TALLINN UNIVERSITY OF TECHNOLOGY
School of Information Technologies

Fatemeh Eskandari 194520IVGM

THE POTENTIAL OF IMPLEMENTING AN E-BIRTH REGISTRATION SYSTEM: A CASE STUDY FROM IRAN

Master's Thesis

Supervisor: Dirk Draheim
Prof. Dr.
Co-Supervisor: Mahtab Shahin
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Fatemeh Eskandari 194520IVGM

VÕIMALIK SÜNNI E-REGISTREERIMISE SÜSTEEMI RAKENDAMINE: IRAANI NÄIDISJUHTUMI UURING

magistritöö

Juhendaja: Dirk Draheim
Prof. Dr.
Kaasjuhendaja: Mahtab Shahin
MA

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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.

Author: Fatemeh Eskandari

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Abstract

The primary goal of most governments is to provide better services to citizens by raising the efficiency of services. On the other hand, new achievements and possibilities of information technologies and communication (ICT) inspire governments towards reforming the governments into e-governments.

The following thesis investigates the feasibility of implementing an e-birth registration system in the case of Iran and identifies how replacing digital technology with existing methods could benefit citizens. In addition, research is being conducted to determine what primary requirements are needed in order to provide e-birth registration services in the Iranian public sector. Besides that, the successful experiences of Estonia in the e-birth registration systems are analyzed to provide a general overview of the steps that have been taken in this country which can be used by the Iranian public sector. In this research, the qualitative research method have been employed to analyze the study by combination of interview, survey, and case study to answer research questions as well as modelling a concrete public e-birth registration services in a business modeler. As a result of this research, the recommendation that how to provide a system that simplifies the birth registration process to citizens by utilizing electronic services and also how to increase public awareness to raise the efficiency of e-services are provided.

This thesis is written in English and is 72 pages long, including 7 chapters and 20 figures.

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List of abbreviations and terms

CRVS	Civil Registration and Vital Statistics
WHO	World Health Organization
IS	Information System
ICT	Information and communication Technology
IT	Information technology
UN	United Nations
E-Government	Electronic Government
ID-Card	Identity Card
PIC	Personal Identity Code
PR	Population Register
IDMS	Identification Management System
EMBR	Estonian Medical Birth Registry
PKI	Public Key Infrastructure
PPP	Public-Private Partnerships
EGDI	E-Government Development Index
OSI	Online Service Index
TII	Telecommunication Infrastructure Index
HCI	Human Capital Index
NOCR	National Organization's Civil Registration
BPMN	Business Process Model and Notation
BP	Business Process

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1 Introduction

1.1 Overview of the Research

According to the World Health Organization (WHO), “the registration of birth is a basic human right, and the birth certification should be conducted immediately after a child is born. In all nations, a birth certificate is a vital legal document that gives an identity to a child” (Council, 2014). Furthermore, the information collected from birth registration documents can enable authorities to determine when, how, and which sectors to emphasize for development activities (Selim, 2019).

Civil registration is the approach that the governments provide a consistent record of births, deaths, and the marital status of their people, and it’s employed to issue legal documents. The legal identity is among the primary benefits of implementing the integrated identification system, providing citizens with the right to access public services in society. Accordingly, the absence of legal identities in risky circumstances could adversely affect citizens. Establishing legal identification and registration of infants at birth provides them with specific rights, entitlements, and benefits. Identity documents enable people to claim an inheritance, health benefits, spousal pension rights, and such civil rights as land ownership. The proof of identity is essential to nationality request. (Rivera & Dr. Kristjan, 2015)

According to the paper (DE, et al., 2015) which analyzed the effects of well-functioning civil registration and vital statistics systems on the population health outcomes in 144 countries during the past 33 years, the well-functioning civil registration system has a key role in providing better healthcare regardless of urbanization rate, population income, health system availability, or pregnancy prevalence. To be more accurate, civil registration data can help authorities collect vital epidemiological information to improve and ensure population health. This information can mitigate disease burden and facilitate the efficiency and effectiveness of healthcare services. (DE, et al., 2015)

Therefore, a reason why many countries make significant annual investments in civil registration and vital statistics (CRVS) systems is to provide critical health information.

Governments provide public service delivery to fulfill the requirements of residents. There is a significant lack of public involvement and participation in the existing model adopted by government agencies to develop and deliver services to citizens. This can actually lead to a variety of important issues, such as the implementation of unnecessary or unusable services and distrust in governments due to the lack of reliable processes that take place during service development. In addition, as people's expectations are rapidly on the rise, citizens expect governments to be more accountable than they currently are and to deliver services efficiently and effectively. The current model of public service in developing countries depends mostly on government bureaucracy without the engagement of citizens in the service delivery process, something which leads to dissatisfaction in society. (Cezon & Wolfsthal, 2011)

The governments have shown greater interest in providing high-quality services for the public than ever before. A whole-of-government approach is to provide the services that increase public and citizen satisfaction as well as delivering high-quality public services in order to improve participation in social activities to win the public trust (Curristine, Lonti, & Joumard, 2007)

Information and communication technology (ICT) enables governments to provide better and more effective services for citizens and enterprises. There is also some criticism of the provision of implementing e-government services, leading to more user-oriented approaches. Moreover, user satisfaction will have a significant effect on the implementation and usage of e-government systems (Verdegem & Verleye, 2019).

A novel strategy must be formulated to replace the complicated bureaucracy and ensure the real-time availability of data in order to accelerate the progress in civil registration and increase birth registration rates. In fact, information technology can pave the way for authorities to access, gather, and store data of birth registration by playing a central role in delivering high-quality public services to citizens (Chapman, 2012).

1.2 Motivation for the Research

Theoretically, the research concept is based on the author's personal experience with numerous digital solutions in Estonia where, according to Digital State Services (2021), 99% of governmental services are online. Moreover, the research topic is based on the reports provided by information and communication technology organizations and e-governments in support of sustainable development in Iran (Organization, 2016). The reports emphasized the implementation of an electronic national registration system to provide birth certificates, marriage certificates, and social security services in order to improve the online services index as a result of enhancing the e-government development index of Iran. The latest UN-based e-government development survey indicates insufficient developments and the absence of proper information technology infrastructure in Iran. Accordingly, the major causes of this situation were identified as mismanaging systems and lack of primary infrastructure (Saman Information Structure, 2018).

For instance, Iran's National Organization for Civil Registration started renewing smart national ID cards in 2012. These smart cards can be adopted to provide people with several services more efficiently than ever before. The primary feature of this card was supposed to be identity confirmation with its owner's biometric data (*e.g.* fingerprint) made digitally available for any investigation purposes. In addition, the card owner can sign documents electronically. In fact, the smart national card was expected to be used for the purposive distribution of subsidies, electronic health services, elections, and other public services (Sabteahval, n.d.). Although the majority of people renewed their national ID cards, this package wound up in failure after a few years.

In recent years, all developed and even developing countries have taken successful steps towards the deployment of e-governments in order to enhance people's quality of life, improve their satisfaction, and boost governments and businesses in relation to their national economic dynamism. In addition, by increasing people's awareness of modern technologies and electronic services, governments are expected to provide public services for various segments of society more efficiently than ever before at the lowest cost and shortest time (Saman Information Structure, 2018). Therefore, these international experiences could be used as helpful resources to provide new ways of delivering services in the Iranian e-government system.

1.3 Research Questions

Hence respect to the previous explanations, this study addresses primary and sub-research questions by adopting different methods such as structured questionnaires, interviews, and case studies, in addition illustrating As-Is and To-Be models of the Iranian birth registration systems in business process modeling.

The main primary research question is as follows:

- How can the citizens and government of Iran benefit from the implementation of e-birth registration services?

Regarding the implementation of electronic services, it is first necessary to discuss why a new form of delivering public service should be developed. To be more accurate, determining how to replace the traditional technology with the digital one could benefit the citizens and the Iranian birth registration system. There are also some criteria for making e-services implementation efficient in a country. These criteria include levels of awareness among citizens, e-government maturity levels, the functionality of the provided e-services, and levels of citizen satisfaction with implemented e-services. The answer to the above question indicates the potential of e-birth registration usage and the importance of e-services. For this purpose, it was decided to distribute questionnaires among citizens to determine the potential of e-birth service provisions and identify how e-service could simplifying the birth registration for citizens as well as the level of citizen's awareness and trust, respect to e-services. Furthermore, BPMN has used to present a diagram of the As-Is and To-Be models in the Bizagi Modeler to illustrate how posing e-birth registration service could benefit stakeholders.

Sub Question 1:

- What are the challenges that governments and citizens might face while utilizing this service?

Addressing this question can help identify the primary obstacles in implementing e-birth registration services in Iran. This must be analyzed from the perspectives of citizens and governments. Therefore, it is necessary to consider such as organizational and administrative factors, technological resources, and specialists in technological

administrative areas. Therefore, open-end questions have conducted in a questionnaire from citizens and also interviews by hospital employees to identify what challenges may cause by implementing this e-service.

Sub Question 2:

- What are the most important underlying factors to be considered when implementing the system?

This question can be addressed to identify the primary infrastructures or organizational challenges, especially needed in hospitals or maternity wards, in order to implement e-birth registration. The analysis is based on analyzing successful international practices in implementing of e-birth services. Therefore, Estonia considered as the best case with a high-ranked index in the e-governance context for implementing electronic services.

2 Background

This chapter addresses the theories of birth registration services, e-service, and citizen satisfaction to emphasize the importance of providing electronic services for citizens. It also discusses birth registration and the potential of e-service implementation.

2.1 Existing Body of Knowledge

Prior to the definition of public e-services, an e-service should first be defined. According to (Lindgrena & Janssonb, 2013) operating in the electronic services of the public sector, it is defined as a dynamic process aiming at value fulfillment for clients. By definition, an e-service refers to an electronic service, i.e. the services that are delivered electronically. What is a service then? There are many different views on the definition of a service provided particularly by governments over the past decade. In general, a service is considered a process with a value that is delivered to its client. (Lindgrena & Janssonb, 2013)

In a broader sense, there is a different view on e-service. Regarding the concept of e-government, e-services generally deal with intangible products such as the information exchange to obtain approvals, payments, and registration tax. According to some analysts, e-services are the information-based processes of interactions between governments and citizens. (Lindgrena & Janssonb, 2013)

In other perspectives, an e-service is characterized as the process of providing services over electronic networks. In governments, an e-service refers to the accessibility of information and enhanced resources on the Internet or other automated platforms for citizens or businesses as a way of making the government accountable to stakeholders (H.S. Hassan, 2011).

According to the existing literature (H.S. Hassan, 2011), there are four types of e-service interactions:

Government-to-government (G2G)

Government-to-citizen (G2C)

Government-to-business (G2B)

Government-to-employee (G2E)

Although governments are increasingly using e-services, the extent of implementation varies from country to country. Differences demonstrate that there is slow e-government progress in developing countries, some of which are even experiencing regression due to facing numerous dynamic drawbacks. The reasons could lie in gaps in the Internet technology infrastructure, procedures, utilization, and sufficient resources to construct the costly national communication infrastructure. This is because the developed countries are pioneers of e-services (H.S. Hassan, 2011).

The concept of electronic government is being actively deployed throughout the world as a very important tool, in fact, capabilities and technological advancements of information and communication technology (ICT) encourage governments toward reforming into implementing e-government (Ostasius & Petraviciute, 2010). However, what is the concept of e-government? According to (Singh, Pathak, Naz, & Belwal, 2010) e-governance is characterized as the development of information and communication technology (ICT) to a governance structure that is "simple, moral, accountable, responsive, and transparent (SMART)". (Singh, Pathak, Naz, & Belwal, 2010) In another definition by Lieber (2000), it is defined as "the implementation of cost-effective models for citizens, industry, federal employees, and other stakeholders to conduct business transactions online. This concept integrates strategy, process, organization, and technology" (Buckley, 2003).

More precisely, e-governance aims to enhance internal government operations to improve interactions between citizens and governments, emphasize that e-governance contributes to internal performance, quality development, and customer satisfaction (Singh, Pathak, Naz, & Belwal, 2010).

Another point of views based on Colby (2001), Chaurasia (2003), and Millard (2004) indicate that ICTs had significant benefits compared to the traditional one, ICTs facilitates accessibility; promote broader multi-communication and distribution of data, providing automated records management functionalities; and generally allow effective information processing and exchange the information. In comparison, ICT improves efficiency (Singh, Pathak, Naz, & Belwal, 2010).

According to the 2010 United Nations' E-Government Survey, widening the usage of e-services in e-governance citizens could improve communications with governments, enhance access to information, and have good leadership in society (H. Bhuiyan, 2011).

As discussed earlier, governments should consider the levels of citizen's confidence and satisfaction with respect to electronic services in particular e-governance. According to (Badri, Al Khaili, & Al Mansoori, 2015) and (Steven, 2017), citizen satisfaction with public services is a concept of combining expectations, interactions, and environmental effects which not only include the feelings or views about "objective services" but are also affected by other criteria like trust in governmental services.

2.2 Theoretical Framework

Basically, there are some factors that affect progress in the implementation of e-governance. A factor lies in management and logistic problems related to the implementation of e-services in the public sector (H.S. Hassan, 2011). In reality, the considerable costs of implementing e-governments do not match the estimated costs (Seltsikasa & M O'Keefeb, 2010). In fact, deploying e-services entails substantial expenses for personnel recruitment in e-services management and initial instances of infrastructure such as hardware and software platforms. Managers may consider it difficult whether the end-users prefer the electronic service to the traditional paper-based one. The other factor is the technological obstacle which has been identified as a serious barrier in the development and preservation of e-service programs in many studies. These factors focus on how governments provide services through the Internet channels. Minority groups, people with disabilities, and remote communities in many countries worldwide are struggling to use and access the Internet. In addition, users sometimes face problems with Internet connections, or in case of complexity, they find it unreliable for their interactions with the government. According to some other researchers, the cultural and characteristic aspects seem to be among the biggest barriers affecting the development of the e-service delivery system. For instance, some residents, especially in specific communities, may have negative views of changing the paper-based services and may not prefer to use electronic service channels. Moreover, the designed services may not consider the languages or cultural contexts of different users and might just be implemented based on the most spoken language in the community. Finally, the levels of

citizen’s awareness could prevent them from actively engaging in governmental electronic services. (H.S. Hassan, 2011)

Thus, successful IT framework implementation in a government needs an efficient strategy, the establishment of required activities, and also sufficient policies and regulations (Drobiazgiewicz, 2018).

Generally, civil registration provides the framework for national legal registration and also enables nations to recognize serious health issues. Hence, governments should track the number of births and deaths in countries to establish a well-functioning healthcare system. Nearly half of the children in the world have remained unregistered. Due to certain challenges, people refuse to report births and deaths in countries. (Nations, 2014)

With civil registration, countries maintain a consistent and accurate record of births, deaths, and marital status of their residents. Thus, civil registration is defined as permanent, obligatory, and systematic documentation of the occurrence and characteristics of birth and death events provided by legislation requirements in each country. Moreover, it is used as a primary resource of birth and death statistics required by the government to provide standard and high-quality services in order to collect accurate, reliable, and timely data with regard to birth and death statistics (Rane, Mahanta, Islam, & Pratim, 2020).

Research has shown that the primary concern about the implementation of new and modern ways to collect registration data is to store and retrieve documents, index data, data management, and process data rapidly and efficiently. Such systems need to be implemented in a network. The outcomes of such systems as opposed to those of the paper-based systems could be affordability, limited physical settings, and more efficiency for governments. (Rane, Mahanta, Islam, & Pratim, 2020)

3 Research Approach and Methods

This chapter introduces the research methods employed in this study to collect and analyze data as well as the procedures for source selection. This study aims to analyze the benefits and risks of providing an e-birth registration services and also investigate the international practice in implementing e-birth registration for a case of Iran. Therefore, the qualitative research approach was adopted to analyze interviews, conduct a survey, and carry out a case study to answer the research questions.

