of participants' perspectives compared to surveys.

The primary data was collected by utilizing an online interview technique between the 10th of January and the 15th of February. The research participants were sent the interview questions online, and they were sent back after answering them in a Word file. The interview consists of eleven questions and four prefilled questionnaires. As a result of data collection, the answers to fifteen interview questions were provided by 20 participants. In Table 1, the purposes of the interview questions which are aligned with the research questions are described below:

Table 1: Relation of the interview questions to the research questions

RQ to be addressed	**Interview Questions**
What are the reasons for citizens to use or not use e-government services?	1. Do you use e-government services? Please, clarify your answer. 9. Do you prefer traditional service delivery or e-government transactions? Why?
What are the factors that affect the usage of ASAN signatures in the Azerbaijaon e-government?	5. What is your opinion about e-government applications in Azerbaijan? 6. What do you think about sharing private information through e-signature confirmation? 7. Do you think e-government applications in Azerbaijan operate safely?
How can ASAN signature system in the Azerbaijan e-government be improved?	4. What is the most complicated thing in your e-government transactions? 10. Do you think the current e-government services are sufficient? If not, how it can be improved? 11. What are your expectations from e-government applications?
General contribution to the interview and research	2. How can e-government applications positively or negatively impact public service delivery? 3. How can you characterize the effects of an e-government system on the functioning of public administration? 8. What are the transactions you use most in e-government applications? Why?

The study's target population consists of Azerbaijani citizens who have used ASAN Signature and Electronic Signature provided by the e-government portal or have yet to use them. The research sample size is expected to be 20 residents (10 citizens who have used ASAN Signature and Electronic Signature provided by the e-government portal and ten

citizens who have not used them) living in Baku. In the study, the convenience sampling method was used. This method, widely used in qualitative research, is practical and easy to perceive for the researchers (Levy & Lemeshow, 2013).

The researcher used content analysis in order to analyze collected data. Content analysis is utilized to find text patterns by categorizing them into words, ideas, and themes. Examining content and its characteristics is a qualitative research method commonly used for content analysis (Gheyle & Jacobs, 2017). Information about the identity information of the participants was requested from them, but anonymous expressions were preferred in the study text. A number was given to every participant, and a naming consisting of male and female will be used while conveying their statements.

I adhered to obtaining informed consent by making the document as clear and easy to understand as possible for participants. Whichever method of conveying informed consent (verbally or in writing) is most practical for the study. Study participants can make an informed decision about whether or not to participate in the research. Respecting the ethics of informed consent requires that the researcher keep careful records of the consent process. File encryption when transferring data and secured filing cabinets are all possible ways to ensure the anonymity of the data. It will also be emphasized that the collected data will not be used for other purposes.

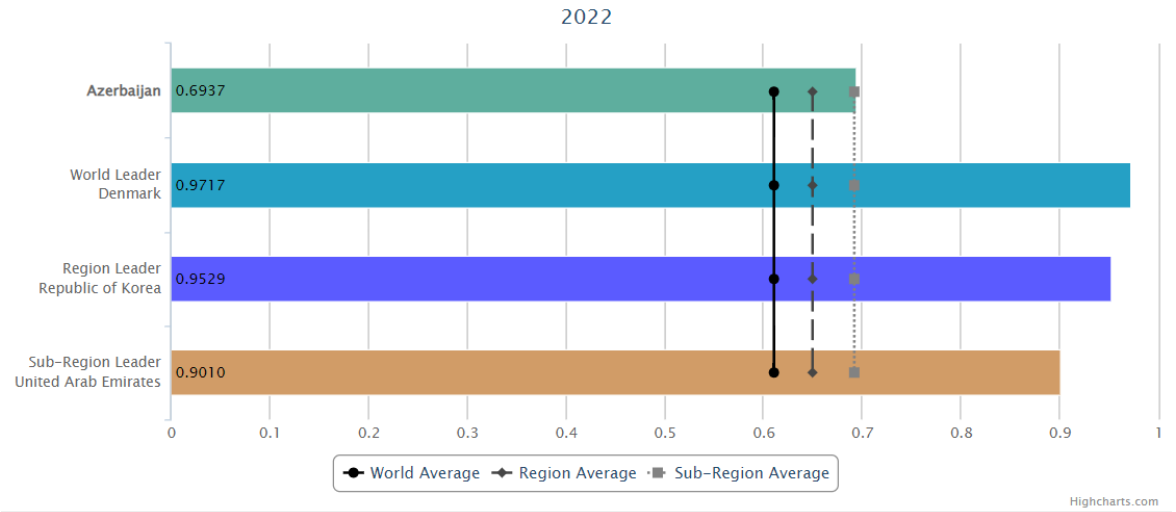
5. ASAN Signature in Azerbaijan: Case Description

In this part of the study, the usage of E-Government Services in Azerbaijan, the economic, organizational and legal foundations of "ASAN Service" formation, the goals and principles of "ASAN Service" organization and the importance of the application of "ASAN Service" for society are analyzed as a case study.

5.1 The Usage of E-Government Services in Azerbaijan

The reforms carried out on the implementation of electronic government in the country have significantly affected the efficient operation of state institutions and private organizations. The approval of the "Regulation on the electronic government portal" and measures related to the expansion of electronic services played an important role in improving the legislative framework in this area and achieving the intended goals (Mahmudova, 2016). State bodies carry out secure information exchange among themselves on the basis of a single infrastructure through the Electronic Government portal. At this time, the "Technical Requirements for connecting information systems and resources, electronic services to the "Electronic Government" portal" approved in May 2014 is taken as a basis (Abbas, 2019). According to the information provided by the Ministry of Digital Development and Transport of Azerbaijan, more than 70 information systems and resources have been identified for the purpose of effective organization of information exchange and formation of an electronic government" (Abbas, 2019).

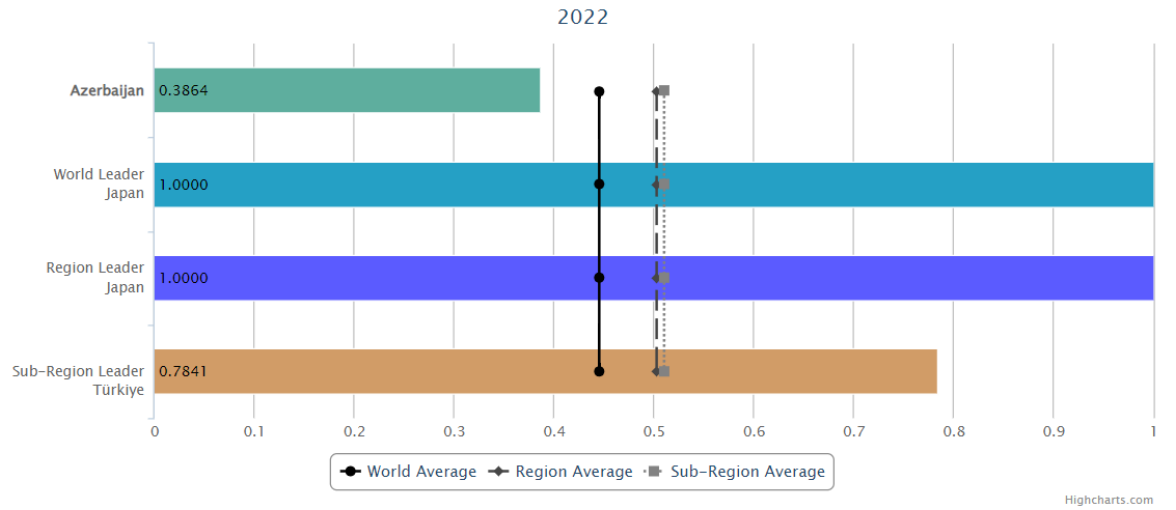
According to the "E-Government Development Index" report published by the UN (2023), in 2022, Azerbaijan fell 13 places from 2020 and ranked 83rd out of 193 countries.