3.1 Research Strategy

The research methodology aims to answer a question or solve a problem. The methods of collecting data and analysing collected data are characterized by scientific analysis (the theories and methods and also topics that are selected) which is not based on assumptions but consists of various perspectives of answering a problem. (Saundersa & Bezzina, 2015)

Qualitative research seeks to provide comprehensive perceptions based on detailed and comprehensive empirical data following “logic in practice” with nonlinear analysis. It focuses on a variety of approaches to collect data from participants, observations, surveys, case studies, in-depth and semi-structured interviews, and open-ended questions to obtain full access to the thoughts and views of participants involved in the natural flow of community interaction. The analysis of fundamental values and opinions is the main advantage of the qualitative approach dealing with broad and open-ended questions and enabling participants to address more important concerns (Choy, 2014).

Based on this research strategy including a case study approach, there are a few strengths of the case study research in IS. To be more accurate, the researcher can develop and analyze theories by practice in this method. Therefore, the method enables the researcher to discover the complexities of processes and determine an effective way of involvement with potential issues and new ideas within the context of information systems (Choy, 2014).

In this thesis, data collection was mainly based on online interviews and surveys to identify the beneficial criteria for implementing e-birth registration. The collected data demonstrated some facts and demands for implementing this service and then making some recommendations to provide such services in Iranian birth registration centers (chapter 7). Furthermore, Google Form has been used to gather information from respondents through a personalized survey and interviews have conducted via social media's.

The interviews were taken from four designated experts working at maternity wards in two different cities of Iran to identify the main demands for providing e-birth registration services, the primary infrastructure of which needed to be analyzed to determine the potential risks that the government and citizens may face while using this e-service. Collecting open-ended answers to the questions could help understand what the primary requirements are and what possible improvements should be conducted to provide the framework for implementing e-birth registration services. The recommendations and solutions are presented in Chapter 7. Moreover, the thematic method has applied in this thesis to analyze the outcome of interviews and open-end questions.

The questionnaires was distributed among citizens to first measure their awareness and trust in e-governance and public electronic services. The next step was to collect their opinions and thoughts about potential advantages and disadvantages with regard to implementing such public e-birth registration services. The survey contained close-end questions as well as an open-ended question.

3.2 Business Process Modelling

According to (Repa, 2011), the purpose of the Process Diagram Technique is providing the package of concepts and rules that the modelers are able to represent in a very simple way the significant features of the behavior of the real world. In continuing the process definition explains how the inputs are converted by the activities to the outputs and also distinguish the flow of the object in the process. So as a consequence the aim is to improve performance, enhance productivity or decrease the costs of the businesses by reducing cycle time or/and increase processing efficiency (Repa, 2011).

In this thesis regard to the importance of birth registration which countries keep a sequential and accurate record of their people's births, deaths, and marital status, and in addition, to simplify the birth registration process for citizen, the novel technologies are needed to replace with the current model of services. In fact, public administrations should take the most usage of modern tools in providing services for citizens. BPMN could be helpful to enhance the birth registration services by presenting a diagram of the As-Is and To-Be models in the Bizagi Modeler that are shown in details in chapter 6. Exist service model is time-consuming and resource-consuming which is illustrated as an AS-Is Model, and the To-Be model is considered the improved and automated concept that could use e-services potential by reducing operations for both citizens and governments, and result in raising the efficiency of the system and citizen satisfaction.

4 Overview of Successful Public e-Birth Registration Service Implementation

To implement e-birth registration services effectively in the Iranian civil registration system, it is necessary to utilize the frameworks and backgrounds of other countries which are currently providing such services for their citizens. Hence, Estonia can be considered the best case as a country with a high-ranked index in the e-governance context for implementing electronic services.

4.1 Estonian Experience

Estonia a nation among the pioneers of digital transformation in e-governance which Estonian citizens can conduct every transaction with their state and private sector services such as filing tax returns, voting, authentication, registering their children's names, banking, and plenty of other activities from anywhere in the world (Korjus, 2018). They also have complete trust that their personal data are kept confidential and secure. In Estonia, data measurement is fully consistent with current national and European regulations (Nøhr, et al., 2017).

The Estonian e-government portal was developed in March 2003. Ever since it has continuously been updated. The portal organizes the information and services offered by numerous government departments. It provides a stable Internet environment for people, businesses, and authorities to connect through a reliable platform. The portal platform enables users to authenticate their national e-ID cards to view and verify their personal details, conduct transactions with local and governmental agencies, and complete and transmit online forms and applications. They can also sign documents digitally and access links to other registry resources on more than 20 national databases. (Commission, 2019)

Estonia has implemented the electronic versions of many of its public services by using the X-road protected data layer as the system backbone (Korjus, 2018). Basically, the X-road is a data exchange layer that allows government databases to link with each other. It was launched in December 2001 and was originally designed as a framework for the structured query formulation of various databases (X-Road History, 2021). It was then expanded to allow the development of e-services to have active access to data stored in

multiple databases. X-road enables authorities as well as natural and legal individuals to search for data in national databases over the Internet by using a single-user interface, writing operations on databases, distributing massive data sets between information systems, conducting continuous search operations of data in various datasheets, and delivering services through Web portals. (Commission, 2019)

In fact, the development of this system started in the early years of Estonian independence, which is strongly linked to the activities of the first Prime Minister of Estonia, Mr. Mart Laar, and his team within the 1992–1994 and 1999–2002 periods. Having been independent of the Soviet Union since 1991, Estonia has begun a political and economic renascence. In those decades, information technology was seen as a solution to Estonia's economy and politics (Metsallik, Ross, Draheim, & Piho, 2018).

In fact, the past form of national identity was decentralized because it had some critical problems such as insufficient quality management and data interoperability. The statistical data were also not freely accessible. Rebuilding a national identity scheme was among the first goals of the newly elected government. As a result, the legal basis for the new system was laid down during the 1990s when both a national identification number system and a population registration system were formed. (Rivera & Dr. Kristjan, 2015)

Public registration is the foundation of all e-governments including Estonia. The national population registration is the most important of these frameworks including all types of personal details such as ID codes, dates, and places of birth, addresses, marital status, citizenship, legal abilities, and guardianship rights (Björklund, 2016).

4.1.1 Evolution of Integration

Based on a case study (Rivera & Dr. Kristjan, 2015) conducted by the World Bank Civil Registration and Vital Statistics (CRVS) program, the efficiency of identity and population registry systems in Estonia were developed in three steps in Estonia: the broad collection of personal identification numbers which took place even before the ID cards and the population registration process started; coordination between ministries and research agencies engaged in data collection, analysis, reporting and storing; and the facilitation of the national identity system through the use of a population registration system.

The first system evolution was to implement a personal identification number. In 1990, a format of the Personal Identity Code (PIC) was based on the regular number of births, gender and date of birth, then was developed and provided in the main platform for the successful launch of the Population Register (PR). Since the middle of 1991, personal identity codes have been assigned to all Estonian residents and particularly after the birth takes place. The first concept of developing a digital ID card was launched in 1997, in fact, the ID card (like a mobile ID) presents the key features of the fully operational e-government. (Rivera & Dr. Kristjan, 2015)

Population statistics, public registration, and identification are generally performed by two main systems in Estonia, i.e. the Population Registry and Vital Statistics System (CRVS) and the Identification Management System (IDMS). The first one is intended to monitor and certify pregnancies, deaths, and other vital events happening in a population, whereas the second one focuses on the supply of legal identity and related documentation to the community. These correlations have provided the basis for their integration. (Rivera & Dr. Kristjan, 2015)

The Estonian Population Registry (PR) is a national registry program known as the largest database of the nation to include all population information and family events in Estonia. It also includes every citizen of the European Union and foreigners who have been given a right of residence in Estonia. The population register's records are used to perform official activities related to the government, municipal councils, and natural or legal individuals. (e-population register, n.d.)

The population registration and ID systems are completely supported by various public sector services. The state and county governments, the Police and Border Guard Council, the Minister of Foreign Affairs, the court system, the Estonian Road Administration, and maternity hospitals are among the public sector agencies authorized to enter data the population registration system. The officials require special authorization from the Ministry of the Interior to gain access to records. However, the public has limited access to the population registration system either for free or charged. In this regard, vital statistical offices conducted vital statistic processes under the responsibility of the Ministry of Finance to register births and deaths, certify marriages and divorces, and correct names in the PR. (Björklund, 2016)

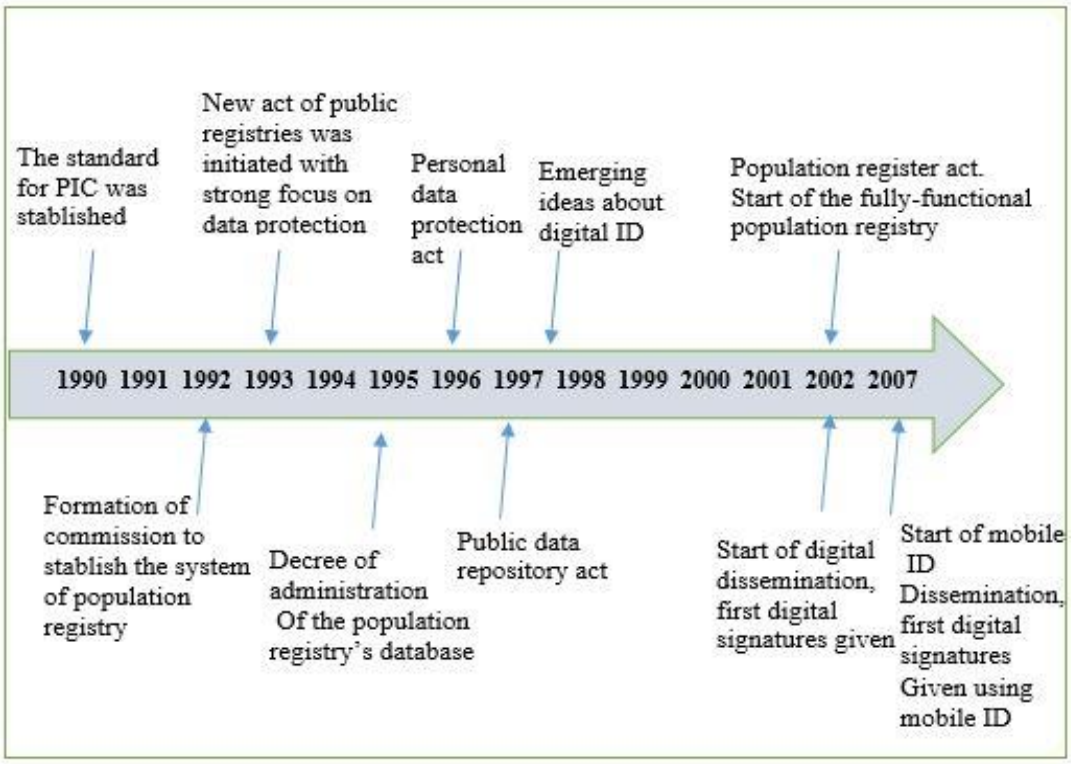

Figure 1. Digital Developments in Estonia after independency

Registration is compulsory for the entire population and also the people residing overseas. The PR is a constant and continuous process in relation to the census by collecting personal data on a daily basis. It is also irreversible under the constitution. Data protection laws guarantee the confidentiality of data collection, and there is only one record per user. The personal details of every citizen shall be reported only in one place. (Rivera & Dr. Kristjan, 2015)

4.1.2 Birth Registration

The first instance of identification (i.e. a medical birth certificate) is performed by physicians either at the hospital at the time of childbirth or at a prenatal check. This first child record is carried out as a birth certificate, which is the vital document for the Estonian Medical Birth Registry (EMBR) system. A birth card is allocated to every child born in Estonia. The cards are sent to the registration system on a monthly basis in a secured way. This information is obtained from all maternal health providers. (Birth of a Child, n.d.)

The birth card is mainly characterized by the Personal Identification Code (PIC), which is issued to each newborn at the time of birth based on gender, date of birth, and a three-digit code indicating the order of birth in the total number of daily deliveries. These codes change on a daily basis and are circulated to hospitals in lists. If the child has not been born in the hospital, the parents should ask the healthcare provider to complete the birth registration card, or the vital statistics officer will grant the PIC at the time of birth registration. (Rivera & Dr. Kristjan, 2015)

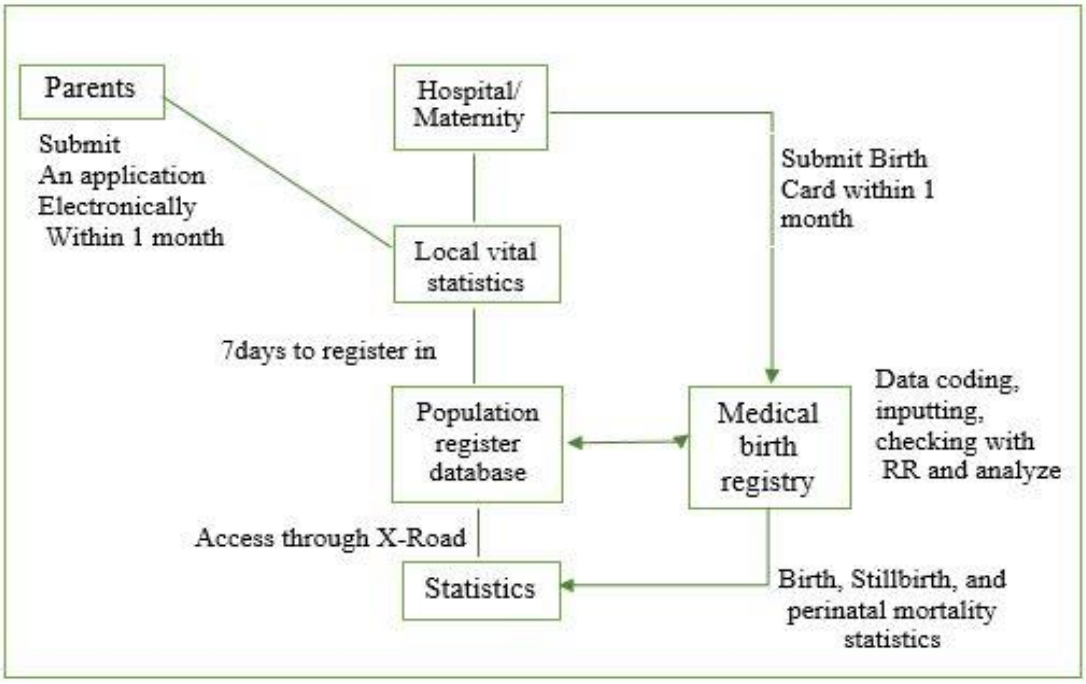

Figure 2. The direction of birth registration process in Estonia

In order to record birth, parents must send an application to the Vital Statistics Office. The officer is responsible for registering the birth within seven working days after the request. (Registration of birth and choosing a name, n.d.)

Birth registration and the production of a birth certificate are free of charge, and the application is not required to be sent in person. However, the application is submitted digitally and must contain the following pieces of information (Birth of a Child, n.d.):

- Name
- Gender
- Date of birth

- Personal identification code
- Place of birth and citizenship of the child
- Personal identification code of the mother
- Personal identification code of the father
- Right of custody

Regarding the Estonian system integration, it is essential to mention that this systemic view used by the government to establish all these components aimed to enhance the delivery of public services and maintain the effectiveness of public administration. As a result, the integration process followed a hierarchy where both components had a purpose and cooperated with each other. In addition to the perceived strategies mentioned, there were three key important factors providing the basis for system integration: comprehensive policy and legal frameworks, Public Key Infrastructure (PKI), and Public-Private Partnerships (PPP). (Rivera & Dr. Kristjan, 2015)

5 Current e-Governance Situation in Iran

Governments have already realized that the need for transformation is improving and maintaining their situation in the international community. In fact, it will not be possible to achieve such conditions in a country where there are ineffective systems. This issue is the main concern in many countries, particularly in developed ones. E-governance in Iran has recently drawn governmental attention more than ever before. (Tohidi, 2011)

According to the 2020 UN E-Government Report, Iran's current rating in the United Nations EGDI 2020 is 89. In contrast with previous years, Iran proceeded 3 notches down to rank 89 among 193 countries in the EGDI 2020. In this report, the e-participation index decreased 7 steps to 118 with the value of 0.46430, which ranges from 0 to 1. As listed on the UN website, Iran's EGDI value was 0.65930 in 2020. With respect to other sub-items, Iran obtained 0.5882 scores in the online service index (OSI), 0.6210 in the Telecommunication Infrastructure Index (TII), and a rate of 0.7686 in the Human Capital Index (HCI). (the United Nations 2020 e-Government survey, 2020)

Since 2004, initiatives and strategies have been employed to implement an e-government system in Iran by preparing a presidential national e-government strategy document including establishing an IT center, a comprehensive e-government program by the high information council, and a roadmap for e-government services (Sience and Technology ,News Agency, 2019).

Some of the electronic services conducted in the public sector are reviewed in the following.

5.1 The National Identity Card

The National Civil Registration Organization in Iran has started to renew ID cards with smart national cards since 2012. With this smart national card, a range of services could be provided for people in a faster and more efficient way. The major feature of the smart national card was supposed to be verifying the card owner's identification through biometric data such as fingerprint. The card owner could also sign documents electronically. In fact, the smart national card was applicable in the purposive distribution of subsidies, electronic health services, elections, and other public services. This project

was supposed to accelerate other e-services; however, it is now stuck in the maze of issuance causing long waits for citizens. (Sabteahval, n.d.)

5.2 Mobile Government Services

In 2019, the Information Technology Organization in Iran launched a system called the Mobile Government System providing 50 types of e-services gathered from 16 different governmental agencies. For instance, Iran's Social Security Organization provided the latest payroll of the insured citizens as an online service, or the Health Organization provided the latest pension deposit and medical board. In addition, the Ministry of Industry supports mobile phone authentication and system verification requests. Services such as paying off online bills and recording postal products are also available in this application (Communication and Information Technology, 2018).

According to the authorities, these services need to be continuously extended and improved in order to facilitate and provide all governmental services for residents electronically. At the same time, there are still a few technical problems in the application. For instance, some query services do not work properly and confuse users on the uploading page. Another issue is that a large number of mobile government services and application platforms are just meant to notify users of any services and link users to relevant websites. (knowledge and technology, 2019)

5.3 National Portal of Electronic Government Services

In 2017, the National Portal of E-Government Services was established to standardize and integrate management of governmental services for citizens. This service aimed to facilitate and accelerate the provision of e-services for citizens, achieve transparency in information about available services, and maintain continuity in delivered services. This portal offer different e-services such as online tax payments and services of a civil national organization such as applying for birth documents and ID cards or renaming (Communication and Information Technology, 2018).

5.4 Overview of Birth Registration System in Iran

The Civil Status Registration Organization is responsible for the registry of vital events such as birth, marriage, divorce, and death and in addition, is responsible for determining and confirming the identity and subsequent issuance of identification documents such as birth certificates and national ID cards for citizens as well as applying changes in identification information such as first names and surnames and also processing and reporting the population immigration statistics (Sabteahval, n.d.). Moreover, hospitals and maternity wards are connected to the online database to provide statistical departments with birth information.

Based on the Iranian Registry Act (INFORMATION, 2005), when a child is born in a hospital or a maternity ward, parents should take the certificate from the hospital with an ID card or resident permit. The hospital should also send the report to the National Organization for Civil Registration (NOCR) database. In the next step, parents bring the certificate to the civil registration office, fill out the paperwork, and make the required payment to apply for the birth registration under some circumstances stating that parents must be married and that the announcement of birth registration should be done by the father or the father's father. Within 15 days, one of the parents should then visit the office again to collect their child's birth documents. (Centre, 2021) However, the process is a little more time-consuming for those who live in remote/rural areas. In fact, the process starts with the reports of birth by local trustees, district governors, teachers, or post officers in the country where they are working as executive agents of governmental entities in their respective regions to the nearest local/office registration department. They collect the reports and required documents and send them to the governmental birth registration center where, after the identity is confirmed, the birth document is issued and sent back to the local department office in the respective regions. Finally, the birth document will be collected from local trustees, district governors, teachers, or post officers to hand it over to parents who are living in rural areas. The birth documents include the following pieces of information:

- The child's name at birth
- The child's gender
- The child's date of birth

- Where the child was born
- Names and the address of the parents
- The parents' nationality status

Figure 3. Birth registration certificate

Based on the birth registry act, a birth document should be prepared and recorded by the official representative of the Birth Registration Organization of Iran inside the country and by the official representative of the Consulate of the Islamic Republic of Iran outside the country (Centre, 2021). As discussed earlier, there are some circumstances stating that as parents must be married and that birth registration must be announced the father or the father's father. The birth registration document contains the following pieces of information:

- Hour and date of birth and also a place of birth
- Name and gender of the keeper of the document
- Name and the birth certificate number of parents
- Name and signature of the official of the birth certificate
- Registration Organization of Iran
- The place of registration and its serial code number
- Fingerprints of the keeper of the document

6 Analysis and Findings

6.1 Survey Outcomes

The survey of Iranian citizens was conducted to evaluate the levels of public awareness about the electronic services, the most common public e-services, the frequency of use, the interest of citizens in governmental portals, the levels of satisfaction and trust of citizens based on changes, and their opinions about birth registration services.

The research results are evaluated below.

The first question concerned the age of respondents assigned to four different age groups. The findings revealed that half of the Iranian sample represented the 31-40 age group, and the minority of respondents were aged 41 and older by 12%. The rest of the respondents were aged 18-23 and 24- 30 accounting for 15.8% and 22.2%, respectively (Figure 4).

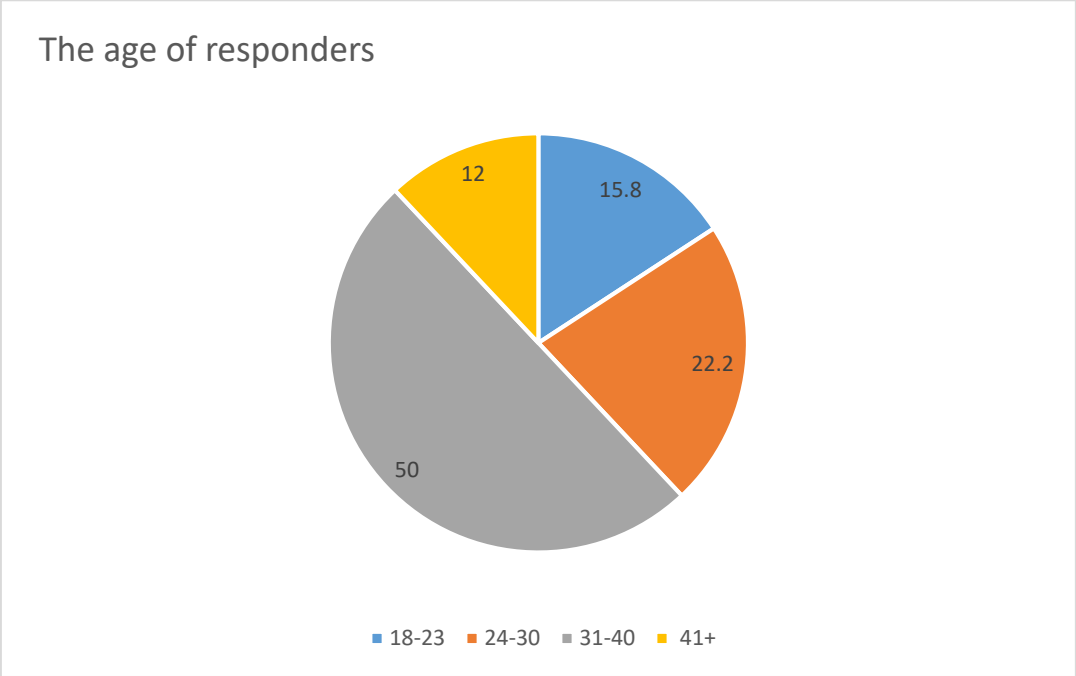

Figure 4. Answer to question 1

The second question concerned the educational background of respondents. According to (Figure 5), the respondents were characterized by four education levels. The majority of

respondents had bachelor degrees accounting for 50% of the population, whereas the respondents with master degrees or PhDs accounted for 22.2%. In addition, the elementary and high school levels with the lowest percentages (10.8% and 17.1%) are the educational background levels of the respondents. Totally, the figure shows that the levels of education among Iranian respondents were relatively adequate.

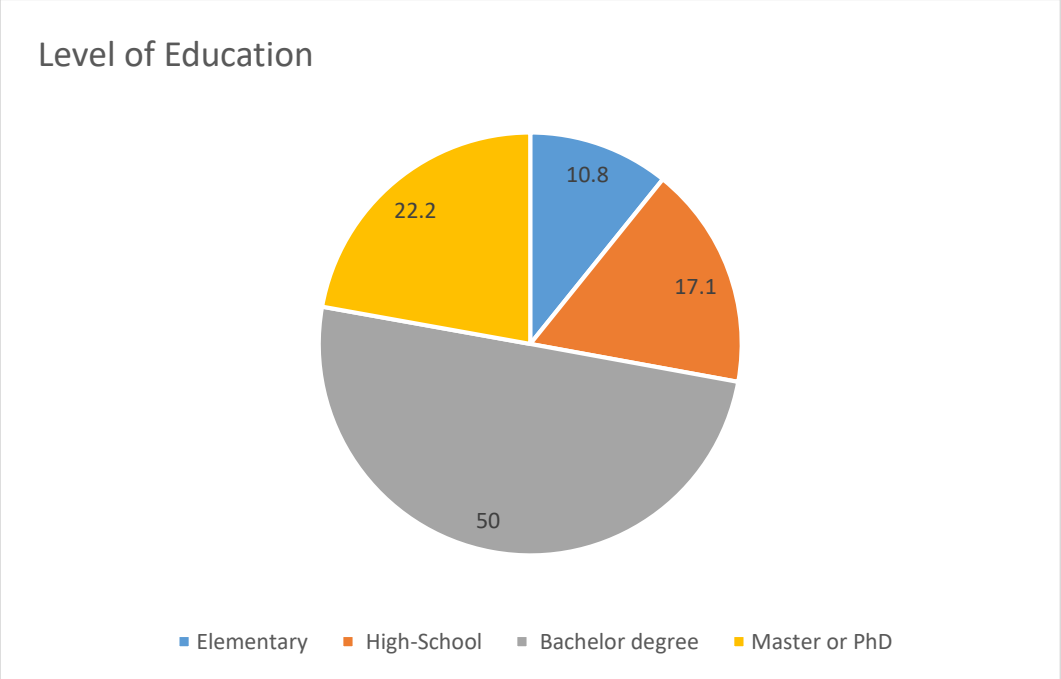

Figure 5. Answer to question 2

The third question aimed to measure the Internet connection accessibility among Iranian respondents. The findings show that (Figure 6) 77.2% of the respondents had full access to the Internet. In contrast, 18.4% of the respondents stated that they often had no access to the Internet, whereas 4.4% admitted that they sometimes had problem connecting to the Internet. The pie chart illustrates that the primary demands for providing electronic services are still facing with difficulties.

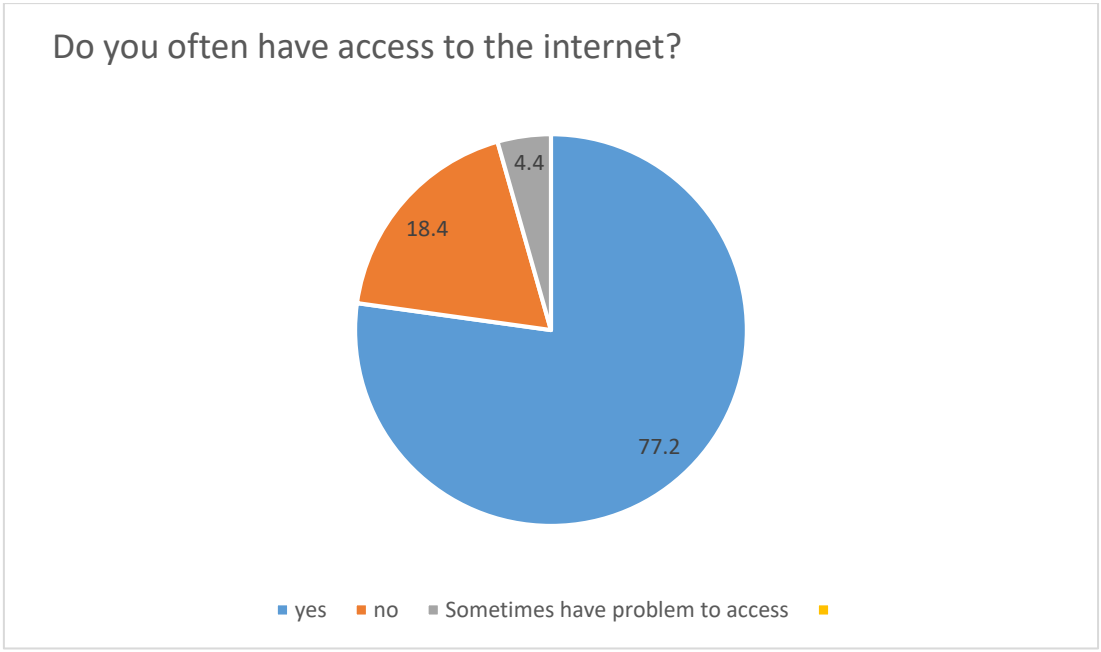

Figure 6. Answer to question 3

The fourth question aimed to determine which channel the users would prefer more to use for public or private services. According to Figure (7), the biggest portion of the sample, *i.e.* 125 individuals (79.1%), used the smartphone. Moreover, 36.7% of them used laptops and PCs, whereas only 22 respondents utilized the service in person.

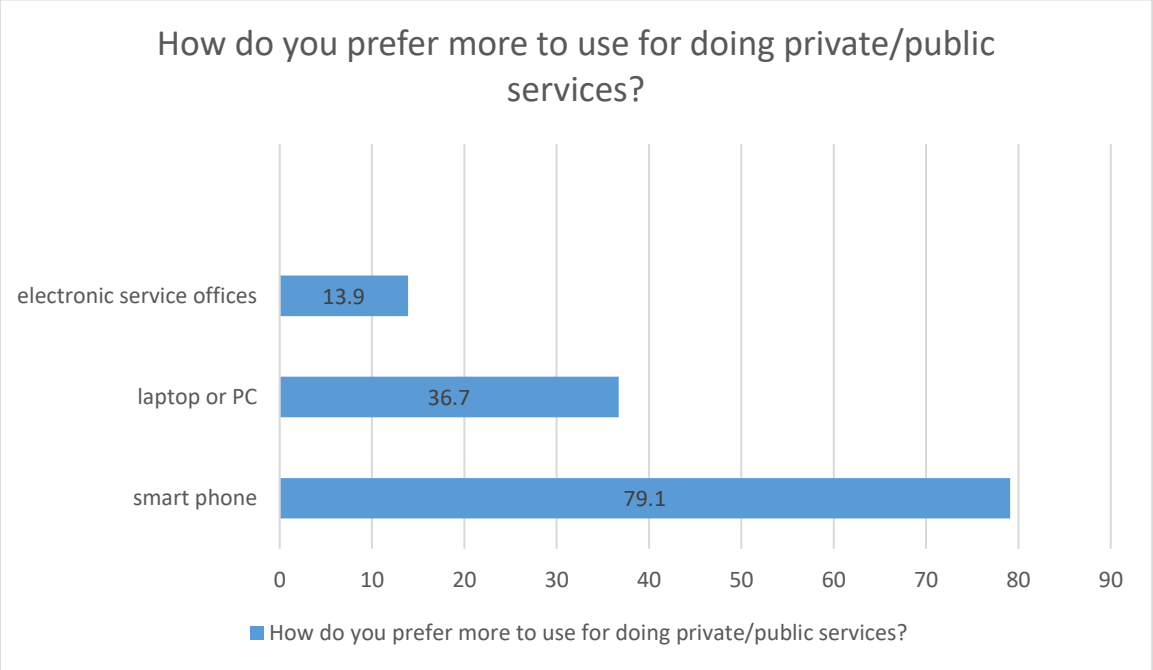

Figure 7. Answer to question 4

The fifth question was asked to determine the frequency of using the Internet by Iranian people. According to the chart (Figure 8), 96.8% of the respondents used the Internet on a daily basis, whereas the rest of the respondents (nearly 3.2%) used it a few times a week. It demonstrates that the majority of the respondents used the Internet regularly.