E-Government Development Index	2022	2020	2018	2016	2014	2012	2010	2008	2005	2004	2003
Azerbaijan (Rank)	83	70	70	56	68	96	83	89	101	89	94
Azerbaijan (Value)	0.69370	0.71000	0.65740	0.62741	0.54720	0.49838	0.45706	0.46090	0.37733	0.38607	0.36351

Figure 1: E-Government Development Index in Azerbaijan[3]

Similarly, according to the "E-Participation Index" report published by the UN, in 2022, Azerbaijan fell 25 places from 2020 and ranked 98th out of 193 countries.



E-Participation Index	2022	2020	2018	2016	2014	2012	2010	2008	2005	2004	2003
Azerbaijan (Rank)	98	73	79	47	77	89	68	49	129	123	123
Azerbaijan (Value)	0.38640	0.69050	0.67980	0.67797	0.43137	0.13160	0.17142	0.25000	0.01587	0.01639	0.01720

Figure 2: E-Participation Index in Azerbaijan[4]

Looking at the sub-indices of the Electronic Government Development and E-Participation Indexes in the country, it is clear that although the level of online service and human capital

[3] UN (2023)
[4] UN (2023)

components is considered high, the level of development of the telecommunication infrastructure component is relatively low.

According to the statistics published on the official website of ASAN Signature, the number of ASAN Signature users has increased to more than half a million over the four years.

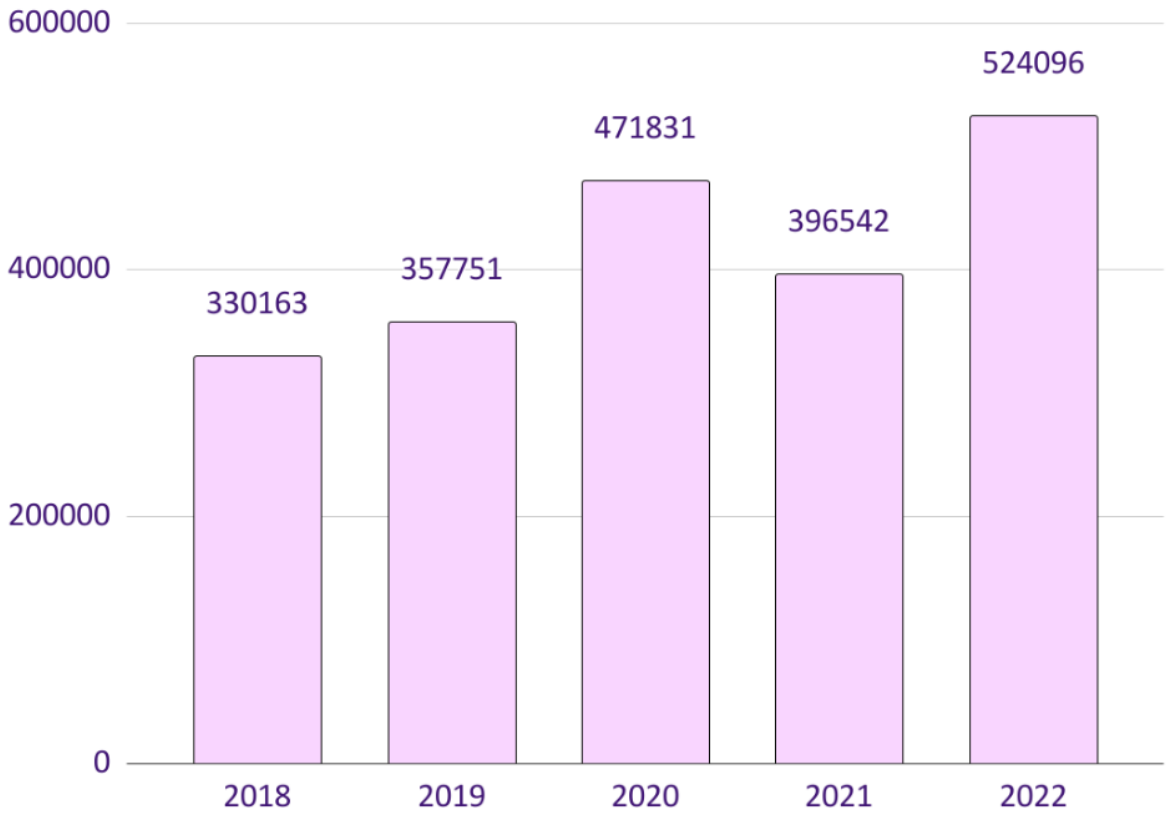


Figure 3: Number of ASAN Signature Certificates between 2018-2022[5]

According to another statistic published in the official website of ASAN Signature, the number of transactions made by using ASAN signatures has considerably increased to more than sixty million over the four years.

[5] asanimza.az

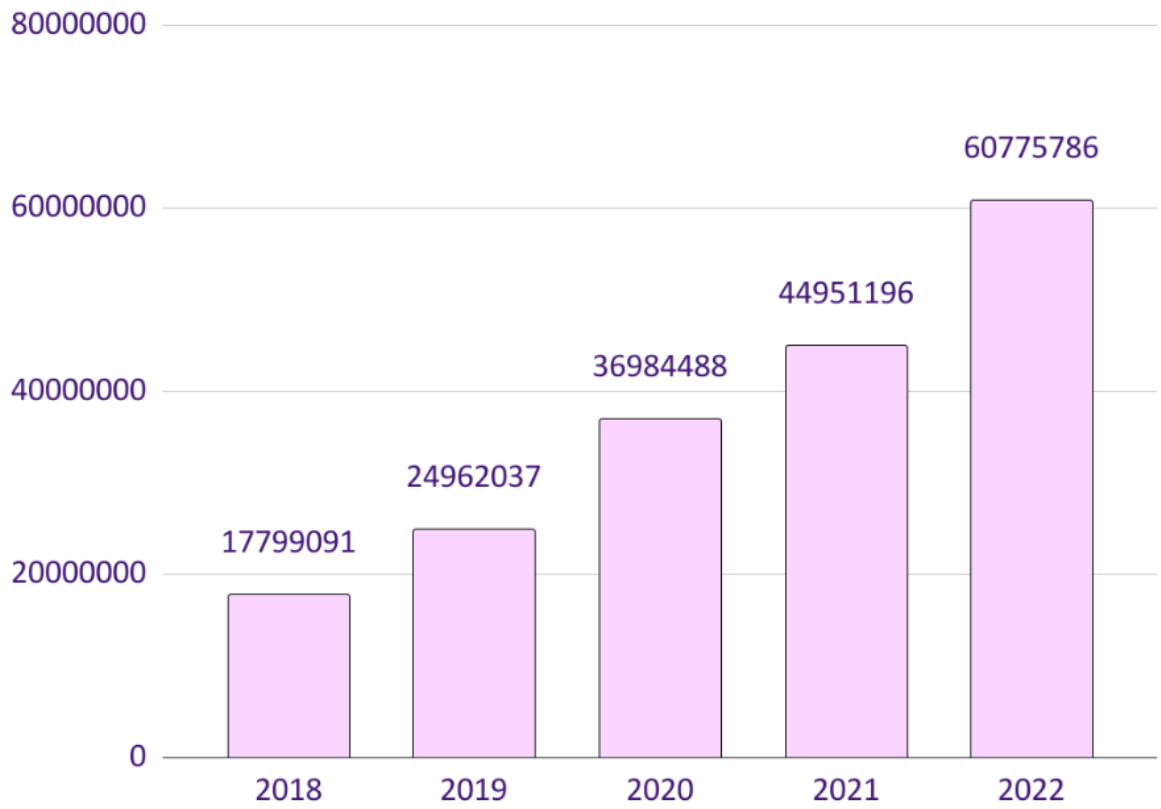


Figure 4: Number of Transactions Made by Using ASAN Signature between 2018-2022[6]

Looking at the list of information systems and resources that should be connected to the electronic government portal, it is clear that the involvement of information systems of most Ministries and a number of important state institutions is planned. In order to ensure uninterrupted information exchange between state bodies, information systems and resources provided by state bodies are registered. It should be noted that a normative-legal base has been formed in this area (Mahmudova, 2016).

The concept also provides for the integration of state information resources and systems on the basis of single technological standards and the formation of a single information space (Mahmudova, 2016). In accordance with the list of information systems and resources to be connected to the "Electronic Government" portal approved by Cabinet of Ministers Resolution No. 118, the information resources of state bodies are integrated into the portal (Garashova, 2018). "Real Estate Registration, Cadastre and Management System", "State Population Register Automated Registration Information System", "Medical Examination Card System", "Automated Tax Information System" and other information resources were created and their integration was ensured on the basis of uniform technological standards

[6] asanimza.az

(Garashova, 2018). The portal has security and adaptation servers of each state body and an Electronic government portal that are participant of the system. These servers play an important role in inter-organizational information exchange and transactions on the portal, preventing potential interference by non-persons and repelling cyber-attacks. In addition, in accordance with the requirements of the law "On Personal Data", in order to present the information collected about the subjects in the information systems to the subject, the section of inter-agency services in the "Electronic Government" system and electronic services for citizens have been created in an informative and interactive manner based on these services (Madatli, 2017). When applying for electronic services, e-signature certificates are used in order to reliably protect the personal data and legal documents of service users and exchange information between state authorities and citizens in a secure environment. The electronic signature is very important in terms of ensuring information security and protecting confidential and personal data, and in order to ensure the use of electronic signature, an Open Key Infrastructure has been established in the country (Garashova, 2018).

5.2 Economic, Organizational and Legal Foundations of "ASAN Service" Formation

One of the terms that has penetrated society in recent times is the concept of "electronic state". Although this term does not yet have a specific definition, many countries in modern times are trying to achieve efficiency and transparency in management through this system. One of such states is Azerbaijan. The most important measure implemented in this field in the country was the introduction of the "ASAN Service" project. The word "ASAN" is formed from the initial letters of the words Azerbaijan Service and Assessment Network in English. In the Azerbaijani translation, it is called Azerbaijan Service and Evaluation Network (Garashova, 2018). It should be noted that "ASAN Service" provides services to citizens guided by the Constitution of the Republic of Azerbaijan, the laws of the Republic of Azerbaijan, international agreements to which the Republic of Azerbaijan is a party, the "Statute on the State Agency", the decisions of the Board of the Agency, the decisions, orders and orders of the chairman of the Agency (Garashova, 2018). The center's director's powers, activities, and work performed in the center, deputies, their powers, activities, and work performed in the centers form the basis of the organization of "ASAN Service". The center carries out its activities jointly with several sectors (Garashova, 2018). Examples of these

sectors are the organization of reception of Citizens, provision of rights of Citizens, organization of Mobile services, Accounting and other institutions (Aliguliyev & Mahmudova, 2018). Each of these sectors performs its own functions. Thus, the first sector ensures the reception and reception of citizens, the provision of information about the services provided in the centers, and the provision of services to citizens in an efficient form. The second sector ensures the provision of services to citizens in the manner established by the legislation, in effective and operational conditions, observing the rules of ethical behavior and turn-taking, and supervises the process of payment of necessary fees in return for the provision of services (Garashova, 2018). In addition, when any unpleasant and illegal event occurs in the center, it takes appropriate measures and offers various solutions to prevent such events from happening. The third sector ensures the interaction of institutions providing services on mobile buses, controls the procedure and environment of service provision and organizes the application of self-service on mobile buses (Garashova, 2018). The fourth sector provides the centers with the necessary technologies and equipment and monitors the proper spending of funds and performs various banking operations (Garashova, 2018). It should be noted that these functions are defined in accordance with the "Regulation on the State Agency". "ASAN" centers have the following rights according to the adopted Regulation of the Agency (Mahmudova, 2016):

- Studying the opinions of the citizens who applied to the center about the conditions created and the services provided;
- Implementation of necessary measures in order to provide services by expanding the application of innovative technologies in the center;
- Making suggestions for the purpose of studying international experience and applying appropriate experience in their activities;
- Implementation of other rights defined by legislation in their activities.

5.3 The Goals and Principles of "ASAN Service" Organization

"ASAN service" project can be evaluated as an Azerbaijani brand, a unique product, and the beginning of a new stage in the management system. This innovation, which belongs to Azerbaijan, allows the citizen to benefit from all the services offered by various state bodies from a single center at the same time. It should be noted that the project was created in order

to achieve citizen satisfaction during the provision of public services. This model ensures transparency in the use of public services by citizens, prevents the occurrence of corruption and implements innovation-oriented and multi-functional services (Abbas, 2019). It also includes the formation of a qualitatively new environment in citizen-official relations. This avant-garde model bureaucracy offers a wide range of simplified services to citizens while strengthening the fight against corruption, and accelerating the use of e-services (Aliguliyev & Mahmudova, 2018). At the same time, the "ASAN service" shows its effective effect in the fight against negative situations, it is of exceptional importance in the application of new and improved standards in public administration.

The goals of the organization of "ASAN service" centers can be specifically grouped as follows (Garashova, 2018):

- Prevention of additional costs and time loss of citizens during the provision of services;
- Establishing a relationship with citizens based on ethical rules and polite behavior;
- Achieving a high level of professionalism;
- Strengthening of trust in citizens' relationship with state structures;
- Increasing transparency during the provision of public services, eliminating cases of corruption;
- Intensification of use of electronic services;
- Carrying out more effective reforms in this area.

"ASAN" activity is based on the principles of promptness, transparency, courtesy, responsibility and comfort (Garashove, 2018). Based on these principles, the centers provide services to citizens in an efficient and transparent manner, ensure the establishment of a relationship with citizens in accordance with the rules of ethical behavior, and the convenience of citizens who use these services is ensured to the maximum extent. Citizens are accepted in the centers on the basis of an electronic queue. Citizens get information about services more easily through electronic boards and signs in the centers (Aliguliyev & Mahmudova, 2018). Also, the center is equipped with computers that can always connect to the Internet. Thus, in the centers, citizens can take advantage of all the electronic services they need. It is even possible to connect to the information systems of other state bodies in the centers. Thus, through the "data center" located in the

centers, it is possible to send information about the necessary documents to the information databases of state bodies without requiring the citizen. Citizens can obtain information about any type of service, necessary documents and queue without coming to the center (Aliguliyev & Mahmudova, 2018). This can be done either online or by phone with the help of the "Call" center (Aliguliyev & Mahmudova, 2018). At the same time, citizens can use the information service through video reception with the help of the call center. It is through these principles that the centers offer more effective, modern and innovative services to citizens. It should also be noted that the direct relationship between state bodies and citizens in the centers has been minimized and the process of transition to electronic services has been intensified. Thus, the factors that cause corruption in the centers have been eliminated.