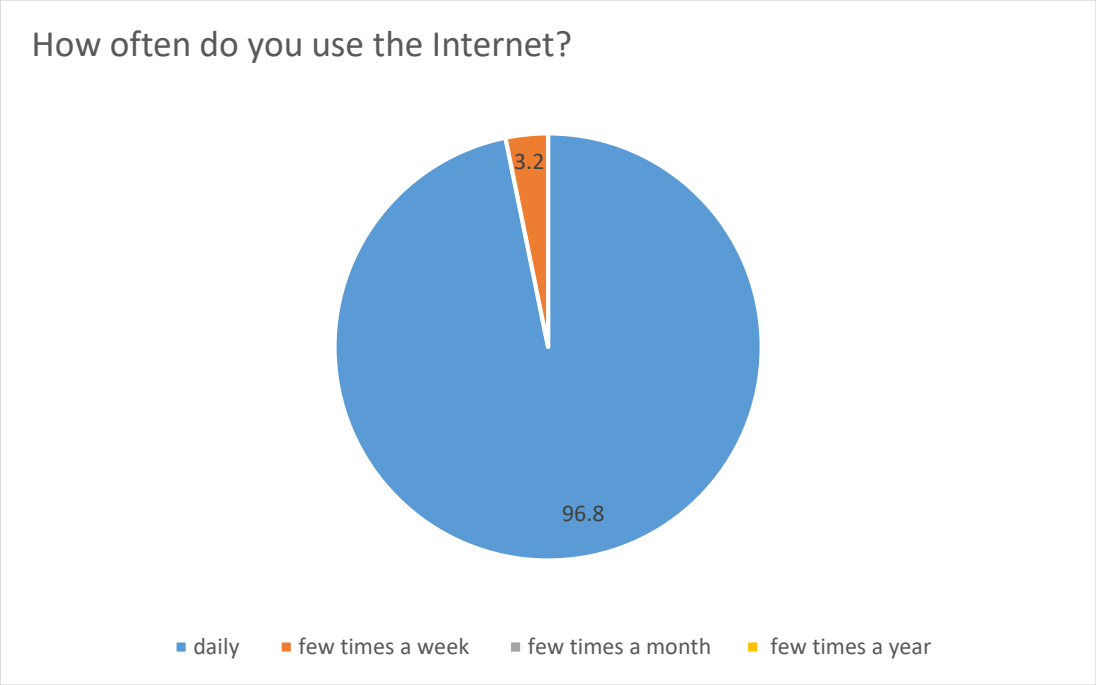

Figure 8. Answer to question 5

The sixth question concerned the frequency of using electronic services provided by the government (Figure 9). The findings revealed that only 10.1% of respondents used the services on a regular basis, whereas 17.7% utilized the services a few times a week. In contrast, 34.8% and 37% of respondents benefited from services on a monthly and yearly bases, respectively. Probably, there is no high frequency of public e-services usage among respondents, something which could be due to the low efficacy of current e-services that fail to satisfy the respondents in the Iranian government. There are also a limited number of e-government services in the field of electronic government.

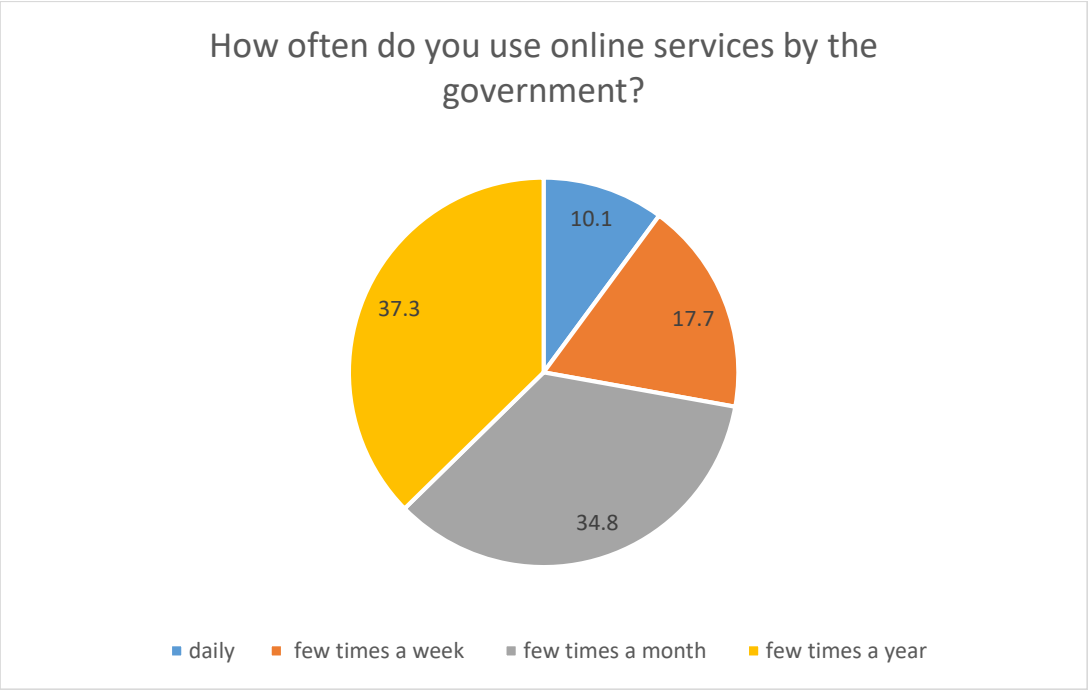

Figure 9. Answer to question 6

The seventh question was asked to evaluate how often the respondents utilized the e-services provided by private companies (Figure 10). According to the pie chart, nearly half of the respondents used e-services just a few times a year, whereas 27.2% of them used services on a monthly basis. In contrast, only 10.8% and 13.9% of respondents used the services on daily and weekly bases, respectively.

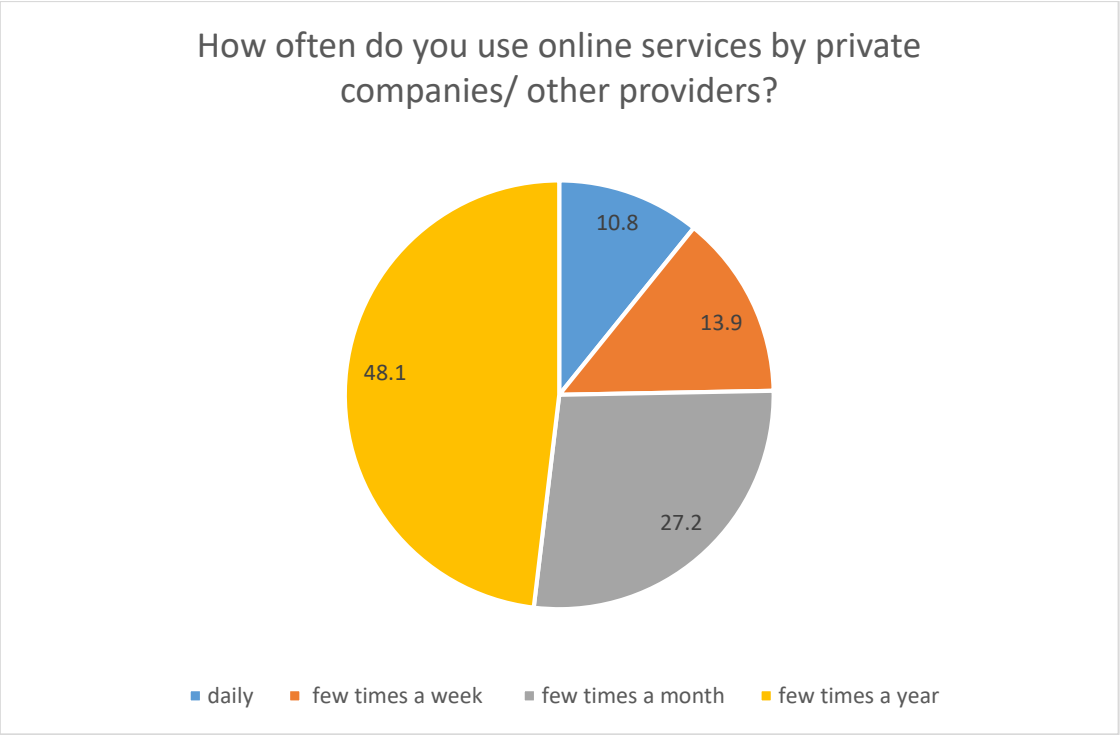

Figure 10. Answer to question 7

The eighth question intended to identify for what purpose the respondents were using the Internet. The chart (Figure 11) demonstrates that the large portion of usage of the Internet belongs to social media and Web surfing by roughly 84%, whereas the next usage was online payment by 53.2%. This service was developed much more appropriately than the other e-services in recent years. Moreover, 40% of respondents admitted that they were using the Internet for research and education. However, a small portion of respondents used it for other public e-services and business by 27% for each purpose.

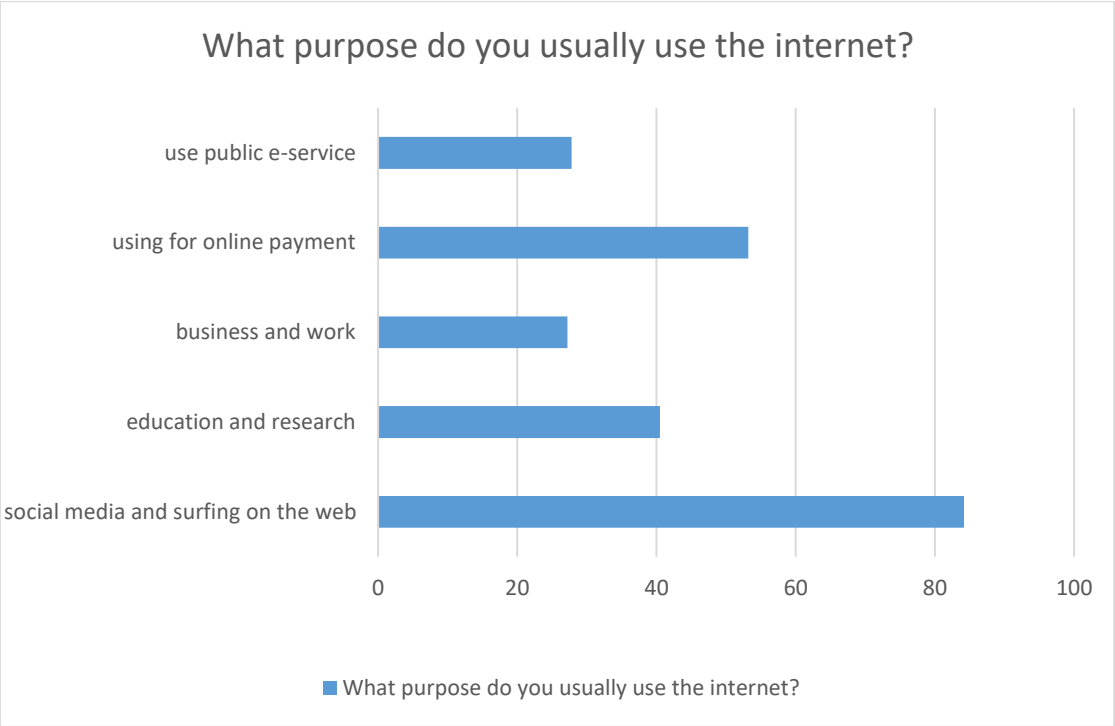

Figure 11. Answer to question 8

The ninth question concerned the awareness of respondents with regard to the presence of electronic public services (Figure 12). Accordingly, nearly 42.4% of respondents were familiar with the public e-services and regularly used them. Similarly, 39.2% of respondents indicated that they were aware of e-services but had no tendency to use them regularly. Furthermore, 10.8% of respondents were even not familiar with governmental e-services, and the last groups were also aware of the availability of services but had never used them.

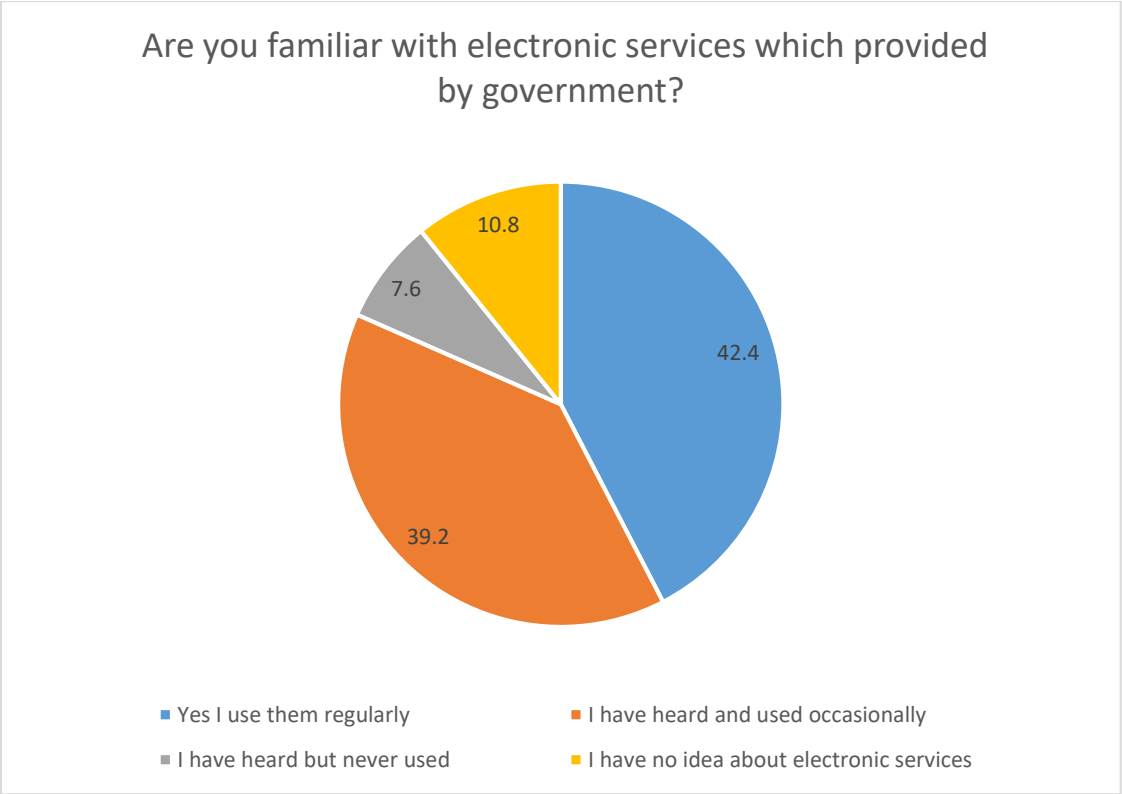

Figure 12. Answer to question 9

Regarding the respondents' experience of staying in queues for receiving governmental services while visiting public governmental offices (Figure 13), half of the respondents always had to wait in queues. Similarly, 38.2% of the respondents experienced staying in queues from time to time. Moreover, nearly 1.2% of the respondents stated that they had never waited in queues, whereas 8.2% rarely experienced staying in long queues. It can be concluded from the statistics in the chart that waiting in long queues also relied on the number of visits of respondents, many of whom paid few visits to offices. In addition, the majority of responses demonstrated that there was a high level of bureaucracy among governmental services, something which created long queues for citizens.