5.4 The Importance of the Application of "ASAN Service" for Society

As a result of the implementation of the "Easy service" project in society, the population can use better quality and modern innovative services. Through modern and convenient technologies installed in the center, citizens benefit from government services by saving time and money. With the application of this model, positive changes have taken place in people's lives, and citizens' consent has been ensured in society regarding the use of public services. Thus, citizens can now use state services in a more prompt and qualitative form and thus trust in state bodies increases among people in the society. In this regard, the activity of "Asan service" is welcomed by the population. The fact that the satisfaction of citizens applying to the center varies between 98-100% is proof of this (Garashova, 2018). This is not only an approval rating, but also an indicator of citizens' confidence. The services of "ASAN Service" centers are offered to citizens based on the "single window" principle. That is, citizens can use any services of different state institutions at the same time. This reduces the personal expenses of citizens and eliminates time loss. One of the main advantages of the centers is that they provide uninterrupted service to citizens on all days of the week (Mahmudova, 2018).

"ASAN service" also operates in the regions on a mobile basis. Before this model was created, citizens faced problems when they received their social benefits. However, with the organization of "ASAN Service" and "ASAN Mobile Service", it became easier to solve the problems of the people living in Baku city or in the regions (Abbas, 2019). Before the implementation of the "ASAN Service" model, we probably all remember well

that we had to wait for days and weeks to receive a document or reference, and that we encountered certain difficulties. Even citizens living in Baku, but registered in the district, were forced to go to the district to change and re-purchase their ID and driver's license (Garashova, 2018). Of course, many problems and obstacles appeared at this time. However, with the creation of this model, these problems and artificial obstacles were eliminated.

6. Research Findings

In this part of the study, the collected data was interpreted and synthesized under the headings of reasons for citizens not to use electronic government applications, the impact of electronic government on public administration, problems experienced in the use of electronic government, trust in electronic government and use of electronic government, purposes of using electronic government services and main factors affecting it and expectations of citizens from electronic government applications.

6.1 Reasons for Citizens Not to Use Electronic Government Applications

E-government, which has been open to the use of citizens for more than ten years in our country, has yet to achieve the desired level of success as a result of both supply-side and demand-side problems. In this context, in this study, questions about the reasons for not using e-government and their perceptions of e-government were asked to the citizens who took the transactions made through e-government directly to public institutions and organizations. One of the participants who are not aware of e-government services expresses this situation as follows:

> *"I hear about e-government, but I do not know what processes are being done. I have also heard that a password is required. Of course, there is a situation like this, when we come to the government office, we also do other procedures. I do not know much about the procedures in the public sector anyway."*

The number of participants who stated that they have heard of e-government but prefer to go to public institutions is high. The participants indicated that they did not know the processes in public administration and learned how civil servants should do the procedures when they came to public institutions. Some statements that support this view can be listed as follows:

> *"I sometimes see e-government on the internet or television. I did not receive the password. If the transactions were on e-government, there would be fewer queues. I have had transactions in public institutions since morning; there is a queue at every institution I go to. If I did not ask the officials, I would struggle for three days how the transactions would be done."*

"I know about e-government. However, I am still determining how things will be. When my transaction is completed in one institution, they refer me to another."

"I heard when they said I should take a queue from e-government. I carry out my public transactions after getting information from public institutions."

"I saw it in a friend, not myself, but another institution did not accept the document he received from the e-government. I also do not use e-government, partly due to habit and partly because I do not know about bureaucracy."

It has been observed that security problems, which constitute an important problem area in the use of e-government, are effective in the non-use of e-government. The majority of the participants need to find using e-government reliable. Some expressed this situation as follows:

"I do not trust. How safe can it be on the internet? Almost every day, there is news that information is stolen over the internet. I see it all around us. Therefore, I do not trust transactions made over e-government."

"There are problems even in everyday transactions. How can we avoid the transactions we make over e-government? Sometimes I see it on the news because e-government has collapsed."

The lack of knowledge or access to the internet and computer use, the biggest obstacle to using electronic e-government, was found at a low rate among the participants. Most participants over 50 and in the low-income group stated not using the internet and computer among the reasons for not using e-government. They expressed this situation as follows:

"If I understood computers, I would never come this far. We are waiting in line and have a financial loss apart from this. We are coming, even if processing takes a few minutes."

"I guess I cannot. I could not even use a smartphone. I do not have any information on how to make transactions through e-government."

"On the Internet, I guess. I do not have internet at my house. There is nowhere I can reach. Frankly, we are forced to come."

The fact that the participants aged 50 and over do not know how to use computers and the internet is an essential obstacle in using e-government. However, the inability of low-income groups to access computers and the internet has become a critical problem in the use of e-government. The rate of participants who stated that the internet pages of public institutions and organizations were mixed or bad remained low.

6.2 Impact of Electronic Government on Public Administration

In the relevant literature, while the positive impact of e-government applications on public administration is discussed, it is emphasized that the reduction of bureaucracy, the acceleration of transactions, the increase in service quality, and the development of a transparent public administration approach. In this context, users were asked about their positive and negative views on how e-government provides public services and the functioning of public administration. By answering the question, **"How can e-government applications positively or negatively impact public service delivery?"** 80% of the participants stated that they had positive effects, and 20% mentioned that they had both positive and negative effects. The vast majority of users noted that access to public services has become possible regardless of time and place. Public services have become more accessible without intermediaries. Also, service quality, time savings, and transaction speed have been improved, while nepotism was largely prevented. Some statements that support these views can be listed as follows:

> *"First of all, I think the quality of service has increased. On the other hand, I am a tradesman; I can only sometimes leave my workplace and go to government offices. With e-government applications, I can handle my weekend transactions regardless of working hours. E-services save me both time and money."*
>
> *"I can explain it this way. I started university in 2010. In the same period, I applied for a loan from a credit institution, and the loan was issued. I went first to the notary public and then to the provincial directorate of the credit institution to arrange the necessary documents to get the loan. Many queues were in the notary and directorate, so I dealt with these transactions for two days. Later, when I went to the bank, I came across it in the same order. I graduated in 2014 and started my master's degree in 2015. I applied for a loan again. The system had changed, and I signed a contract via e-government. This process took a short time, about 3-4 minutes. When I look at it from this perspective, e-government provides serious advantages in terms of time, money, and speed." (Women-26, 26)*
>
> *"I work in a private bank. Therefore, the working hours of banks and public institutions are almost the same; I cannot get permission constantly. I do not need to go to an institution with e-government. Today, citizens interact more with public institutions. These interactions are valid for me; whether it is payment or other*

transactions, I must go to public institutions constantly. Transactions on e-government benefit me in many ways."

The participants, who think that it may have a negative impact, stated that the segments of society who cannot access the internet and use computers, smartphones, and other communication tools might have difficulties. The rate of participants who stated that it might confuse is lower. Some statements that support these views can be listed as follows:

"I am not someone who understands the internet and computers very well. Therefore, I come to public institutions and do the transactions. Technology is a blessing, but older people like me cannot adapt to these jobs."

"I think that e-government can have positive effects as we can process transactions without coming to public institutions. However, it can be information, or e-government can be explained with a public service announcement. For example, I do not know what is in e-government."

"It certainly has positive effects. For example, there is no waiting in line. Nevertheless, as a society, we are also strangers to public transactions. You will receive a document; the document's name has changed, or that transaction has been removed, and another transaction has arrived. A solution could be found for these as well.

"I do not know about e-government. I was told to take a queue from an institution via e-government. Believe me, I had a hard time until I completed my process."

All participants, who think that the e-government system positively affects the functioning of the public administration, show a similar attitude that the speed of public services and financial savings will increase, and bureaucracy will decrease.

The participant who works in the private sector and thinks it may adversely affect service delivery stated, *"the elderly, the disabled, or the segments of the society who do not know how to use the internet may have difficulties* ."Another participant, working in the private sector, stated that *"it can confuse."* Most participants, who thought it could have a negative effect, highlighted that there might be "security problems."