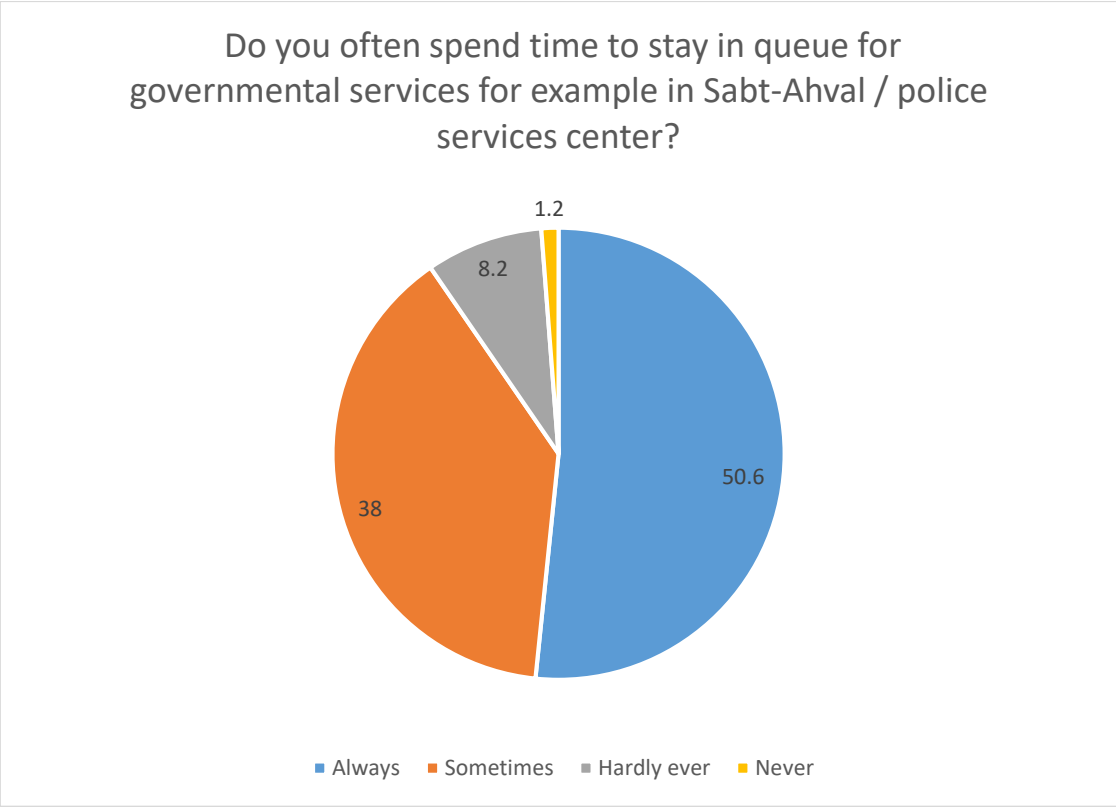

Figure 13. Answer to question 10

The next question pertained to the public e-services which respondents had used so far. According to (Figure 14), a large number of respondents (nearly 50%) used e-banking services. As discussed earlier, these services have significantly improved in recent years, and citizens are now able to conduct most of their transactions online. In contrast, the other e-services have been used by less than 40%, a finding which demonstrates that the governmental e-services are also not fully achieved. Moreover, authorities need to increase the levels of awareness among citizens with regard to the provided e-services. Finally, 4.4% of respondents had not used any kinds of e-services at all.

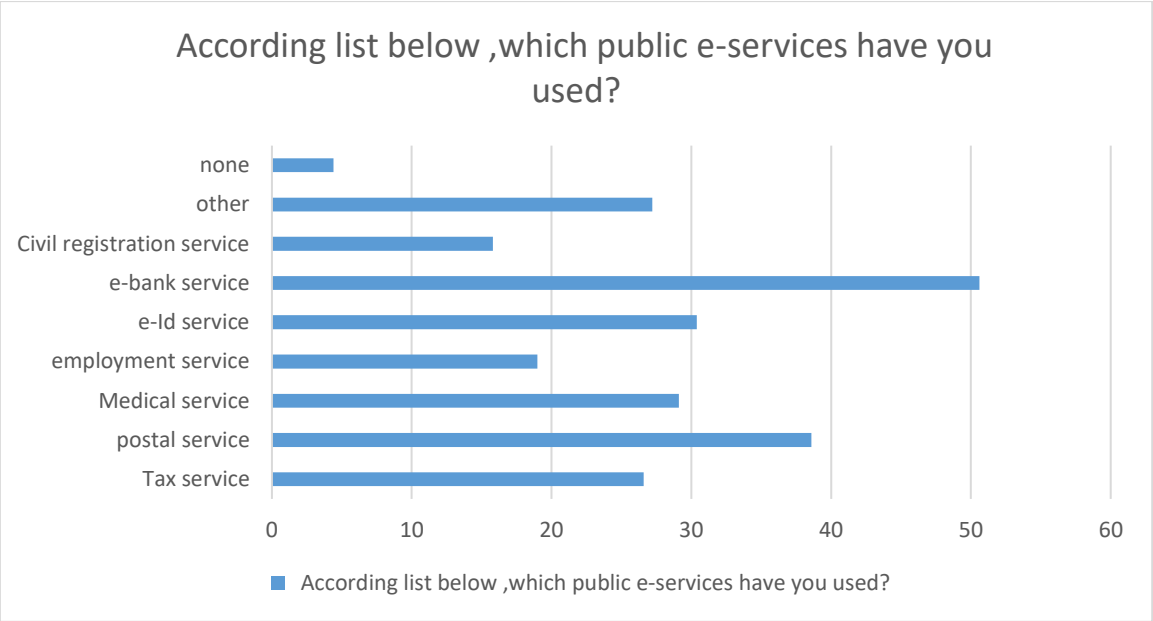

Figure 14. Answer to question 11

The next question (Figure 15) sought to identify from which channel respondents had access to electronic services. Accordingly, 63.9% of respondents preferred to use mobile apps to receive the provided services, whereas only 27.2% of respondents used the portals, and 6.3% of them had no tendency to use electronic governmental services.

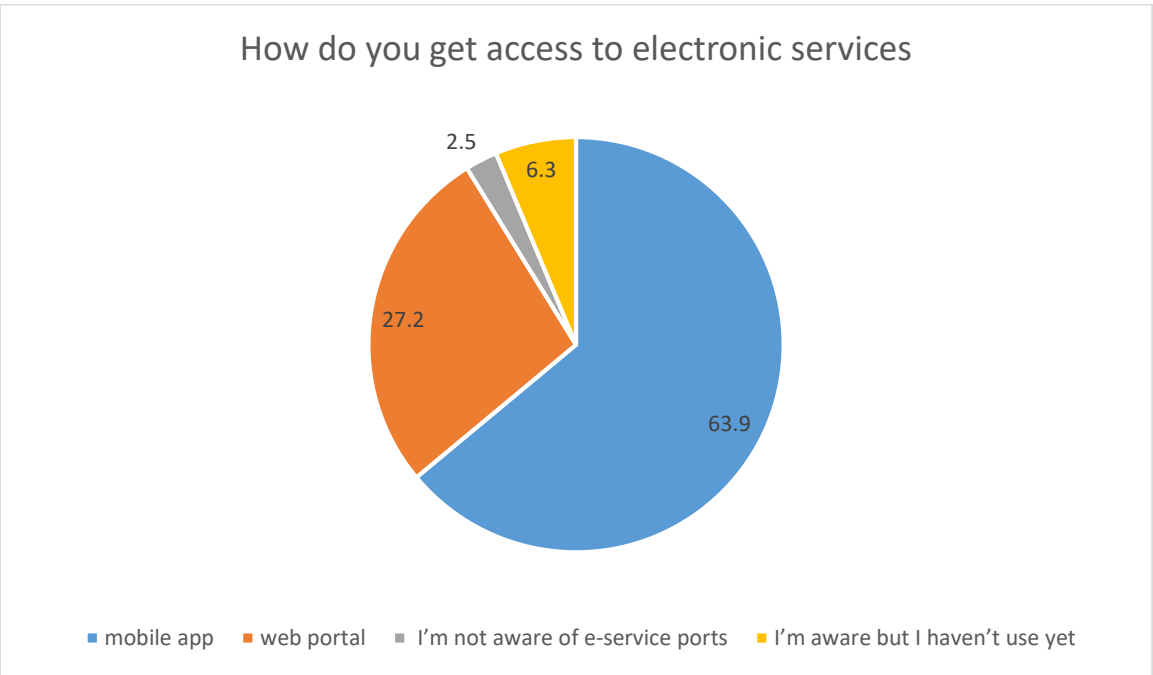

Figure 15. Answer to question 12

The next question was asked to measure the preferences of respondents for the replacement of traditional services with e-services. The chart shows that 82.3% of respondents were willing to use e-services, whereas 17.7% of them disagreed with replacement. These findings might be due to the complex bureaucracy in the traditional way of providing services as well as the maze of going from office to office which would make respondents more likely to use electronic services (Figure 16).

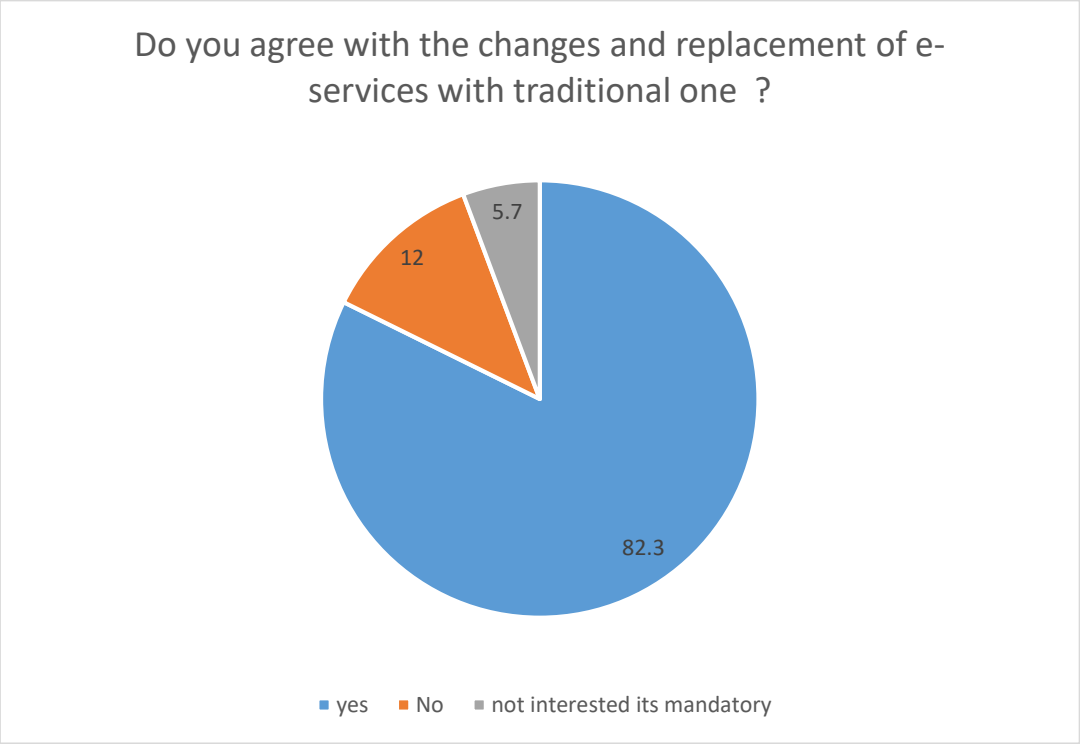

Figure 16. Answer to question 13

The next question (Figure 17) was intended to evaluate the provisions of delivered e-services by respondents. The chart indicates that 67.1% of respondents found e-services satisfactory, whereas 30.9% of respondents were not satisfied with the provided electronic services and considered them weak.

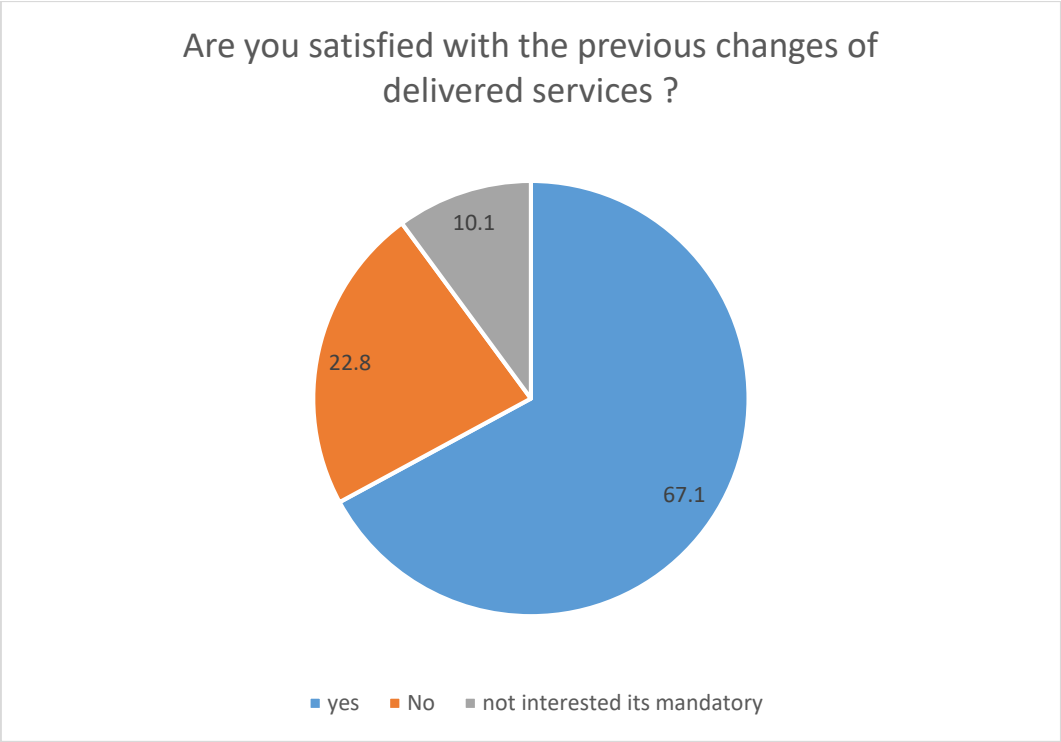

Figure 17 Answer to question 14

The next question pertained to the respondent experience with electronic services evaluated with respect to the information accuracy, completeness, and up-to-date data. According to the evaluation criteria (Disagree, Neutral, and Agree) in the chart (Figure 18), 45.6% of the respondents found the public e-services accurate and coordinated, whereas 24.1% of the respondents disagreed, 30.9% had no idea about the implemented services.

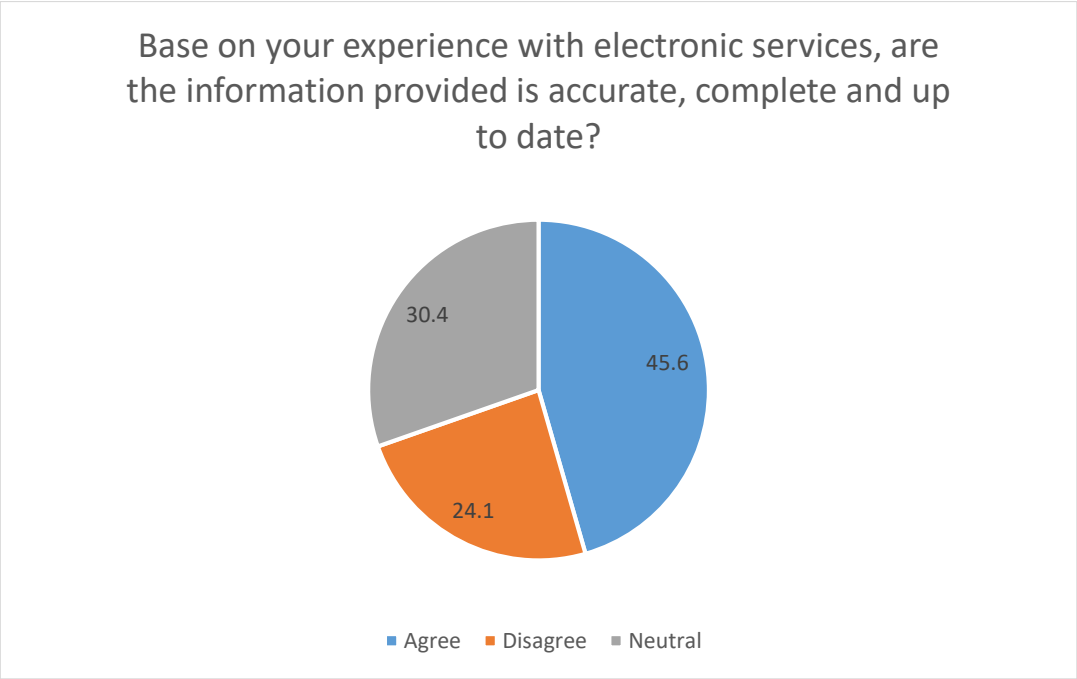

Figure 18. Answer to question 15

The next two questions aimed to measure the levels of trustworthiness of electronic public services among citizens by asking the preference of respondents to use services in person or electronically. According to (Figure 19), 74% of the respondents preferred to use online services, whereas 20.9% preferred to visit offices, and 4.4% had insufficient knowledge about how to use online services.

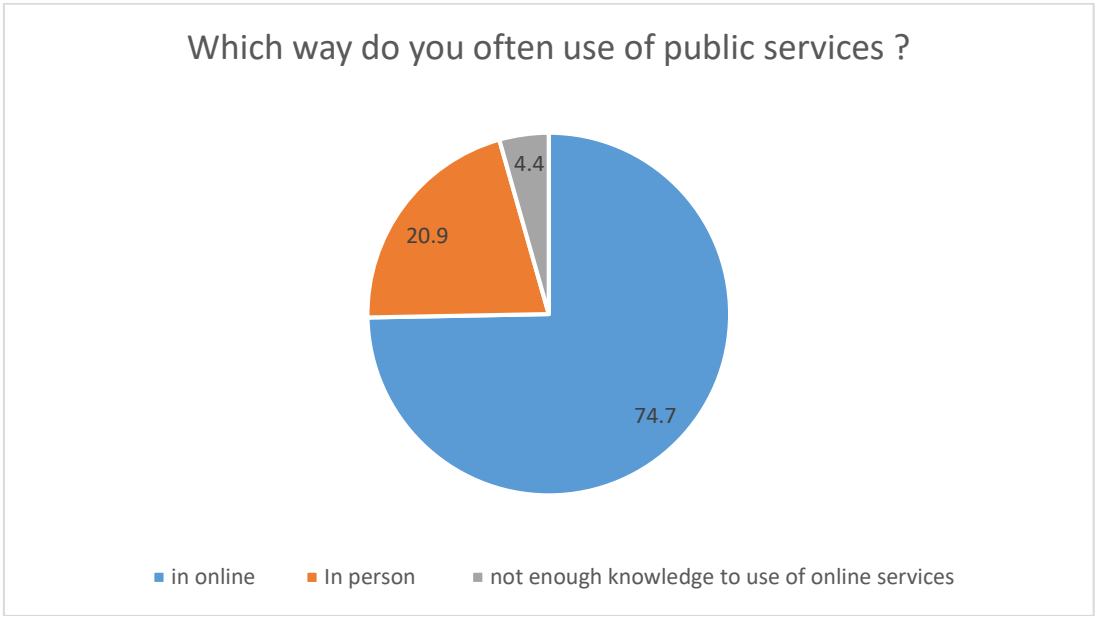

Figure 19. Answer to question 16

As discussed previously, in order to evaluate levels of confidence among respondents with regard to security and privacy of the delivered services, they were asked whether they trusted the security of their information in governmental portals/applications. According to (Figure 20), 62% of respondents were satisfied with the security of their information, whereas the rest of the respondents demonstrated no positive responses.

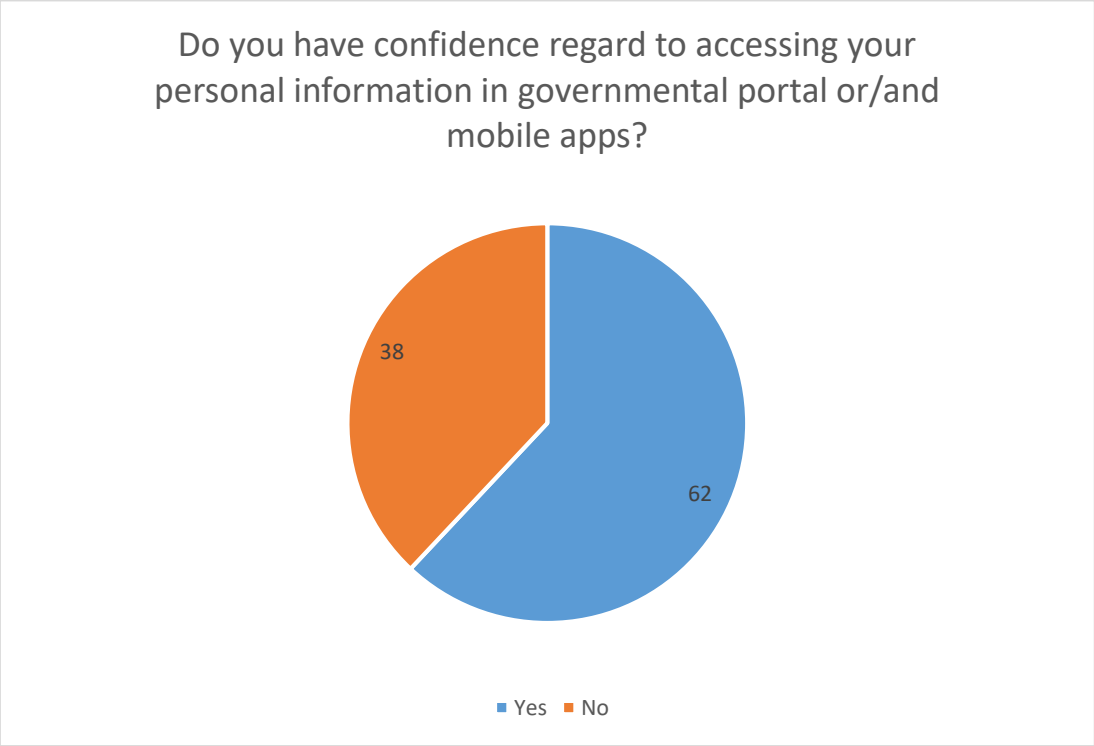

Figure 20. Answer to question 17

Regarding the last question, the respondents were asked to express their opinions on the advantages and disadvantages of implementing a novel e-service that would simplify the birth registration process.

The comments of respondents were summarized and coded in six different categories, i.e. information accuracy, security and confidentiality, awareness level, legislation problems, and benefits of the mentioned services. Based on these categories, the most important concern about the implementation of such e-services was the weaknesses of the required infrastructure such as the Internet access, speed, and coverage across the country as well as the insufficient performance of electronic governmental services. For instance, a respondent indicated that “The main issue is the speed of Internet connection and access to personal data in governmental portals” and “the provided services need to be upgraded

and optimized because e-government systems are not only integrated even they are very weak and inefficient". The other point which was mentioned most by responders concerned the accuracy of information and level of awareness about electronic services among citizens mostly in rural areas. According to comments, some of the responders believed that this kind of system would cause many problems such as "the failure to enter the required information correctly which it would be time-consuming and costly to enter accurate information". Regarding to awareness, most of them believed that those who are not literate enough or lacked sufficient knowledge about e-services would usually face problems. Moreover, the next barriers emphasized by respondents concerned the security and legislative problems. Accordingly, they stated that "there should be higher levels of protection for access to personal information than ever before". Moreover, "obtaining birth certificates for illegal children" was another problem which could exacerbate the process. Regarding the benefits of providing e-birth registration system, the responders indicated that "such system could reduce the face-to-face visits to obtain certificates and as a result it would save time and resources, and eliminates long queues".

6.2 Summary

This survey of Iranian citizens was based on five dimensions with 19 sub-criteria, i.e. demographics, levels of awareness of citizens, interest of citizens in governmental portals, levels of satisfaction of citizens based on changes, and levels of trust. The analysis of the survey illustrates that approximately 90% of respondents were aged 20–40 years old and that they mostly had higher education degrees. Therefore, most of the respondents were at least able to use online services. Although a high usage rate of the Internet was estimated at nearly 97% on a daily basis, the significant Internet usage belonged social media and Web surfing. However, the public/private online service usage accounted for 10% on a daily basis, and only 42% of respondents confirmed that they were using e-services regularly. Hence, it can be concluded that Iranian citizens are not familiar with the advantages of online services, also on the other hand answering the sixteenth question, large number of responders admitted that they preferred to use online services; however the responses to another question indicated that they usually spent time in queues to access governmental services in administrative offices. The other point which should be taken into consideration is that only less than half of responders were satisfied with the information accuracy and the use of up-to-date information in public e-services. As a

result, this demonstrates that a few citizens would be likely to use electronic services if they were sure about security, ease of use, availability of sufficient knowledge in the use of e-services, and information accuracy. Moreover, many of them commented on the Internet connection speed and quality of e-service platforms, something which means that there is high demand for the development of the primary infrastructure in the Iranian e-government system.

6.3 Interview Outcome

Four hospital employees from two different cities of Iran (Zanjan and Esfahan) were interviewed. They were working in the birth certificate issuance unit of hospitals. The interviews had to be conducted in order to determine what kind of problems and barriers were now on the way of birth certificate units in their interactions between the civil registration center and citizens as well as what primary criteria were needed to simplify the current birth certificate issuance service. It was also essential to determine what main problems might stem from the implementation of services electronically. As discussed in Chapter 5, new parents should take birth certificates from hospitals by providing their personal documents. In fact, it is the first step in issuing birth documents by the birth registration center. Therefore, this process is time-consuming and full of paperwork. In Estonia, if the child is born in a hospital, the child's birth certificate will be sent to the population register by the hospital, and then the application to register the birth of the child can be submitted to the e-population register or any local governments (Registration of birth and choosing a name, n.d.).

The first interview question asked what challenges were associated with the process of issuing a birth registry certificate in a hospital. The employee in Zanjan Province responded that legislation problems of married certificates made the process complicated. However, three other employees in Esfahan and Zanjan stated that people should sometimes stay in long queues to obtain a birth certificate. This would cause employees to enter inaccurate information in the certificate, whereas the point is that such a queue could spread infection right now in the COVID-19 pandemic.

The second question asked what recommendation the respondents might have for simplifying the registration process and reducing the current bureaucracy rate. All employees in hospitals suggested enabling the hospitals to access the integrated system

through the civil registration database to enter the initial birth information certificate with the possibility of checking the accuracy of data entered into the system in order to simplify the process.

The third question concerned what the main barriers to the implementation of an integrated electronic birth registration system were at hospitals (IT specialist, financial cost, management, etc.). The employee in Zanjan Province stated that there was a lack of having primary infrastructure for the implementation of e-services. However, other employees indicated that it was first essential to provide financial supports to develop primary infrastructure and train employees as well as having IT specialists in hospitals.

The fourth question asked what primary infrastructure had to be provided in hospitals in order to implement electronic birth registration services. The second and third interviewed employees admitted access to high-speed Internet connection, 24-hour and regular support, accurate and comprehensive training, and employment of IT specialists in hospitals were among the prerequisites in addition to having a reliable integrated system. In addition to the mentioned factors, the fourth interviewed employee added that the system security should be high enough to prevent data leakage.

The fifth question concerned what interoperability problems could happen with the civil registration office. The first interviewed employee responded that a poor Internet connection and also errors in access to the database might cause some problems. In addition, the next employee stated that a system outage or the Internet speed disruption could be problematic. However, the third one stated that if the system performance was reliable and accurate, there would be no problem. Finally, the last interviewed employee emphasized that entering inaccurate information into the database could cause a problem for citizens in the process of obtaining birth documents, something which would cause dissatisfaction.

The sixth question asked what legislative problems might the implementation of electronic birth registration face. Two of the employees considered no legislation problems in the implementation of electronic birth registration. However, the third one stated that the type of marriage could cause difficulties. Finally, the last one stated that having a marriage certificate was important in applying for a birth certificate at hospitals.

Therefore, those who have no marriage documents might even refuse to obtain a birth child in hospitals.

6.4 Summary

According to the analysis of interview results, there are some difficulties in the current birth registration process. In order to make this service electronic, it necessary to overcome some primary obstacles. In the current system based to the first question in the previous chapter, parents sometimes have to stay in long queues to obtain their children's certificates in addition to undergoing all paperwork and time-consuming procedures. Moreover, employees sometimes provide inaccurate information in certificates. The other point indicated by all employees was the importance of providing an integrated system with the civil registration center to simplify the current process. Apart from all the difficulties in the current system, changing the whole process to an electronic system would need to provide the main infrastructure components such as IT specialists, high-speed Internet connection, employee training, and efficient platforms to have regular access to the database.

6.5 Technical Part: As-Is and To-Be Models

6.5.1 As-Is and To-Be Models

This subchapter is about modeling electronic services in the birth registration process. The importance of birth registration for citizens include registering a birth or death, applying for a copy of a birth certificate, getting married or divorced, or making arrangements for the funeral of a relative, and for governments generating vital statistics while others routinely use statistics on births and deaths in their role as health-service planners, relative administrates, policy-makers or demographers analyzing fertility and mortality statistics. (Schwarb, 2012)

According to the above description, providing an integrated and networked system could not only simplify the process for citizens, but also vital for governments to have timely and more accurate information to use for social and economic planning in key sectors such as identification, statistics, health, education, employment, and housing (Schwarb, 2012). Therefore, there is a serious demand to simplify the method of providing the

service by digitizing the processes with modern technology to cope with performing duties digitally which would keep costs down in utilizing the resources and also minimize employee's workload.

In this system, the main stakeholders include the Iranian Civil Status Registration Organization (governmental institute), a national online database for vital statistics center (National Organization for Civil Registration), local department and offices (registration district), Statistical Center of Iran, Ministry of Health, and Population Association of Iran and citizens. In this mechanism, Civil Status Registration Organization is responsible for Registry of the vital events such as birth, marriage, divorce and, death. (Centre, 2021)

Determining and confirming the identity and subsequent issuance of Identity Documents such as birth certificates and national ID for citizens, as well as issuing the changes in Identification information such as Name, Surname, and also processing and reporting the population immigration statistics. All the vital statistic documents issued are being automatically archived in National Organization for Civil Registration database. As mention above the other stakeholder in this process is hospitals they are connected to the online database and provide statistical departments with information's of vital events as well as providing birth certificates for citizens. In addition, in remote areas district governors, teachers, post officers, and local trustees across the country working as executive agents of governmental entities in their respective region which providing documents for all vital events occurring in their respective population to the nearest civil registration unit on a scheduled basis, and collect the issued birth certificate from the registration unit and hand over to citizens in remote areas.

6.5.2 As-Is Model for Iranian Birth Registration System

In this section, the As-Is model has illustrated the entire process of the birth registration system in Iran and particularly the process of obtaining birth certificates and birth documents by citizens. In this system, citizens have to obtain and bring the certificate from the hospital and then visit the registration office to apply for birth document. In this model, citizens waste their time by going through the complex bureaucracy.

BP starts from the moment that, the child is born in hospital/ maternity then the parent should take the certificate from the hospital with an ID card or resident permit by one of the parents. Also besides that hospital send the report to the National organization's civil

registration database. For the next step, parents bring the certificate to the civil registration office and fill out paperwork and make the payment to apply for the birth registration under some circumstances, as parents must be married and the announcement of birth registration should be done by the father or father's father. Then within 15 days one of the parents should visit the office again to collect their child's birth document. But the process for those who are living in remote/rural areas is a bit more time consuming, the BP start with the reports of birth by local trustees, district governors, teachers, or post officers in whole the country who are working as executive agents of governmental entities in their respective region to nearest local/office registration departments. Then they collect the reports and needed documents and send them to the governmental birth registration center. In this center after confirming the identity, the issuing the birth document takes place and send back to the respective regions local department office. At the last step again the birth document will be collected with local trustees, district governors, teachers, or post officers to hand over to parents which are living in rural areas (see Appendix 3).

6.5.3 To-Be Model for Iranian Birth Registration System

In this segment, it is suggested to develop a rather modernized and simplistic way for citizens to access birth registration service by taking into account how this service has implemented in developed countries such as Estonia. But in the suggested process for To-Be model, in reality, it would be hard to develop such a model as an e-service in the Iranian birth registration system.

In this regard, there are some factors which should be taken into consideration, there are a wide range of risks related to the stakeholders which are coordinated and involved in this system, at first step some legislation obstacles respect to implementing electronic services needed to be changed, level of awareness and trust among citizens should increase, and currently, governmental agencies do not have inter-organizational connections due to the absence of proper electronic network between them so reforming birth registration authority is needed.