While most users answered, **"How can you characterize the effects of an e-government system on the functioning of public administration?"** that bureaucracy would decrease, savings would increase, transactions would accelerate, the workload would reduce, and public services would become permanent. Mentioned answers came from those who stated that public administration would be more transparent, public services would be more

auditable, paper consumption would decrease, and public administration would be more egalitarian. Comparing the situation before and after public services are provided in the electronic environment, the participant states that some social segments come intensively in specific periods. Nevertheless, there is a decrease in these segments with e-government services, and these services also affect the functioning of the public administration positively:

> *"I have been a civil servant for 20 years; of course, there was no transaction in the electronic environment when I started. At that time, citizens came to public institutions and completed their transactions, whether doing routine work or other transactions. For example, a criminal record is given via e-government. In particular, young people who have just started university and university graduates have been coming less frequently in the last few years compared to the past. Criminal record registration and other transactions are highly demanded during certain periods when schools are opened or closed. This process alone prevents the formation of long queues. I can say that the officers' workload has slightly lightened."*

Most users state that they can accomplish transfers with e-government transactions without going to public institutions. Therefore, there will be no congestion in public institutions, the savings and the continuity of public services will increase, and the workload and bureaucratic processes will decrease since the transactions are in an electronic environment. They expressed this situation as follows:

> *"Even for the most straightforward transactions, many signatures are required, or it may be necessary to approve it by different units. During my university years, I was required to go to various departments to get a signed student certificate. I think it is the same in other institutions. Even if you do not take any action and go to a public institution to get information, you can wait in line. E-government has partially eliminated this. In this way, bureaucracy can be eliminated.*
>
> *"It has a lot of positive effects. Paperwork is decreasing, and transactions are happening faster. However, in my mind, the important thing is to save money. Reducing paper consumption is an important thing in itself. We should not just look at it as paper. Machines consume energy, maintenance, and repair; we can also add these. There is even staff who only take care of photocopying."*
>
> *"Electronic government services are just developing in our country, in my opinion. I see some benefits in terms of public administration. For example, the concept of*

service called 24/7 is developing. Bureaucracy is decreasing. Today goes, and tomorrow disappears. Complaints or requests can be made, which is excellent; when encountering a problem, you can find a solution directly. The torpedo is also being prevented."

Participants who stated that with the e-government application, the public administration would carry out its transactions with less paper and that it would cause less damage to nature expressed this situation as follows:

"The state makes a significant part of paper consumption in our country. In public administration, transactions must be written so that e-government will reduce paper consumption in public administration. This situation should not be viewed only from an economic point of view. After all, paper is produced from our natural resources, namely trees. I see the less paper consumption, the less harm to nature."

"Transactions can be made from an economic point of view, that is, with less cost. Cost redundancy not only saves money, but I can say that the demand for trees may decrease a little bit."

6.3 Problems Experienced in the Use of Electronic Government

The shortest dialogues during the interviews were about the problems experienced in using e-government, that is, the problems they encountered in using e-government, both before receiving the service and during the service procurement. Considering the answers in this context, most of the participants stated that they did not have any problems with using e-government. When we look at the participants' responses, who said that they have problems with the question, "**What is the most complicated thing in your e-government transactions?"** the answers to the problem of access and failure of the system come to the fore. In contrast, the rate of those who stated that the waiting times are long is relatively low. The participants who mentioned problems stated they had no complications with calling public services after the new interface design. The participants, who said that they have no issues with the new interface, think that their access has become more accessible by grouping the services under different categories and the ease of searching. One of the participants expresses this claim as follows:

"I have been using e-government almost since it was first used. The problem I had until today was that there was no easy access to the public services provided. You will receive a document. You had to do a few things. Now the system has been

changed, so it is possible to search with a word for whatever you want to do. Let me add that they have also separated public services, which is very good in terms of use.

Regarding the most frequently mentioned access problem and the problem of system failure in transactions made via e-government, users stated that this problem occurs in a certain period, partially or temporarily. Particularly in some periods, users have frequently expressed that the system does not work entirely or partially due to the intensity of demand for public services. Again, users stated that the system's error in transactions is temporary. Some statements that support this view are as follows:

"Sometimes, but not always, e-government collapses. There may be an application or registration procedures related to the university. During this period, I cannot log in or perform transactions even if I log in to the system. It does not take a day at most, maybe not even that long."

"I can list the most common problems I have with e-government as being unable to log in to the system and giving an error. I rarely experience the problem of needing help logging in to the system. In some operations, I need to repeat the operation. I do not have these problems much, but these are the most important ones."

"The process takes a little longer than my problem. Apart from this, there is an access problem on days when e-government collapses, but it is usually short-lived."

Participants frequently emphasized that the e-government system is entirely or partially closed due to the intensity of application, registration, or inquiry processes in specific periods in Azerbaijan. However, slow or late processing of transactions on days covering the same periods is among the problems faced by the participants.

6.4 Trust in Electronic Government and Use of Electronic Government

The most crucial factor in the success of e-government applications is minimizing security problems. It is frequently emphasized that e-government applications will be successful if they are deemed "safe" by public institutions, the private sector, and all segments of society. In this context, users were asked whether Azerbaijan's e-government system works safely, security concerns in the transactions, and how e-government applications affect trust in the state and public institutions. To answer the question **"What is you opinion about e-government applications in Azerbaijan?"** it has been observed that the participants, who think e-government applications operate safely, have "not encountered any problems so far,"

which is effective in their thoughts about safe operations. Users who think that e-government applications do not work securely believe that the system over the internet will always pose a risk. In addition, it can be said that the news in some press and media organs is vital in having wings.

One of the participants, a doctoral student, thinks that e-government applications work safely. He expressed the opinion that there is no adverse event in terms of e-government security in Azerbaijan and that some media organs reported that the identity information of citizens was stolen, which was done intentionally. He expressed it as follows:

> *"It works well. Until today, I have never heard of nor encountered a security problem related to e-government. There is a licensed anti-virus program on my computer, but when I log in to the e-state system, the program is disabled. I see on news sites the news that 50 million citizens' identity information has been stolen. The same news has been for years; some news sites say it was stolen from the e-government. This news is false and made on purpose. I think it was done to mislead the citizens."*

Some statements that support this view are as follows:

> *"It works safely, and the state would not make this system anyway if it were a problem in terms of security. In my opinion, citizens can learn many things thanks to the e-government system. There is a mobile line inquiry system; thanks to this, we can check whether the line has been opened on us, so if it is, we can start the transaction immediately. When you look at it from this perspective, the e-government system provides our security."*
>
> *"It is protected by professional software; it works safely. In our age, safeguarding personal information is very important, but it is not right to exaggerate this. We use a credit card, and there is a risk of being copied or stolen, so do we say no? This example can be applied to the case of e-government; I trust the government.*

Another tradesman participant thinks that the e-government needs to be fixed in Azerbaijan. He emphasizes that the news in the press and media organs is effective in his distrust of the participatory system. Some statements that support this view are as follows:

> *"I do not believe that this system works safely in our country. The rumors about the stolen information of millions in the recent news can be realized soon. Furthermore, unfortunately, these reports were not denied either."*
>
> *"I think it is working because a system can steal the information of even world-famous companies or on the internet. In our country, thousands of people have*

obtained information, and a company was established or fraudulent. There are publications in newspapers and news that our personal information can be stolen almost once a week. However, this fact does not change the fact that e-government is a useful field for me, so I use it even if it is at any risk."

"I do not think it is working. We, as a country, could be better at technology. Let alone in the USA, even in countries such as Japan, people's information is obtained or manipulated over the internet. This manipulation does not necessarily mean it can be taken from outside and inside."

"I do not think certainty operates safely. I am not just saying this. Look what happened to the news in the past. That alone is a reason."

A striking point in the interviews can be seen in the answers the participants gave to the question, **"What do you think about sharing private information through e-signature confirmation?"**. Participants showed similar attitudes in both questions. While the participants stated that e-government applications in Azerbaijan work safely, there is no security concern in their transactions via e-government. In contrast, the participants who indicated that e-government applications in Azerbaijan do not operate securely stated that they have security concerns in their dealings with e-government. To answer the question **"Do you think e-government applications in Azerbaijan operate safely?"** most participants who did not express an opinion on the question think there is no security concern in the transaction dimension. One of the participants, who is a university student, comments on this issue as follows:

"I do not have any security concerns in my transactions via e-government. For example, we apply for the exam, there is a confirmation code or the same for other transactions. I think this is more a case of public institutions. Ultimately, the responsibility for the public service provided rests with public institutions. If there is a problem, we can prove our action."

One of the frequently emphasized benefits of e-government applications is that e-government will reinforce trust in public institutions and ultimately increase confidence in government. In this context, the question "How do you think the e-government application affects the trust in the government and public institutions?" was asked to the users. While 70% of the participants stated that e-government applications would increase trust in the government and public institutions, 30% said there is no relationship between e-government

applications and trust in government and public institutions and that trust in public institutions depends on other factors.

The participants, who think e-government will increase the trust in the government and public institutions, mainly stated that confidence would increase since transactions are faster and more auditable on the internet, public institutions are positioned in a more transparent structure, and the complaint mechanism works effectively. They expressed this situation as follows:

> *"I graduated from college about 18 years ago. After graduating, I decided to do a master's degree but could not enter. Following or applying for applications in a different city took much work. You cannot see the results of the exams we took or how many people applied with what score. Even if you see it, who will you object to? Now I see, whether on social media or other media, an illegal advertisement or other kinds of things, society immediately reacts, and there is a complaint mechanism. Furthermore, most importantly, transactions are transparent in front of everyone. Even this example increases trust in institutions."*
>
> *"Today, the state's relationship between citizens and the private sector has increased. Because of this, millions of public transactions are made in a day. It is not possible to monitor or control this with the traditional method. I believe that e-government transactions play a key role at this point. At this point, public monitoring of public transactions may be possible with e-government. In this respect, I think the confidence in the public has increased."*
>
> *"I think it increases. Whether it is public tenders or buying and selling transactions, it has become straightforward to follow up online. The same is true for public services. Therefore, both the public and the citizens will have confidence in the area where supervision exists.*

Most users, who state that there is no relationship between e-government applications and trust in government and public institutions, think trust depends on political, economic, and social factors. Again, most interviewees predict that e-government has positive aspects but does not directly relate to trust in the state and public institutions. Some statements that support this view are as follows:

> *"I think that trust in the system can vary according to demographic factors. A person who suffers from any grievance due to the e-government application, for whatever*

reason, will put the responsibility on the other party and will have a severe trust problem.

"I do not have any effect on increasing or decreasing trust in public institutions. See, municipalities are the best example. They are also a part of e-government, but good e-government system practices do not reassure the mayor or the municipality."

"His services to justice via e-government may be outstanding, but this does not increase our confidence in the functioning of the courts or them. I think confidence in this matter depends on other factors."

6.5 Purposes of Using Electronic Government Services and Main Factors Affecting It

It can be said that the usage purposes of e-government differ according to age, gender, education, and employment status. During the interviews, questions were asked about the purpose of the participants in using e-government and the main factors affecting it. In this context, when we look at the answers, it can be stated that there is a similarity in the aims of using e-government by people who experience similar conditions. For example, students intensively carry out examination applications, student document inquiries, and loan and dormitory transactions. Private sector and public employees frequently use transactions related to social security, finance, and justice services.

Considering the answers given to the question **“What are the transactions you use most in e-government applications? Why",** social security and insurance, justice, complaint and obtaining information, telecommunications, education, traffic and transportation, tax fees and penalties and health categories came to the fore, while the e-government application used by all participants was "mobile line inquiry ."Most participants said they have regularly made mobile line inquiries in the last year.

Since information and communication technologies have become more accessible in recent years in our country and the diversity of these tools has increased daily, citizens cannot follow these developments. They are unaware of the risks they bring. Although information and communication technologies have provided great convenience for citizens, telephone fraud, frequently emphasized in the press and media organs recently is among the fraud methods. One of the participants, who stated that she had suffered from the phone line opened on her behalf in the past, expressed this situation as follows:

“There may be a person or persons I do not know; they opened a line for me. I learned this later. After that, I struggled with it materially and morally damaged for a while. From the day I see the mobile line inquiry in e-government, I check it 2 or 3 times a month.

Another critical issue that came to the fore during the interviews was the participants who had a registered vehicle stated that they regularly performed the penalty inquiry and rapid pass system account information inquiry written on the vehicle plate. Participants expressed this situation as follows:

"I constantly drive during the day, so there are times when I violate the traffic rules both in and out of the city. That is why I check e-government in terms of early payment. Also, I do not remember many traffic fines coming to my address. HGS is the same. Consequently, I cross the highway and look at it when I question a fine or go out of the city."

"I am in traffic almost daily, and there is a penalty. I always use it to take advantage of the discount regarding early payment."

“The early payment period expires until the address is notified. Therefore, e-government comes to our rescue in this regard.”

Another prominent point in the interviews is that electronic government is the first choice of all participants in the traditional service delivery and transactions they can make over e-government. To the question, **“Do you prefer traditional service delivery or e-government transactions? Why?”**

all participants stated they would be e-government. In this context, it can be said that the majority of the participants stated that they would prefer e-government, being easily accessible, saving time, and having the opportunity to transact twenty-four hours a day, seven days a week. Some statements that support this view can be listed as follows:

“I prefer e-government. Both in terms of money and time. Unfortunately, e-government is not widely used, so public institutions have a queue even for the easiest jobs."

"E-government would be my first choice. It provides me much convenience regarding access to fast information and time."

“I wish all transactions were via e-government. I do not go to public institutions for transactions that I can do e-government. I am not available in terms of my working hours.”

"Even if you go to public institutions to get information, I prefer to use e-government rather than public institutions for these transactions, which wastes both time and money."

"I prefer e-government. I do not always have the opportunity to go to public institutions."

Participants stated that they prefer e-government because it is easily accessible, saves time, and allows them to transact twenty-four hours a day, seven days a week. The fact that the participants only sometimes have the opportunity to go to public institutions and organizations during the day can be an essential factor in the first choice of e-government.

6.6 Expectations of Citizens from Electronic Government Applications

The expectations of citizens, one of the most important actors of e-government, regarding e-government are of great importance. In this context, the **"Do you think the current e-government services are sufficient? If not, how it can be improved?"** question was posed. While 60% of the users expressed their thoughts on improving the existing services, 40% stated they were sufficient. Most participants who considered enhancing the services said that e-government services have developed in the last few years and that there are more information activities. The vast majority of the participants who find the existing services sufficient consider "the ability to make transactions for them through e-government" as the most crucial factor in finding the services satisfactory. They expressed this situation as follows:

"I frequently benefit from the processes of e-government, which we can now describe as information or inquiry processes. Nevertheless, I think it can be improved. We should be able to obtain information and perform other transactions via e-government. Technology is changing so fast that it seems difficult for public institutions today to keep up with it. We have a huge bureaucracy in our country. Inevitably, this also affects e-government transactions. Until a few years ago, another public institution could accept a document belonging to an institution we received through e-government. Alternatively, while the electronic transactions of a public institution are at an outstanding level, the system of another public institution could be better or works better. I think all institutions should be standardized, and this should be addressed."

"I think it can be improved. These services can be used for transactions from public institutions and other things. For example, it can express ideas or convey our wishes to public institutions."