Another challenge in the Iranian birth register system for the To-Be model is e-identification, it should mention that although for Iranian citizens e-ID cards has provided three primary uses of identification, authentication, and digital identity, in practice after

a decade of implementation, it doesn't fully work, so it's necessary to have a primary infrastructure for posing networked services, In fact, in realistic, usage of e-ID cards can benefit in providing a certificate in hospitals/maternities in an electronic way instead of bringing the certificate to public authority in person and fulfill the forms and documents.

The event in this model starts from the hospital, after the report that child is born, by utilizing e-ID cards users would be authenticated without providing previously needed documents (Marriage document, ID- document booklets) then further documents which are provided by doctor/midwife would be attached and submitted in Iranian Civil Registration Organization. Furthermore, it should mention for those who are living in a remote district or their birth child doesn't take place in the hospital, the starting event is when the parent logs into the portal via ID code, attaching a needed documents and, sign documents digitally. To continue, after submitting information in the portal and gets a confirmation that documentation is submitted successfully, the user should process the payment successfully and then wait for the issuance birth document. Eventually, the citizen gets a notification to check and confirm issued documents in the portal, they could collect the birth document in spot or via postal service and the events end.

Such a system could simplify the issuance of the birth certificate process, reduce the costs and time consumption for citizens, particularly those who are living in remote areas, and also could mitigate the administrative burden. This e-services has the potential to obtain accurate statistics of the birth rate in real-time, and improve in providing comprehensive information to other sectors. (see Appendix 4)

6.6 Discussion

The conducted survey and interviews in this thesis helped evaluate citizens' awareness and their tendencies to use governmental e-service as well as their perspective regarding the provision of e-birth registration services. The survey also addressed the obstacles in the current system and the main demands for providing e-services. In addition, studying the Estonian e-birth registration system could be the best practice to provide the necessary frameworks for the Iranian birth register system.

According to the results, the main challenges in the first step included providing the components of the primary infrastructure such as the high-speed Internet connection

without disruption, employing IT specialists in hospitals to deal with any technical issues, and also providing the technological infrastructure and the integrated system to enable authorities of hospitals and those of the national birth registration database to exchange information on a most secure and trackable platform. In fact, providing such e-service as explained in the previous chapter could be benefited even more for citizens that living in remote districts. In fact in this model no longer need local department and offices as well as local trustees as an intermediary organization. As a consequence, this could reduce the employee workloads. Another point is the current legislation problems in the current registration process. According to the final question in an interview, it is necessary to revise the type of marriage, parental nationalities, and also unmarried parents by considering changes due to their negative effects on the acquisition of birth documents.

Iranian respondents were partially aware of the theoretical e-governance process and were eager to use the alternative way of enhancing and easing their lives. However, some people, especially in rural areas, lack the necessary knowledge about e-services or have no access to the Internet connection. Therefore, meaningful steps should be taken to provide an efficient and effective way of delivering electronic services by authorities.

Another important point that needs to be discussed is identification with e-ID cards, as mentioned by interviewed employees, providing an integrated portal with a Civil Registration organization could simplify the process, so it can be said that e-ID and ID card readers are needed to facilitate this process and enable citizens to sign digital documents as a public e-service that is implemented in Estonia. In fact, as is explained in chapter 5 although the majority of Iranian citizen has received their e-ID cards, due to some reasons (e.g. mismanagement, lack of primary infrastructure, US sanction against Iran's government) in reality this project after a decade failed to achieve the planned goal.

Overall, these findings can provide useful information on different aspects of delivering e-governmental services that need to be enhanced. The findings also show how to make the most of e-service provisions in simplifying the process of implemented governmental services.

7 Recommendations and Conclusion

7.1 Conclusion

In general, the adoption of e-government can result in several aspects of governing between the government and citizens as well as the government and the private sector by decentralizing governmental data, increasing effectiveness and productivity, enhancing information transparency, improving citizen satisfaction, and reducing the complexity of service delivery and bureaucracy. As discussed earlier, the conditions of e-participation and e-government indices declined in Iran in 2020 as opposed to 2018. Despite all the efforts and strategies to improve e-government in Iran, achieving e-governance objectives has been complicated and is associated with several challenges.

This thesis aimed to determine how the Iranian government and citizens could benefit from the implementation of e-birth registration services. According to the research findings, replacing the traditional services with e-services increased public and citizen satisfaction by delivering high-quality public services and reducing the complicated bureaucratic process, in fact as it illustrated in the As-Is model in chapter 6 the current birth registration system are performing manually by citizens and several numbers of employees in a different organization to accomplish the issuance birth documents. So it can be seen that by transforming this service to an online way by providing a Civil Registration Platform, citizens will be able to submit as well as obtain needed documents in a fast and user-friendly, and also cost-efficient way. Furthermore, authorities would be ensured that data could be accessed, collected, and stored in a real-time framework (Rane, Mahanta, Islam, & Pratim, 2020). And also based on the interview and the survey in this thesis, the respondents emphasized that implementing e-services saved time and resources, removed long queues, and eliminated face-to-face visits (chapter 6.2). In continuing regard to the first sub-question, “what the challenges that governments and citizens might face while utilizing this service?” As explained according to (Seltsikasa & M O'Keefeb, 2010) in reality, the considerable costs of implementing e-governments do not match the estimated costs which could affect the transforming to new service, to be more precise this point has already happened as one of the main reasons that e-ID card project in Iranian public sector hasn’t accomplished successfully yet (karimi, 2020). The other point that was emphasized by responders in the survey was the weaknesses of the

required infrastructure such as Internet access, speed, and coverage across the country. And also regard to the level of citizen's awareness as one of the important factors in implementing e-services which could impact on principles of e-participations (H.S. Hassan, 2011) although the results of the survey showed that public awareness on e-governance utilizing is relatively high, their responses in open-end question indicated that the authorities need to improve the level of awareness among citizens more than before. Furthermore, the next barriers emphasized by respondents concerned the legislative problems, according to (Drobiazgiewicz, 2018) Implementing IT systems in government means more than just placing innovations in services, successful IT framework implementation, in addition, involves a comprehensive state strategy, the construction of relevant mechanisms, and also the proper regulations and legislation. As the interviewed employees indicated that in subchapter 6.3 currently having a marriage certificate important in applying for a birth certificate at hospitals Therefore, those who have no marriage documents might even refuse to obtain a birth child in hospitals. Regarding the second sub-question "What are the most important underlying factors to be considered when implementing the system?" As the research strategy posed in this study, analyzing Estonia practices in the implementation of e-birth services has taken into consideration as a positive approach. As it demonstrated in To-Bo model in subchapter 6.5.1 utilizing e-ID card in providing e-birth registration service in the integrated system have several advantages, including authenticating users via e-ID in hospitals which as a result citizens don't require to provide a needed document on a paper, and could log in to the portal personally and process desired service. Moreover, e-ID cards would enable them to sign documents digitally. But as discussed in sub-chapter 5.1 e-ID card doesn't fully work base on its designed features and as consequence, full e-service provision is not possible without operable e-ID cards in this process.

7.2 Recommendations

According to the results in Chapter 6, there were some important points prior to the implementation of implementing e-services that could affect the provision of electronic birth registration services. This section presents some recommendations based on the evaluation of findings as well as the Estonian e-birth registration system to demonstrate the potential of implementing e-birth registration services as well as demands and obstacles in providing the service in the Iranian civil registration system.

Recommendations for increasing public awareness and providing e-services such e-birth registration system are as follows:

- Providing well-functioning ICT infrastructure, include enabling e-ID card features as well as providing card readers at least in governmental agencies
- Providing another secure and safe authenticating methods like Mobile-ID to access e-service and digital signing
- Making an advocacy plan and raising the awareness of the electronic birth registration process
- Analyzing high demands for providing integrated systems in different sectors
- Guaranteeing the Internet connection coverage, especially in remote places
- Explaining the benefits of providing electronic services published on TV, radio, newspapers, and other media
- Developing a plan for explaining the process of providing electronic services in remote areas by training local trustees
- Developing programs to explain e-governance system in schools to familiarize students with IT and relevant provisions
- Providing high-speed Internet connections across Iran, especially in rural areas
- Establishing service delivery points in all provinces and remote places within the reach of population centers
- Ensuring that registration services are free of charge
- Training the staff and local authorities regarding e-service issuance
- Establishing certain protocols for the release of data to other ministries or to the public services
- Identifying possible incentive mechanisms
- Ensuring the security of personal data archive records

- Identifying the legation gaps affecting the provision of e-services

All these criteria cannot be applied instantly due to some factors such as financing and budgeting, the absence of IT specialists to develop the system, and also the lack of qualified and skilled decision-makers. At the same time, learning from other pioneering countries in employing novel technologies for governance could also help achieve measurable results in the future.

7.3 Implications for Future Research

This study aimed to analyze provisions in the implementation of e-birth registration services in the Iranian public sector and different aspects of its benefits as well as what key considerations should be given in order to provide it, which the important point in providing this e-service was relied on implementing an integrated platform that guaranteeing confidentiality and interoperability of the information. So in this regard, the author believed that besides all needed technological infrastructure for providing data-exchange layer such as X-road in Estonia, the necessary organizational and administrative factors in the Iranian public sector are needed to be addressed and analyzed in future works.

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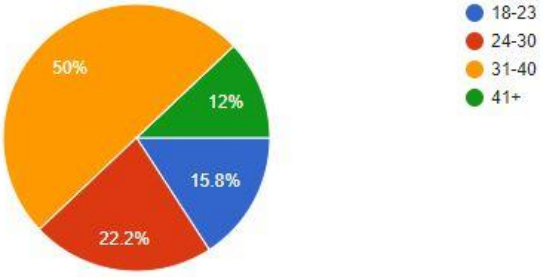
Appendix 1 – Survey for Citizens in Persian Language.

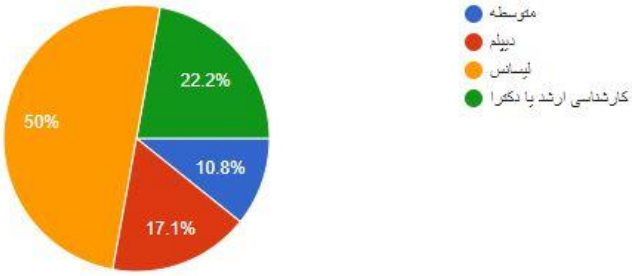
سن

158 responses



سطح تحصیلات

158 responses

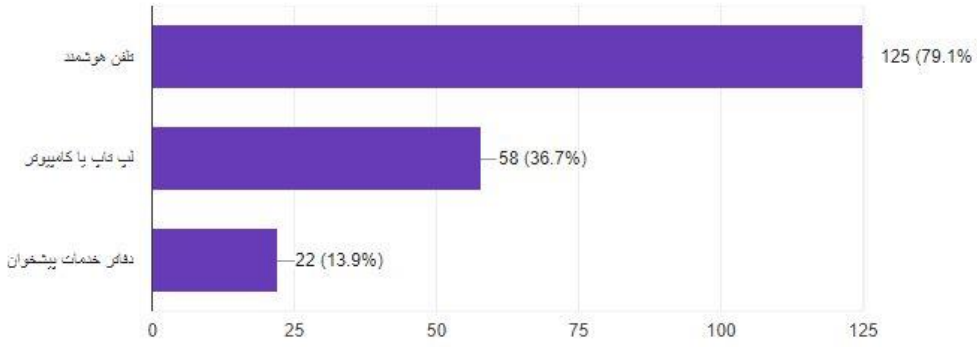


آیا همیشه به اینترنت دسترسی دارید ؟

158 responses

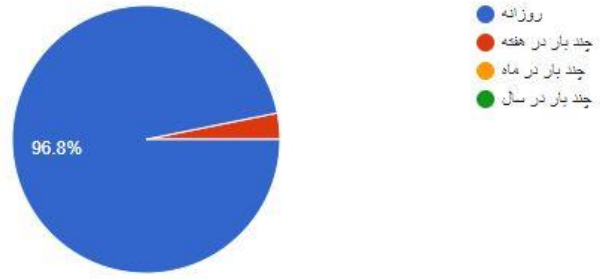
برای انجام خدمات دولتی/خصوصی ازکدام یک از موارد استفاده میکنید؟

158 responses



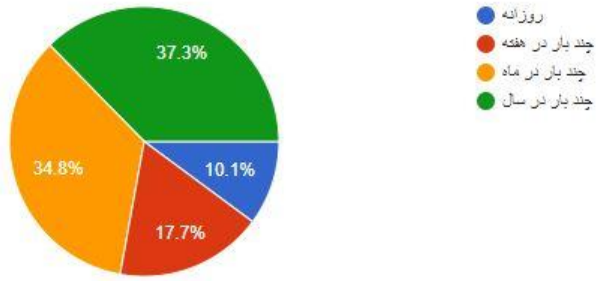
میزان استفاده شما از اینترنت چقدر است؟

158 responses



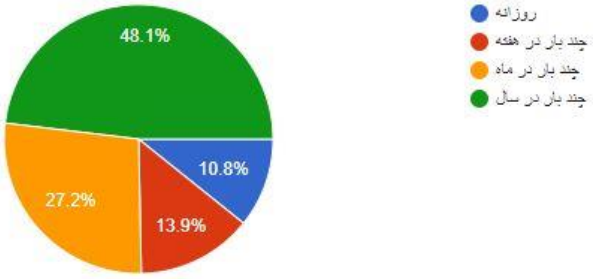
میزان استفاده شما از خدمات آنلاین دولتی چقدر است؟

158 responses



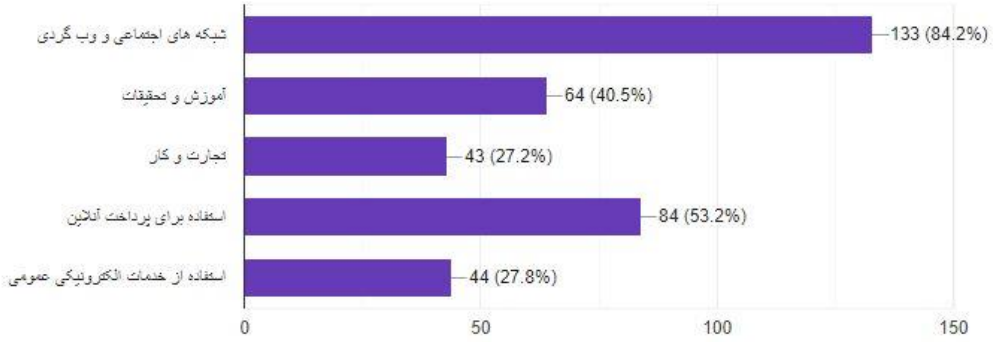
میزان استفاده شما از خدمات آنلاین شرکت های خصوصی چقدر است؟

158 responses



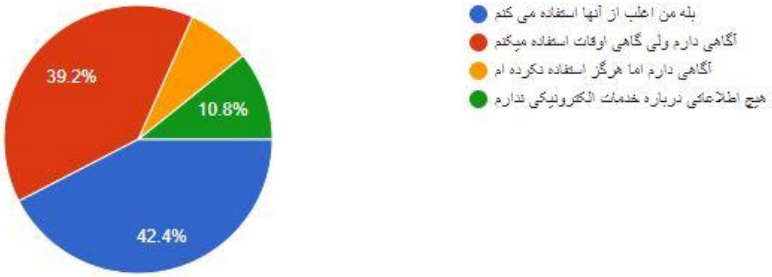
از طریق اینترنت از چه امکاناتی بیشترین استفاده می کنید؟

158 responses



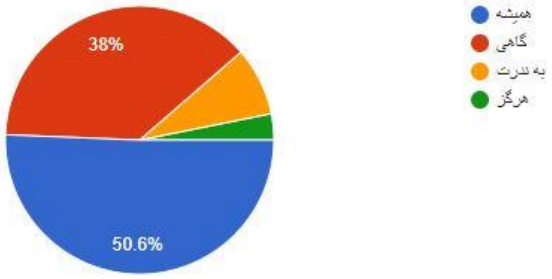
آیا با خدمات الکترونیکی ارائه شده توسط دولت آشنا هستید؟