"Technology is changing every day, and e-government needs to adapt itself to this too. I think the institution providing e-government services and all institutions should support it, and even non-governmental organizations should be included in the process. I think it is necessary to work on reducing bureaucracy and improving the e-government system with trade unions, foundations, or other institutions."

Some participants expressed this situation as follows:

"I am retired. I do not do any other job. The vast majority of transactions I make through e-government are inquiry transactions. It works for me like a traffic ticket or drug inquiry."

"It is sufficient, so all the operations can be done in e-government. Due to some procedures, we have to go to public institutions. Apart from that, more than 2000 transactions that I know can be made in e-government."

To answer the question, **"What are your expectations from e-government applications?"** the majority of users respond to the question as interaction-oriented transactions rather than informational transactions in the e-government system. At this point, while expressing the need, the number of users who cannot explain their expectations from the government is relatively low due to the lack of technical knowledge about both public administration and e-government applications. Some statements that support this claim can be listed as follows:

"In the transactions we make from e-government, we may need to take a document we received from e-government to another institution, apart from inquiry procedures or information processes. We can upload the document on e-government or something else. That is my expectation."

"The public should invest in information and communication technologies. I think that e-government will develop in this way. My short-term expectation from e-government is to be able to perform transactions between government offices."

"My expectation from e-government can be similar to social media platforms. For example, we will be able to upload our photos. Thanks to this, if we need to submit a petition, we can issue it in e-government. It may be in other transactions."

"I don't know much about the functioning of public institutions. The name of the transactions also changes constantly, so I have yet to learn. I do not have any expectations. Nevertheless, it better improve."

"I don't know much about technology. I am using the Internet and a phone, that is all. It is also a situation related to e-government technology, so I have no expectations."

Most participants who are not e-government users were asked, "**What are your expectations from e-government applications?"**. The proportion of participants who had no expectations or did not express an opinion was low. Most participants stated they need to learn how to use e-government and what kind of transactions are made. For e-government applications to be successful, reaching all segments of society and providing the necessary information is of great importance. Some participants expressed this situation as follows:

"I do not know how to use it. More information is needed on this subject. I have heard that you need a password. However, I still need to ask how to get it. I just found out that thousands of public services were being offered. So, if we were to be informed more about this, we would not have to come this far."

"It can be like an advertisement or a brochure. Now we have a job in the public sector that must come immediately. If we know it is in e-government, we will try to do it from there."

7. Proposal to Improve the Usage of ASAN Signature in Azerbaijan

Under this heading, the research and recommendations in this field are listed.

Although e-government applications worldwide are not very long, information technology and e-government applications have been successfully carried out in economically developed countries. At this point, the experiences of developed countries should be utilized while implementing e-government applications. Despite the fact that each country determines different goals and strategies regarding e-government, it is frequently emphasized that similar problems may be encountered in the establishment and operation phase of e-government. Azerbaijan has experienced similar conditions with many states in transferring public services to an electronic environment and e-government. Even though the studies on e-government in Azerbaijan do not date back a very long time, it can be said that it has made a lot of progress. E-government applications, based on speed, efficiency, transparency, and citizen-oriented in business and transactions, have gained particular importance in Azerbaijan in recent years. Many public institutions have started to use e-Government applications that offer various services.

The "e-government perception" of the participants using e-government applications is positive. It can be stated that users tend to positively impact e-government applications both in delivering public services and the processes of public services. Very few participants note that they do not use computers, smartphones, or the Internet. Participants who do not use information and communication technology tools are elderly and low-income people. Most participants, who stated that they do not use e-government applications, do not find it reliable to go to public institutions in person and make online transactions.

According to citizens using e-government applications, existing services indicate that public services can be accessed regardless of time and place, access to public services without an intermediary becomes possible, service quality increases, time savings increase, the speed of transactions increases, and nepotism and bureaucracy in the functioning of public organizations will decrease. Along with it, savings will increase, the rate of transactions will increase, the workload will reduce, and public services will become permanent. Very few of the users stated that there might be problems in the delivery of e-government services.

Participants claimed that it might be difficult and cause confusion among the elderly, the disabled, or the segments of society who do not know how to use the internet. While most e-government users stated that they did not have any problems in using e-government, the participants who stated that they had problems noted that the most problematic issue was access problem and system error.

The feeling of trust forms the basis of social relations. The research shows that the participants who use and do not use e-government differ in confidence. It can be said that the trust tendency of the participants who use e-government is high, and the trust tendency of the participants who do not use it is lower. In this context, most e-government users stated that e-government operates securely in Azerbaijan and that there is no security concern in transactions made through e-government. The main factor in the "trust" feeling of the participants who stated that they do not have any security concerns is that they have not encountered security problems before. It can be said that the participants who stated that they have security concerns from the users that the e-government is over the internet and the news in the press and media organs are effective. Again, many users stated that the electronic government would increase trust in the government and public institutions. It can be said that all of the users show a similar attitude in questions about trust and security. It can be said that there is a high tendency among the participants who are not e-government users that e-government does not function securely in Azerbaijan and that e-government will not increase trust in the government and public institutions.

It can be stated that participants who use and do not use e-government have similar attitudes about insecurity. The mentioned insecurity is that e-government applications over the internet will always pose a risk, and the news in some press and media organs is effective. Being easily accessible, saving time, and having the opportunity to make transactions twenty-four hours a day, seven days a week, were the main factors for users to prefer e-government applications.

It is observed that the expectations regarding e-government differ between users and non-users. Users stated that e-government services could be improved as there are more information-oriented processes. Citizens not using e-government services expressed that they should have more information about e-government.

It is seen that the problems related to e-government differ between users and non-users in some aspects and are similar in some parts. The lack of knowledge about "e-government" by the participants who are not e-government users and the distrust of the internet in general

and "e-government" appear as important problem areas in using e-government. Public institutions and organizations play a significant role in eliminating the lack of information. The services offered by public institutions via e-government should be effectively explained to all segments of society. In this context, public institutions should convey their services via e-government to citizens with various advertising tools, especially public service ads. In addition, materials prepared in the form of brochures, information notes, and booklets regarding the use of e-government can be distributed to citizens in public institutions. Insecurity or lack of trust creates a “common” problem for citizens who use e-government applications and those who do not. It is seen that the main factors in insecurity are the news on the internet and some press and media organs. Administrative authorities should take precautions against information that does not reflect the truth on the internet and social media.

One of the problem areas faced by e-government users is that e-government operates late or not at all in some periods. As a result of the intense demand for the service in the application, inquiry, and registration processes that concern the whole or the majority of the society in Azerbaijan, it becomes wholly or partially inaccessible. At this point, two ways can help to overcome this problem. First, in the services predicted to be crowded, a ranking can be made based on the number in the last digit of the users' ID numbers. Secondly, by applying a quota to the e-government service offered based on the "first come, first served" principle, the entire system can be prevented from being accessed.

Some of the reasons why Azerbaijan lags behind other countries regarding e-government development are the problems encountered during the transition to e-government. These can be expressed as the lack of widespread use of the internet, the low rate of computer use, the not having enough knowledge and education in the field of e-Government, the inability of citizens to trust the electronic environment, the lack of functionality and up-to-dateness in the websites of institutions. In short, the infrastructure required for e-Government has not been established. There are not only problems in the transition to e-Government but also with the introduction of e-Government applications. There are some issues both in terms of institutions and citizens. Several changes occur both in the lives of citizens and institutions, and some difficulties stand out along with the benefits obtained while adapting to them. The most critical problems faced by citizens are that citizens do not trust the electronic environment at first. They do not know how to use the internet and computers and cannot adapt to the services in the electronic environment.

Research findings implied that e-signature is not used enough in Azerbaijan, which means that the hypothesis of this study was supported. The reasons for this are described below:

Lack of Awareness: Many people may not be aware of the existence and benefits of e-signatures. Lack of awareness could be due to a lack of promotion and marketing of e-signatures by relevant government agencies and private companies.

Low Digital Literacy: Azerbaijan may have a significant portion of the population lacking the digital skills to use e-signatures effectively. Being could be due to a lack of access to digital devices, limited education, or a lack of training programs that teach digital skills.

Limited Legal Framework: Azerbaijan has an incomplete or inadequate legal framework that regulates the use of e-signatures. Without clear laws and regulations that recognize and support e-signatures, people, and organizations do not feel confident or secure in using them.

Limited Infrastructure: Azerbaijan does not have sufficient technological infrastructure to support using e-signatures. No proper infrastructure could be due to a lack of investment in digital infrastructure, limited internet connectivity, or inadequate software and hardware systems that enable e-signature use.

Returning to the main research question, "**What can be done to increase the usage of ASAN signature in the Azerbaijan e-government?"** the following recommendations can be made:

Increasing awareness and trust: One of the main barriers to adopting e-government services is the lack of understanding and trust among citizens. Therefore, the government of Azerbaijan needs to launch awareness campaigns to promote e-government services and communicate their benefits to citizens. These campaigns should address citizens' concerns about data privacy and security and provide clear and user-friendly information about the e-services available.

Improving accessibility: In order to increase the usage of e-government services, it is essential to ensure that they are accessible to all citizens, regardless of their location or level of digital literacy. The government should work to improve internet connectivity and provide training programs for citizens to develop their digital skills.

Enhancing service quality: Security is a major concern for people using e-government services. The government should ensure that all e-government services are secure and that users' personal information is protected. The quality of e-government services is a crucial factor in determining their adoption and usage by citizens. The government should ensure that e-services are user-friendly, efficient, and meet citizens' needs. It is also essential to

provide reliable and timely support to citizens who encounter difficulties when using e-services.

Encouraging collaboration: Collaboration between the government, private sector, and civil society can help to boost the usage of e-government services. The government should work with private companies to develop innovative e-services that meet citizens' needs and involve civil society organizations in designing and delivering e-government services to ensure that they are citizen-centric.

Simplify the process: The process of using e-government services should be simple and user-friendly. The government can conduct usability testing to identify user issues and make necessary improvements.

Providing incentives: The government can encourage people to use e-government services. For example, they can offer discounts or special offers to people who use e-government services to pay their taxes or apply for permits.

Collaborating with the private sector: The government can collaborate with the private sector to develop innovative e-government services that meet the needs of citizens. This collaboration can be done through public-private partnerships, where the government works with private companies to build and implement e-government services.

By implementing these recommendations, the government of Azerbaijan can increase the usage of e-government services and make it easier for citizens to access government services online.

The four-stage model of Layne and Lee (2008) can be applied to the e-government sphere in Azerbaijan. During the catalog phase of the model, some static and fundamental information can be provided through the website of ASAN Signature. The transaction phase enables people to execute certain basic operations online, such as submitting government forms and will increase the catalog's search capabilities (Layne & Lee, 2008). Rather than just automating current procedures, it will restructure the website of ASAN Signature services at the start of the vertical integration stage. Its primary goal will be coordinating emergency services across jurisdictions. During the horizontal integration stage, the process wil focus on bringing together disparate parts of the infrastructure to finally work together to provide the end users with a seamless experience.

In addition, the e-government experience of Singapore can be applied in Azerbaijan. First, strong leadership with a good vision will be crucial for the success of ASAN Signature. The government should involve all stakeholders in this vision and clearly state the e-government

vision. Through a clearly articulated vision, the Azerbaijani government can inspire a mindset change and make public institutions understand the e-government transition. Second, the Azerbaijani government should support e-government initiatives by strengthening the information infrastructure and reducing the digital divide. The Azerbaijani government needs to allocate resources primarily to disadvantaged groups and initiate training programs that can benefit all segments of society. Finally, the integration of the state's public institutions operating in different service areas will be necessary in order to provide more services to the citizens. In order to achieve this integration, it is necessary to establish coordination centers. In addition to various coordination centers in Azerbaijan, meetings and forums should be organized to facilitate communication between public institutions in order to create a culture of information sharing.

8. Limitations and Future Work

It should be noted that the survey solely considered the opinions of Azerbaijani participants. Future studies could likewise take into account the viewpoints of politicians, government representatives, and other parties engaged in the creation and delivery of electronic government services. This can help shed light on the successes and failures of Azerbaijan's e-government services. Second, making some action plans for the activities that help to implement the recommendations for ASAN Service could also be future work.

Third, the research was designed as a cross-sectional interview technique which makes it difficult to draw conclusions about cause and effect. A longitudinal study of people's attitudes about and use of e-government services through time might be an interesting direction to explore in future studies. Last but not least, the research neglected how cultural and societal aspects affect people's propensity to use e-government services. Since Azerbaijan is such a heterogeneous nation with widely differing cultural and social standards, it will be important for future studies to account for these differences.

Several avenues may be pursued in the future to boost Azerbaijani citizens' satisfaction with e-government services. To begin, the government might put more effort into making e-government services more easily accessible and user-friendly. This might be accomplished by measures such as streamlining the application process, improving the clarity of directives, and expanding the number of service delivery options available to the public. Third, the state might work to increase public confidence in e-government programs. For example, governments might notify individuals about the data they collect and how it will be used in an open and responsible manner. Finally, the government and private companies might work together to provide cutting-edge e-government services tailored to the public's wants and requirements.

To sum up the future perspective, this study has offered important insights into the variables affecting the use of e-government services in Azerbaijan. Several problems with the study, however, need further investigation. The Azerbaijani government might do more to encourage the use of its electronic government services by focusing on making them more accessible and user-friendly, fostering more public confidence, and working with outside collaborators to create cutting-edge e-government offerings.

Summary

In today's information society, rapid developments in information and communication technologies affect both public institutions and citizens and cause change. Being an information society requires accessing, transferring, and using information. With the rapidly developing technology, society is entering a process of rapid change in accessing, sharing, and using data and trying to act according to the changing conditions. Not only to provide services following these conditions, but public institutions are also driven to seek innovations and carry out various studies, increase the quality of services, meet renewed expectations with technology, reduce cost items and bureaucracy, and speed up business and transactions. Information and communication technologies come into play here, and various e-government applications use these technologies to realize what is desired. On the other hand, citizens are trying to improve themselves and ensure the necessary harmony by following information and communication technologies to use these applications and make the most of the services. This study hypothesized that e-signature is not used enough in Azerbaijan. In this regard, the main research question was determined as follows: What can be done to increase the usage of ASAN signatures in the Azerbaijan e-government?

In this study, an inductive research approach-case study methodology was employed. This research uses Azerbaijan as a case study because no work is available in the context of increasing the use of ASAN signatures in the e-government services in Azerbaijan. In addition, the structured interview technique as one of the qualitative research methods as a primary data collection process was used in the study. Research findings implied that e-signature is not used enough in Azerbaijan, which means that the hypothesis of this study was supported.

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Appendix 2

Interview Questions

1. Do you think e-government services are used widely? Please, clarify your answer.
2. How can e-government applications positively or negatively impact on public service delivery?
3. How can you characterize the effects of an e-government system on the functioning of public administration?
4. What is the most complicated thing in your e-government transactions?
5. What is your opinion about e-government applications in Azerbaijan?
6. Do you think about sharing private information through e-signature confirmation?
7. Do you think e-government applications in Azerbaijan operate safely?
8. What are the transactions you use most in e-government applications? Why?
9. Do you prefer traditional service delivery or e-government transactions? Why?
10. Do you think the current e-government services are sufficient? If not, how it can be improved?
11. What are your expectations from e-government applications?