158 responses



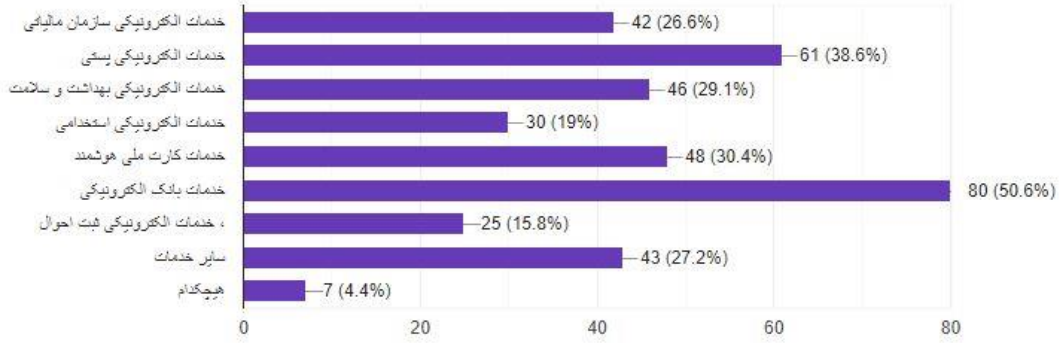
در صورت مراجعه حضوری برای خدمات دولتی نظیر خدمات پلیس +10 یا سازمان ثبت احوال آیا می بایست در صف منتظر بمانید؟

158 responses



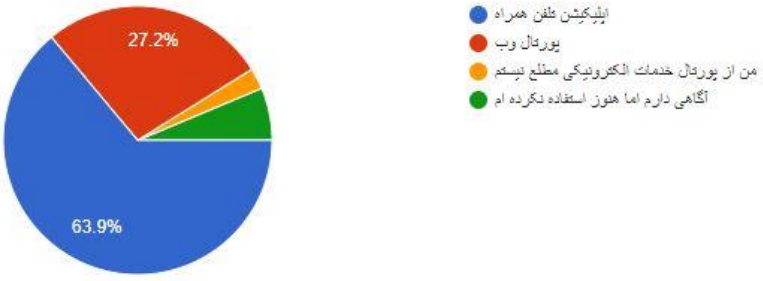
طبق لیست زیر ، تاکنون از کدام خدمات الکترونیکی عمومی استفاده کرده اید؟

158 responses



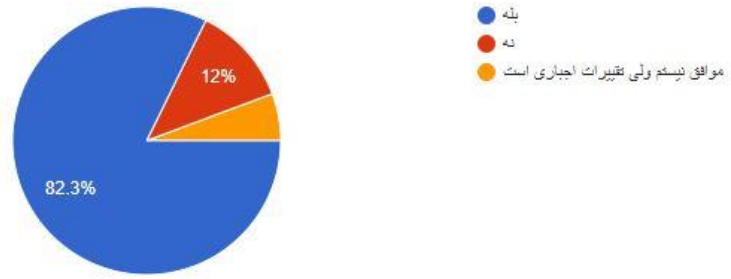
چگونه به خدمات الکترونیکی دسترسی پیدا می کنید؟

158 responses



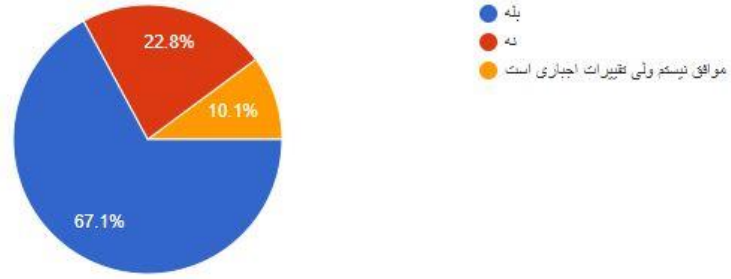
آیا با تغییرات و جایگزینی خدمات الکترونیکی با خدمات حضوری موافق هستید؟

158 responses



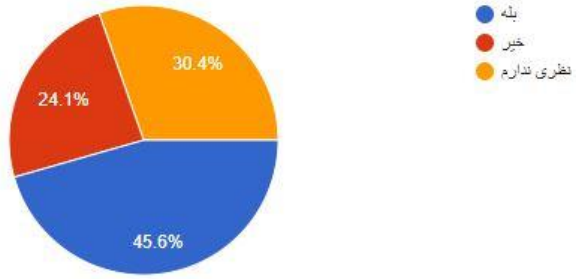
آیا ازجایگزینی خدمات ارائه شده به عنوان مثال خدمات کارت ملی هوشمند راضی هستید؟

158 responses



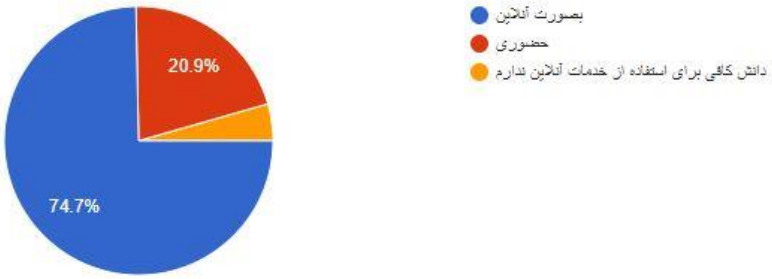
براساس تجربه خود از خدمات الکترونیکی ، آیا اطلاعات ارائه شده دقیق ، کامل و به روز هستند؟

158 responses



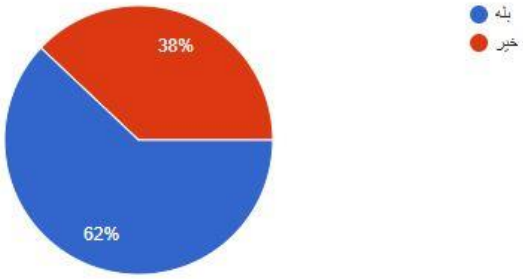
از چه روشی اغلب از خدمات عمومی استفاده می کنید؟

158 responses



آیا از لحاظ امنیتی از دسترسی به اطلاعات شخصی تان در پورتال دولتی و یا اپلیکیشن های تلفن همراه اطمینان می کنید؟

158 responses



در صورت اجرای سرویس الکترونیکی جدیدی که روند ثبت نام تولد نوزاد را سرعت ببخشد به گونه ای که والدین نیازی به گرفتن گواهی از بیمارستان و پر کردن فرم ها و مدارک مورد نیازدر ثبت احوال نداشته و فقط بعد از تولد برای گرفتن شناسنامه نوزاد به ثبت احوال مراجعه کنند , فکر می کنید در صورت پیاده سازی این سرویس در کنار مزایا ممکن است چه مشکلات و معایبی را برای شهروندان ایجاد کند؟

46 responses

کسانی که سواد کافی ندارند معمولا در شهرستانها یا دهستانها با مشکل مواجه میشوند و امکان خطا بسیار زیاد است حتی ممکن است برخی از ثبت اتولد به علل مختلف خودداری کنند!

دسترسی به اطلاعات شخصی و امنیت و حفاظت از اطلاعات

حفاظت از اطلاعات شخصی و محرمانه

عدم سطح آگاهی عده ای از مردم باعث سردرگمی آنها میشود

خیلی طرح خوبی هست، باعث صرفه جویی در زمان می شود.

اشتباه واردن کردن اطلاعات
زمان بر شدن درصورت عدم رسیدگی داصحیح

جعبه جا شدن اطلاعات یا خطای کاربران

تقلب یا اشتباهات سهوی ناشی از عدم اطلاعات کافی

لطفا اگر پیشنهاد و عقیده ای راجع بهبود یا تغییرات درباره خدمات الکترونیکی مرتبط با دولت دارید بیان کنید

34 responses

نظری ندارم

ارتقا سیستم ها و بهینه سازی آنها زیرا سیستم های دولت الکترونیک نه تنها یکپارچه نیستند بلکه بسیار ضعیف هستند و کارایی لازم را ندارند.

خیر

برقراری سرویس اینترنت پرسرعت و کاهش تعرفه اینترنت خانگی

بهبود سرعت و کیفیت اینترنت و آنتن دهی

درصورت پیاده سازی طرح و در نظر گرفتن تمامی پیامده های آن به نظر طرح جالب و مفیدی دررخصوص کاهش مراجعات حضوری می باشد

سرعت بالاتری داشته باشه

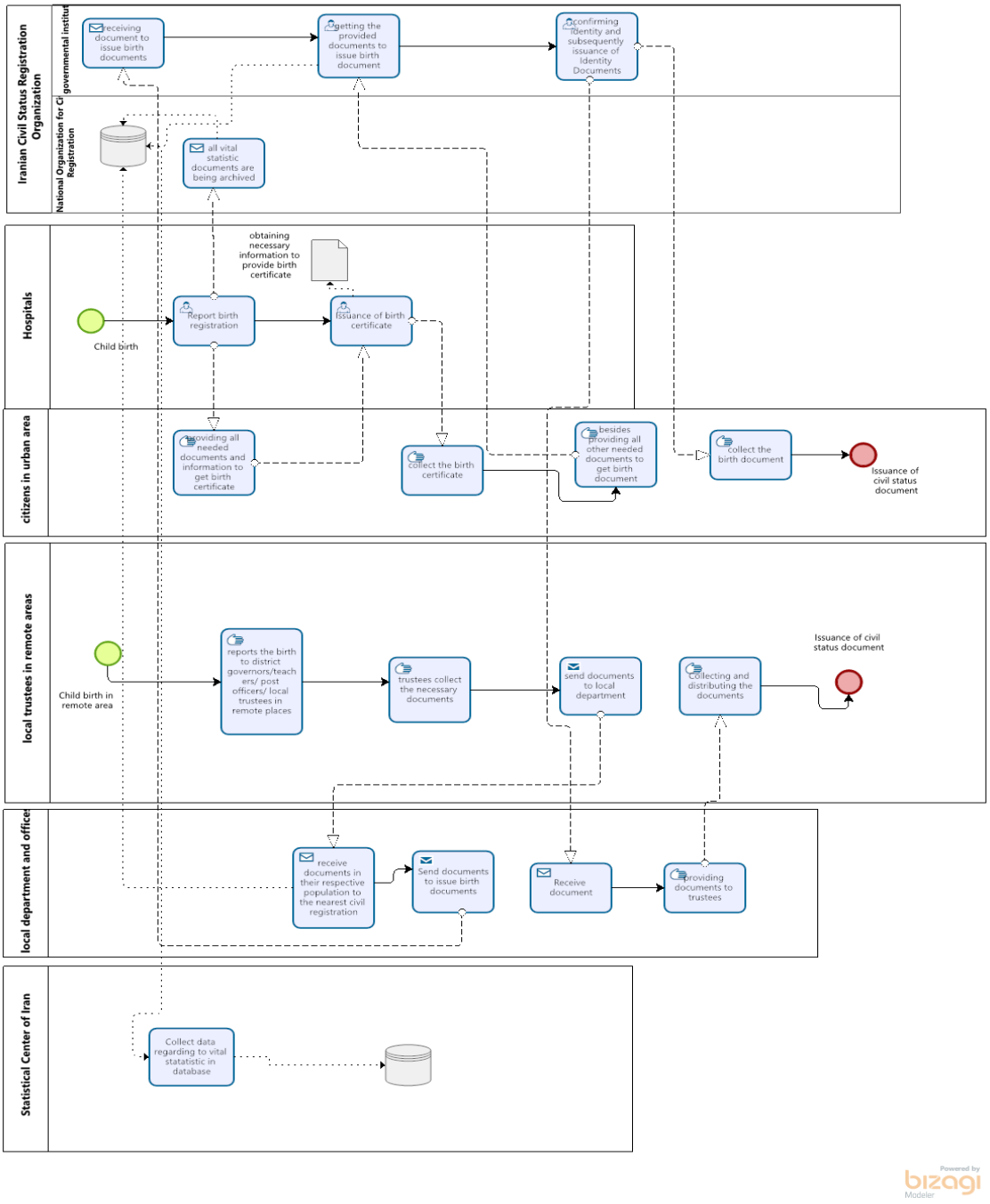
به نظر من اولین قدم ایجاد سواد رسانه‌ای بالا در میان مردم و فرهنگ سازی مناسب میان مردم و کارمندان اقدام موثری خواهد بود.

بالا بردن پرسنل
بشتیبانی آنلاین و پاسخ سریع و به موقع به تمامی سوالات

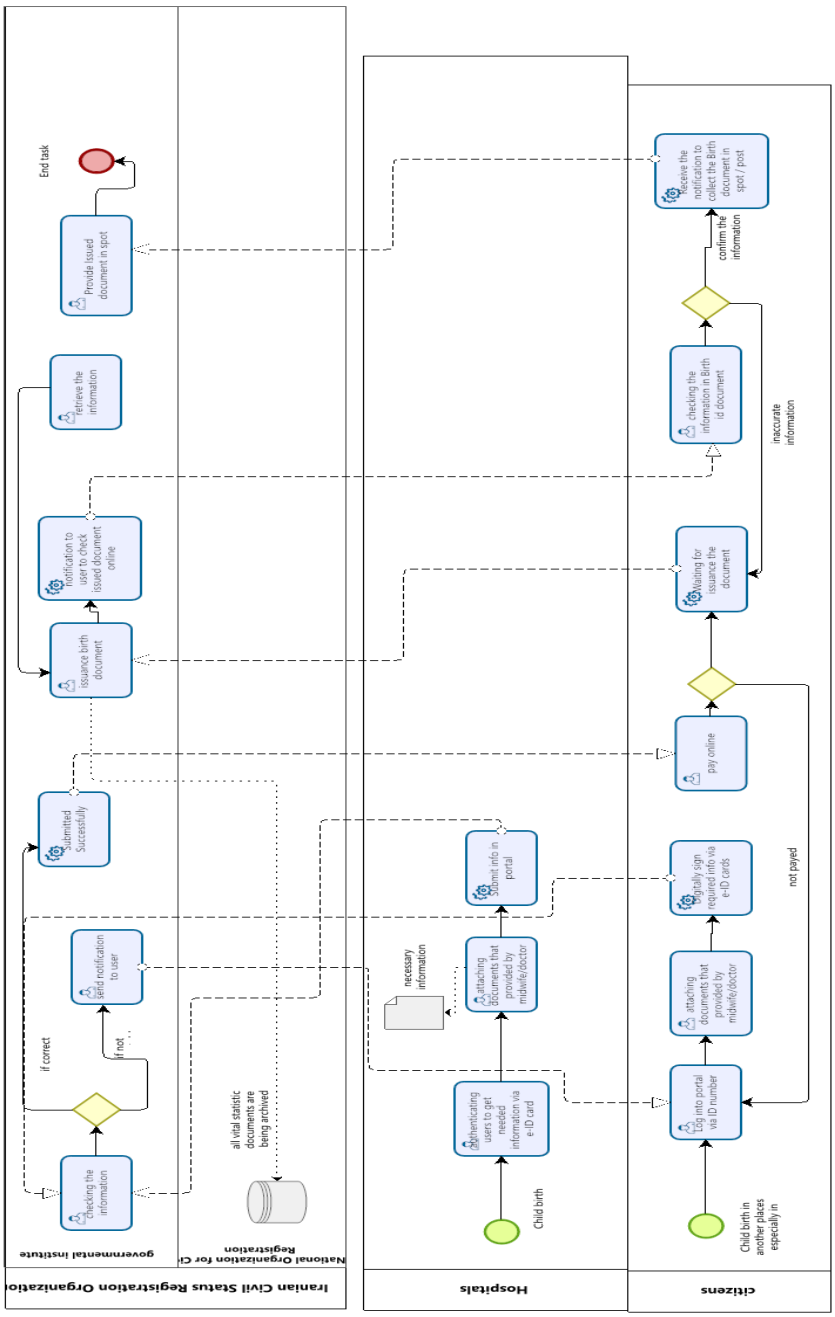
Appendix 2 – List of Interviews

1. Interview A – employee of Bahman Hospital in Zanjan - Audio Recording in WhatsApp, 14.03.2021
2. Interview B – employee of Zanjan province Hospital – Conducted via WhatsApp, 13.03.2021
3. Interview C – employee of Esfahan province Hospital - Audio Recording in WhatsApp, 16.03.2021
4. Interview D – employee of Esfahan province Hospital - Audio Recording in WhatsApp, 18.03.2021

Appendix 3 – As-Is Model for Iranian Birth Registration System



Appendix 4 – To-Be Model for Iranian Birth Registration System



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